Developing a nuanced understanding of the factors that influence digital inclusion for active and healthy ageing among older people

By:

Yuhua Wang

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The University of Sheffield
Faculty of Social Science
Information School

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ABSTRACT

Background: Older people have long been reported as being on the unfavourable side of the digital divide. Studies on the influencing factors have left contextual factors relatively underexplored. Meanwhile, research investigating informal digital skills learning among older people is scarce. This research aims to extend theoretical and empirical understanding of digital inclusion among older people.

Methodology: This research adopted a sequential mixed methods design with two studies. The first study applied a quantitative approach. Two sets of cross-sectional survey data obtained from a UK leading digital inclusion charity were analysed. The second study applied a qualitative approach. Twenty-seven semi-structured interviews with older people recruited from various forms of informal learning settings were conducted. Findings from these two studies were triangulated for confirmation and complementarity.

Findings: The digital divide among older people were very diversified, fragmented, and dynamic. The factors that influenced the participants' digital engagement were multi-faceted. Older people adopted a hybrid model of online-offline practice to strike a balance between digital inclusion and active and healthy ageing. Informal learning supported older people's digital engagement through forming bundles of daily practices such as *socialising* and *using the Internet* that was mutually sustaining.

Conclusion: This research revealed a digital minefield rather than a digital divide among older people. Older people's limited digital engagement in the digital minefield should be considered normal instead of an exceptional part of their daily living. Informal learning sessions should be developed as a *new infrastructure* for sustaining older people's digital inclusion. Influencing factors should not be addressed in isolation but studied in an ecological framework. Future studies could take an ethnographic approach to better develop practical measures.

Keywords

Digital divide, digital inclusion, informal learning, ageing, practice theory, sustainability

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GLOSSARY OF ACRONYMS

ICT	Information and Communication Technology
UTAUT2	Unified Theory of Acceptance and Use of Technology 2
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
AHA	Active and Healthy Ageing
LMW	Learn My Way
GTF	Good Things Foundation
GDPR	General Data Protection Regulation
MIS	Management Information System
SPSS	Statistical Package for the Social Sciences
HMRC	HM Revenue and Customs

A DIGITAL MINEFIELD

"It is like walking through a minefield. A minefield with unexpected problems."

—Fred, aged 73, an interview participant

CHAPTER 1 INTRODUCTION

1.1 OVERVIEW

The digital divide phenomenon was first observed in the 1990s when some people gained a relative advantage from having a computer over those who did not own one (Selwyn, 2004). Subsequently, with the development and broad application of information and communication technologies (ICTs) and the Internet, the digital divide concept has been expanded. This initial gap in access to computers is now regarded as a *first-level digital divide*, while the disparities in skills and use of ICTs and the Internet demarcate a *second-level digital divide* (Helsper, 2009; Selwyn, Gorard, Furlong, & Madden, 2003). Moreover, a *third-level digital divide* is defined by differentiated outcomes people receive from their digital engagement (Lutz, 2019; Robinson, 2015; Scheerder, Van Deursen, & Van Dijk, 2017). Meanwhile, a concept of *digital inclusion* was derived from the digital divide research to account for the policies and initiatives that aimed to close the 'divide'.

Older people have long been reported as being on the unfavourable side of the digital divide across these levels (Godfrey & Johnson, 2009; Seifert & Schelling, 2016). This association between the factor of 'age' and the extent of digital engagement was often regarded as the *grey digital divide* (Morris, Goodman, & Brading, 2007; Quan-Haase, Williams, Kicevski, Elueze, & Wellman, 2018). On top of this, studies have further identified a *fourth digital divide* among older people in sustained use of ICTs and the Internet, which is characterised by a gradual digital disengagement (Olphert & Damodaran, 2013; Sandhu, Damodaran, & Ramondt, 2013). With the acceleration of technological advancement, how to help older people to age well in a digital society has received more scholarly attention from both fields of the digital divide research and ageing-related study (Levy & Simonovsky, 2016; Zaidman & Tinker, 2016b). Studies have found a significant role of ICT training and digital skills learning in helping older people to not only sustain their digital engagement but also maintain an active ageing and independent lifestyle (Damodaran, Olphert, & Phipps, 2013; Rikard, Berkowsky, & Cotten, 2018; Tirado-Morueta, Rodríguez-Martín, Álvarez-Arregui, Ortíz-Sobrino, & Aguaded-Gómez, 2021). Yet, few studies on older people's digital inclusion in later life have integrated both perspectives from the digital divide research and ageing-related discourses (Tsatsou, 2021; Zaidman & Tinker, 2016b). Research investigating how and why older people maintain their level of digital inclusion through informal learning is scarce. In the meanwhile, existing literature on the influencing factors of digital inclusion among older people have largely prioritised the personal factors, at socio-demographic (e.g., gender, education), physical (e.g., declined mobility) or psychological dimensions (e.g., attitude, emotion), leaving the contextual factors relatively underexplored. Thus, an integrated approach that applies a holistic view is urgently needed to better understand the digital divide among older people, as well as how informal learning and support on ICTs and the Internet is related to sustained digital inclusion and active (and healthy) ageing. In other words, the digital divide among older people needs to be examined in the context of daily life.

This research aims to extend theoretical and empirical understanding of the day-to-day engagement with and maintenance of ICTs and the Internet among people aged 65 years and over. Viewed in its broader context of population ageing and digitalisation in the UK, this research spanned various active research fields, including digital society, social inequality, and active and healthy ageing. It also aligned with broad interests from charities and industries, the government, and the wider community to enhance digital inclusion and active and healthy ageing among older people.

In this chapter, the background to the research is explained in Section 1.2. Research aims, objectives, and research questions are set out in Section 1.3. The following Sections 1.4 and 1.5 continue with expounding the rationale for undertaking this research and assumptions behind it. Section 1.6 is devoted to the presentation of the structure of this thesis. Section 1.7 offers a conclusion for this chapter.

1.2 BACKGROUND TO THE RESEARCH

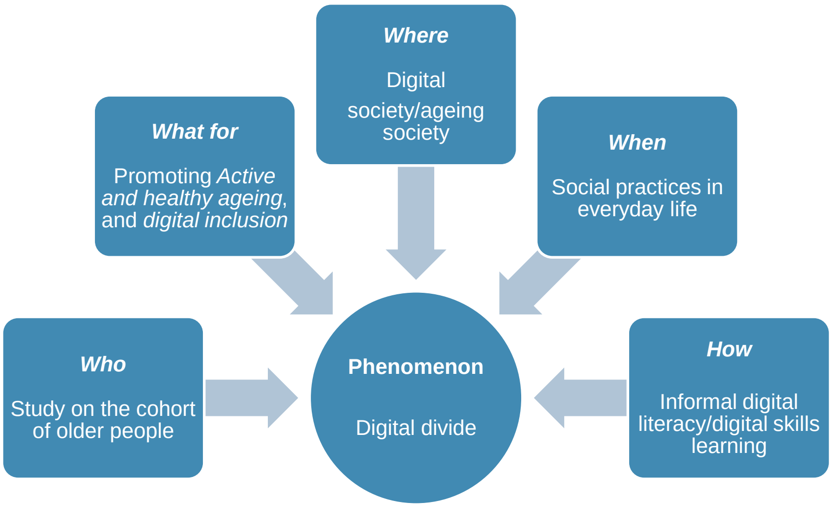
Population ageing and digitisation of products and services are two major trends that have swept across the UK and will continue throughout the decades to come. On the one hand, although the UK population ages at a slower rate than other countries, the challenges that the society faces are still significant. The cohort of older adults (aged 65 and over) comprises about 18% of the nation's entire population and is projected to grow to nearly 25% by 2050 (Office for National Statistics, 2017). Owing to the advancements in medicine, people live longer with a projection of the older-old age group (aged 85 and over) to more than double in the next two decades (Age UK, 2017). This dramatic demographic change will inevitably bring about pressures and profound implications across sectors and on multiple layers of our society. In response, initiatives such as ‘active and healthy ageing’ and ‘ageing in place’ were promoted to address the problems arising with population ageing (Peek et al., 2014; The Kings Fund, 2014, 2015). On the other hand, digital technologies, predominately the Internet, have permeated almost every aspect of our social life over the past decades. As a result, the UK government has put forward goals of ‘digital first’ and ‘digital by default’ to migrant services and resources to online platforms (Cabinet Office, 2010).

The use of ICTs and the Internet among older people aged 65 and over has steadily increased in the UK over the last decade from less than five million to over eight million. However, many of them use the Internet in a limited way (Age UK, 2018a). Despite this, there were still over 3.4 million people over the age of 65 who were not online by the end of 2020, with 83% of them have never been online and 17% who discontinued Internet use; they respectively accounted for 85% and 72% of the whole offline population of all ages (Office for National Statistics, 2021). In other words, older people take up a relatively large proportion of the entire population of limited users, discontinued users and non-users of the Internet (Yates et al., 2020). These data highlighted a clear gap between older and younger people regarding the level of digital inclusion (Hargittai, Piper, & Morris, 2018; Helsper, 2009; Matthews & Nazroo, 2015; Seifert & Schelling, 2016). A better understanding of the factors that hinder or facilitate older people’s digital inclusion is therefore of urgent need and strategic importance.

Meanwhile, as noted in Age UK’s (2018a) report, more and more everyday activities involve using ICTs and the Internet, making digital skills essential life skills. In this sense, the investigation of older people’s digital inclusion in this research went beyond a narrow concept of measuring use behaviours and direct digital outcomes. It grounded the ‘digital’ element in older people’s everyday lives and looked at its broader beneficial impact concerning their health and well-being.

As introduced in Section 1.1, this research aimed to extend both theoretical and empirical understanding of the social phenomenon of the digital divide among older people. A conceptual map is presented below in Figure 1-1 to give a better view of the background to this research.

Figure 1-1 Diagrammatic illustration of the conceptual map for this research



As illustrated in Figure 1-1, this research was primarily built upon an extensive body of theories and debates on the social phenomenon of the digital divide. In addition, five research areas and policy domains added a context to, and set a scope for, this research, namely:

- The research focused on the cohort of older people (i.e., the dimension of ‘who’ that defines the population under study);
- Ageing-related theories such as active and healthy ageing, as well as research on promoting digital inclusion (i.e., the dimension of ‘what for’ that explains the meaning of and expectation for becoming digitally included);
- Initiatives/policies on building a digital society, such as digital-by-default, while addressing the social impacts from an ageing population, such as ageing in place and age-friendly city (i.e., the dimension of ‘where’ that presents the broader social context that this study is situated within);
- Social theories of everyday life practices (i.e., the dimension of ‘when’ that depicts the embeddedness of digital technologies in daily activities);
- The practical programmes of informal digital skills learning (i.e., the dimension of ‘how’ that describes the measures to address the digital divide).

Although progress has been made in bridging gaps at the first two levels of the digital divide in the UK, they remain inhibitors to digital inclusion among older people (Age UK, 2021b; Office for National Statistics, 2021). The digital divide in the third level and disparities in continuous digital engagement (i.e., the fourth digital divide), meanwhile, have become gradually recognised to be particularly common amongst the older population (Van Deursen & Helsper, 2015b). Thus, problems that underlie these more complex mixes of 'divides' needed to be addressed, not only to help older people gain access to the devices and make use of them but also to enable them to remain socially connected and live an active and healthy later life in the digital age. That is to say; this research needed to approach digital inequalities among older people from an integrated view as much as studying them in isolated layers. Again, this stressed the importance of placing this research in the natural setting of everyday life. All these conceptual layers and dimensions are blended into older people's daily routines. It also called for a creative and inclusive methodological strategy such as the mixed methodology this research adopted to accommodate and benefit from different perspectives (i.e., integrated vs layered).

The digital divide is a real, practical concern as much as a theoretical debate. As mentioned in the previous Section 1.1, digital inclusion initiatives and policies were derived from the concept of the digital divide to address its practical implications. Accordingly, a wide range of informal digital skills learning programmes was developed to facilitate digital inclusion initiatives by promoting digital literacy among older people (Good Things Foundation, 2016). The development of digital skills training programmes aligned with other initiatives for building a resilient digital society and age-friendly smart cities (Golant, 2017).

Hence, this research reached out to the practitioners in the digital inclusion sector at its inception and linked up with the Good Things Foundation, a leading UK digital inclusion charity based in Sheffield. This research, therefore, gained access to two cross-sectional surveys on the learners of Learn My Way (LMW), a platform that promotes digital skills learning. In addition, this research connected with the Online Centres Network (2021) that include more than 5,000 digital skills training organisations.

1.3 RESEARCH QUESTIONS

1.3.1 Aim and objectives

By placing the analysis of the digital divide in a wider social context, this research aims to develop a better understanding of the factors that influence older people's sustained use of ICTs and the beneficial outcomes they gain from day-to-day digital maintenance and participation. This aim of gaining a *better understanding* of the influencing factors (i.e., understanding what the factors are and how they exert an influence) necessitates evaluating the digital divide phenomenon (i.e., to understand the inequalities) from triangulating multiple theoretical perspectives. It also calls for a reflection on the meaning of *beneficial outcomes* concerning digital inclusion initiatives and active and healthy ageing (i.e., to understand what digital participation is for).

More specifically, the research objectives are:

1) To understand the landscape of older people's digital inclusion and digital activities.
2) To explore the circumstances behind the patterns of digital participation (e.g., continuing, dropping out, expanding).
3) To identify and elicit the factors that influence older people's digital engagement.
4) To explore the impacts of informal learning and support networks on sustaining older people's digital inclusion for active and healthy ageing.

1.3.2 Research questions

The overarching research question is set as:

> *Why does the digital divide take place and develop among older people and how do older people sustain their use of ICTs and the Internet through informal learning for an active and healthy later life?*

It is then developed into the following secondary research questions:

- RQ1: What is the landscape of the digital divide among those older people who engaged in the informal learning of digital skills?

- RQ2: How does the informal learning of digital skills address the digital divide among older people?

- RQ3: Does sustaining digital inclusion contribute to an active and healthy ageing for older people? If yes, how? If not, why?

To better contextualise the research questions, the concept of 'informal learning' is discussed and defined here for clarity.

In this research, informal learning is distinguished from formal learning based on the dynamics of the session being delivered. Formal learning tends to be teacher-directed, characterised by structured sessions/timetabling and clearly defined learning objectives (Eshach, 2007). It is usually run in a short-term and repeated periodically, with a potential to lead towards qualification/certification for use in the labour market (e.g., certain skills or trainings required by employers) (Cedefop, 2014). Thus, learners often 'graduate' from such formal learning sessions once they meet a set of learning outcomes. Being teacher-directed in nature, these learning outcomes are pre-defined by the teachers rather than the learners (Nygren, Nissinen, Hämäläinen, & De Wever, 2019).

In contrast, informal learning is defined as the type of learning that is learner-directed and symbolised by a casual and situated learning approach to meet the learner's emerging and changing daily needs (e.g., for personal interest, to use services that moved online). Therefore, informal learning has no pre-set timeframe (being casual), nor predetermined learning activities (being emergent and dynamic) (Eshach, 2007; MacKean & Abbott-Chapman, 2011; Nygren et al., 2019). With the learners being the judge of their own learning outcomes, learners who engage in informal learning may change, repeat, and extend their learning processes based on their needs and level of satisfaction. Informal learning thus forms an important part of lifelong learning (Hager, 2001), especially among older people in retirement (MacKean & Abbott-Chapman, 2011). Like formal learning, informal learning is sensitive to and subject to the timeframe of support provision. For example, although older people may intend to continuously engage in an informal learning session at their local community, they may be 'forced' to discontinue once the volunteers or the facilitating environment is removed. It is worth noting that using structured learning materials in a learning session does not necessarily make it formal learning. It is not uncommon to observe structured learning materials/handouts in an informal learning session (see examples in Sections 4.3 and 5.6). The 'structure' that demarcates a formal learning lies with the course delivery model but not the contents; it is informal as long as the learning process and activities are casual, and learner directed.

This definition lays a foundation for an understanding of the LMW data used and analysed in Chapter 4 (see Section 4.3.2).

1.4 RATIONALE FOR UNDERTAKING THIS RESEARCH

The advancements achieved in the science domain over the past decades, primarily in medicine and technology, are well received and reflected in the growing proportion of and the increasing life expectancy for older people. They, however, also put forward greater challenges to the social sphere, bringing about higher and more complex demands on health and social services that society needs to accommodate (Shergold, Lyons, & Hubers, 2015). Meanwhile, as the digital technologies penetrated through almost all segments in the social system, thereby also in people's daily lives, it becomes more of a 'must' than a 'need' for citizens living in the system to gain enough digital skills and seize digital opportunities (Wu & Liu, 2013). Helsper (2008) noted that Dutton (2006) and his colleagues regarded digital technologies as part of the infrastructure supporting people's daily lives. The 'real world' is thus more and more difficult to separate from the 'digital world'. Although there were plenty of discourses organised around digital inclusion and population ageing, respectively, there has been a lack of research on the third-level divide among older people from a dynamic perspective (Gonzales, 2015; Olphert & Damodaran, 2013; Scheerder et al., 2017; Van Deursen & Van Dijk, 2019).

There has been an increasing amount of discourses concerning under-researched dimensions of the 'digital divide' in recent years (Siren & Knudsen, 2016). The field of digital divide research has made a shift from classifying the population into dichotomous groups of 'users' and 'non-users' towards a more comprehensive consideration of the disparities within and across groups. For example, in a study conducted in the Netherlands on a large sample of older people (n=1418), elderly Internet users were clustered into four subgroups based on their differing online behaviours: practical users, minimisers, maximisers and social users (Van Boekel, Peek, & Luijkx, 2017). This finding implies a rejection of a one-size-fits-all approach for the promotion of digital inclusion. Instead, it champions a more nuanced approach in policymaking to address the digital divide. There is also an urgency to identify latent factors from the context that influence older people's interest, motivation and trust in digital use and engagement (Yusif, Soar, & Hafeez-Baig, 2016).

Most studies on older people's digital inclusion have been limited in scope by either discussing different types of devices (e.g., focus on the use of tablets) or purposes of use (e.g., for health information searching and management). In contrast, few studies have set the scope to an open system like everyday life and drawn upon social theories of practice to unravel the orders from the messiness of daily activities (Cox, 2013; Olsson, Samuelsson, & Viscovi, 2019b; Tan & Chan, 2018). There is a need to understand how older people sustain their use of the Internet and carry out technology maintenance in everyday life.

Thus, this research topic entails a systematic approach to address the complex digital divide phenomenon holistically. So far, most of the existing research adopted a single-method approach, which inherently narrowed findings to a single perspective that was hard to compare with those of others from apparently different studies (e.g., qualitative findings vs quantitative findings). The phenomenon under research is rather complex and needs a mixed-methodology to develop more comprehensive understandings and comparable findings within a single research project (Peek et al., 2014).

1.5 ASSUMPTIONS

This section presents the assumptions that underlie this research. Firstly, digital inclusion and the idea of being included in a particular social network is considered a relative concept. It is dynamic, time-dependent, and contextual. Under different value systems and beliefs, and for different demographic groups, there are differing understandings of where the boundary of 'inclusion' is drawn. For the cohort of older people, the value of digital inclusion research lies in its potential to drive for a better way of ageing (Goraya & Light, 2011). Digital participation, however, also has negative implications on people's daily life and general wellbeing. This 'dark side' of Internet use has rarely been mentioned in digital inclusion studies on older people. In contrast, there is overwhelming evidence suggesting that the Internet can be problematic for younger generations (Mei, Yau, Chai, Guo, & Potenza, 2016). This research thus assumes that there could be adverse effects of digital inclusion on older people's health and wellbeing. This assumption underpins a critical reflection on the value of digital inclusion and the relationship between *digital inclusion* and *active and healthy ageing*.

Secondly, lifelong learning has been increasingly recognised as an essential part of active and healthy ageing (Narushima, Liu, & Diestelkamp, 2018b). Meanwhile, learning how to interact with digital technologies has become an indispensable part for older people to adapt to the increasingly digitalised society (Martínez-Alcalá et al., 2018). There is a range of formal training to teach older people digital skills (Mitzner et al., 2010; Zaidman & Tinker, 2016a). Nevertheless, this research is built on the assumption that older people primarily learn digital literacy and digital skills from informal learning contexts such as home, social events and informal learning sessions (e.g., those provided by organisations from the Online Centres Network). This is because formal training is usually structured and run in the short term. In contrast, informal learnings are often more casual, learner-directed, and lasting (as a part of lifelong learning).

1.6 THESIS STRUCTURE

This thesis consists of seven chapters. This introductory chapter presents an overview of this research background, states the research questions, and justifies the rationale behind the defined research scope. Chapter 2 is dedicated to a literature review on the related research fields identified in Figure 1-1. The literature review process is introduced first, followed by detailed discussions on the findings from the extant literature. A synthesis of the findings is presented before the research gaps are articulated. In Chapter 3, the research methodology and its philosophical underpinning based on a broad concept of Critical Realism are examined. The design of a mixed methodology approach is outlined, and the methods adopted in the quantitative and qualitative phases of this research are justified. Chapter 4 reports how the quantitative study was carried out, followed by presenting findings from data analysis on two survey datasets. Accordingly, Chapter 5 presents how the qualitative data were collected through semi-structured interviews and the themes and findings that emerged from template analysis on the interview transcripts. Chapter 6 compares and discusses the findings from both studies through triangulating between methods and theoretical lenses. Chapter 7 concludes the findings from this thesis that address the research questions presented in Chapter 1. Contribution to knowledge and implications on practice and policy are presented. The research limitations are also examined, and directions for future research pointed out to conclude this thesis.

1.7 CONCLUSION

This chapter provided a brief introduction to the proposed research, introduced the background to it, described this research's strategic importance, and after that explained in detail the rationale for undertaking it. It provided the research aim and objectives and some underlying assumptions. The next chapter presents a literature review on previous research in the identified field of study.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

The previous chapter introduced the research background, and the importance and rationale for researching it were explained. Research aims and objectives were given, and the underlying assumptions were discussed. In this chapter, by reviewing the extant literature, the concepts introduced in Chapter 1 are explored in-depth. It contributes to an understanding of the knowledge in this topic area and how the debates and relevant theories, models, and practices have evolved and become intertwined over time, setting the context and foundation for this particular research. Research gaps are thereafter identified, corresponding to the research questions stated in Section 1.3.2.

This chapter is organised as follows: After the brief introduction in this section, Section 2.1 presents the search strategy. Section 2.3 discusses the conceptualisation of relevant concepts separately, with an emphasis on ‘digital inclusion’. The following sections go from abstract concepts to concrete theories and related studies. They are discussed through the lenses of ‘what’, ‘who’ and when’, and ‘why and how’ concerning different aspects of the digital divide among older people, which are then elaborated in Section 2.4, Section 2.5, and Section 2.6, respectively. Section 2.7 provides a synthesis of the literature reviewed and specifies the gaps. Section 2.8 concludes this chapter and introduces the next.

2.2 SEARCH STRATEGY

This research adopted a strategy of four consecutive stages iteratively. In other words, although search strategy was classified into different stages based on differing aims at each phase, the processes in earlier stages were revisited whenever necessary to allow for reflexivity and update. This structure enabled the researcher to adapt to situations where, for example, social theories of practice were considered to be of relevance to the study as the qualitative study rolled out. The stages are described in Table 2-1.

Table 2-1 Illustration of search strategy by stages

Stage	Search process	Aim
1	• Identify platform and key databases • Identify groups of search terms • Repeated search on different platforms and databases	To scope the research area and to gain an understanding of the landscape and direction of current research, as well as brief historical developments of themes
2	• Select representative papers from the first stage • Identify key authors and seminal publications	To understand key definitions, concepts, theories and models, and contentions in the researched area
3	• Backward citation search • Identify synonyms, antonyms, and acronyms • Execute refined keyword searching	To find relevant research and expand the reading within defined areas through snowballing
4	• Forward citation search • Database search alerts	To keep updated with new relevant research in this field

In stage 1, eight databases were first identified in the first round[1], including Web of Science, Scopus, Emerald Insight, CINAHL, psycINFO, MEDLINE, Science Direct and ASSIA. In addition, searches were also executed on the university library catalogue Starplus and Google Scholar for more inclusive results. Secondly, search phrases and terms were articulated and classified, including "digital inclusion" group, "older people" group and "ageing" group. A complete list of search term groups can be found in Appendix 1. Thirdly, Boolean operators were used to retrieve the most relevant returns from the databases. The first-round search generated in total 3555[2] results. As the research progressed, the pool of databases was refined. Web of Science, Emerald Insight, and Science Direct were found to have generated more relevant search results and were used to search for up-to-date publications at later phases of this research.

Stage 2 was a convergent phase that planned to select the most representative papers to quickly understand the research landscape. Duplicates were removed, after which 15 papers were selected for first-round reading based on the following set of inclusion

[1] The first round of literature search was carried out at the planning stage between 2016-2017, prior to data collection and analysis.
[2] Web of Science 353, CINAHL 11, PsycINFO 587, Scopus 158, Emerald Insight 551, ASSIA 29, Science Direct 386, Medline via PubMed 568.

criteria: most relevant work; most recent work; most comprehensive review paper (especially systematic review papers); and those with distinctive methodological approaches. This stage was revisited whenever a new platform or potential research area of relevance was identified when new findings from later phases of this research emerged.

Stage 3 and Stage 4 were executed as a snowballing method to keep the research up to date. They were repeated during this research to locate new publications that have cited the key publications and authors. For example, Hargittai's (2002) *Second-Level Digital Divide: Differences in People's Online Skills* is a key publication in the digital divide research. Regular searches were made to identify new publications that cited this article.

In addition, as this research intended to link theory and practice, a wide variety of reports, policies, and official statistics from the public, third and private sectors were also reviewed. Apart from those from the public sector, reports shared by the following organisations were also regarded as of high relevance and high authority: Office for National Statistics, Ofcom, Good Things Foundation, Centre for Ageing Better, and Age UK. The official websites from these organisations were visited periodically to obtain new statistics and reports from the industry.

2.3 INTRODUCING THE CONCEPTS

2.3.1 Digital inclusion and digital divide

In the UK, 'digital inclusion' has become a main initiative since the government proposed a revolutionary strategy of 'digital by default' in 2010, which involved the shift of, at least, the most used services to digital platforms (Cabinet Office, 2010; PWC, 2009). The UK government defines 'digital inclusion' as a series of actions to overcome four main challenges that hinder the use of digital tools, namely access, skills, motivation and trust/confidence (Cabinet Office, 2014; NHS, 2019). Under the broader context of the booming digital economy, the concept of 'digital inclusion' has been not only widely used and frequently referenced in government policy papers but also in private and third-sector organisational strategies that aim to prompt their target audience to go online to reap the digital dividends, be they individual, organisational, or societal (Centre for Economics and Business Research, 2015). This movement, however, has been criticised for further marginalising and disempowering those struggling to go online, such as older people, if necessary support is not in place or fit for purpose (Allmann & Blank, 2021). To this date (i.e., 10/07/2021), extensive numbers of projects have been delivered to increase digital take-up, the majority of which, however, have attempted to address the first two challenges (access and skills), leaving the domains of 'motivation' and 'trust' relatively underexplored (Blank & Lutz, 2018; Lutz, 2019; Scheerder et al., 2017). This hinders the propagation of digital adoption to some extent as 'access' and 'skills' exert influences on behaviours in the short-term, whilst 'motivation' and 'trust' impact digital adoptions and 'go'/'no go' decisions in a longer-term.

Meanwhile, in academia, 'digital inclusion', together with 'digital exclusion', 'e-inclusion', 'digital participation', 'digital engagement' and many other similar terms, has also featured in trending research topics in a wide range of fields such as Sociology and Management Information Systems (MIS). However, despite its increasing popularity in governmental, institutional, and academic studies, there is yet no consensus on or an established definition of 'digital inclusion' available. On the one hand, in most literature, it is perceived as an alternative term for 'digital divide', which commonly refers to a gap to bridge between those who can benefit from using digital technologies and those who are disadvantaged as not being able to or not willing to use these certain kinds of digital technologies, i.e. the ICTs and the Internet (Olphert, Damodaran, & May, 2005; Wong, Law, Fung, & Lam, 2009). On the other hand, many different paradigms still exist that tend to distinguish differences regarding the qualities, meanings, and implications of these terms. For example, 'digital inclusion' is regarded as more of a political term compared to 'digital divide' due to ongoing socio-political discussions around 'social inclusion' or 'social exclusion' (Goraya & Light, 2011; Helsper, 2008; Long & Bramham, 2006; Powell, 2000). Also, in his seminal publication '*Technology and Social Inclusion: Rethinking the Digital Divide*', Warschauer (2003) put forward the idea of expanding the concept of 'digital divide' by taking into account its 'social-embeddedness', although he did not use the exact literal expression of 'digital inclusion'. Likewise, Selwyn (2004, p. 343) argued that "… the digital divide can be seen as a practical embodiment of the wider theme of social inclusion…". After that, as noticed by Mori (2011), many researchers have been inclined to regard the theme of 'digital inclusion' as to where 'digital divide' and 'social equality/inclusion' agendas converge.

For this research, the approach used by Goraya and Light (2011) has been adopted. That is, the researcher recognised and acknowledged the nuances between these terminologies mentioned above but chose to discard the differences as they do not undermine the core arguments of this research in any respect. In other words, ‘digital inclusion’ and the constellation of similar terms were used interchangeably throughout this research unless otherwise noted. As a matter of fact, it was helpful to keep them within the same conceptual framework for gaining a more comprehensive view of the exclusive social phenomenon that they reflected. The term ‘digital divide’ was heavily referenced in later sections due to its historical role in literature and the large body of theories and concepts already developed. Nonetheless, the term ‘digital inclusion’ was preferred for defining and scoping this research for the following reasons. First, it conforms to the language used by the UK government and organisations like the Good Things Foundation and Age UK. They are the main forces behind widening digital participation projects across the UK. Using shared language helps this research concerning forming bettering communication, collaboration on empirical studies and communicating findings.

Second, it sends out a more positive message in a semantic sense, as it is not only merely pointing out the existing inequalities in the digital society but also advocating for actions to address the problems encountered with viable and sustainable solutions. Third, the word ‘*divide*’ risks underestimating a multi-faceted complex problem by oversimplifying it into polarised disparities, which is a fallacy/mind trap to look out for in any digital or social inequality study (Van Dijk, 2005). Last, the ‘digital divide’ tends to draw attention to a relatively narrow research scope that focuses on uneven access to digital technologies. In contrast, digital inclusion implies undertaking a more comprehensive appraisal of ICT use in all aspects of life (Foley, Codagnone, & Osimo, 2008).

2.3.2 Digital inclusion

To avoid taking the concept and agenda of digital inclusion at its face value, it is imperative first to make sense of the context of its inception, the approaches to its conceptualisation, and associated assumptions and value systems that underpin the development of digital inclusion theories. In doing so, questions related to the fundamentals of this research were addressed, including: What is the digital divide? When was it first defined? What does ‘digital’ mean, and how is it related to other terms such as the ‘Internet’ and ‘ICTs’? Who is being excluded, and what are the assessment criteria? How is digital inclusion related to social inclusion? What determinants have been identified? Moreover, what is on the agenda for future digital inclusion research and programmes?

2.3.2.1 The inception and early conceptual development of digital inclusion

The conceptualisation of digital inclusion began with the academic discourses that revolve around the ‘digital divide’, which describes the inequalities found within the population on the uneven access to digital. The literal expression of ‘digital divide’ first appeared in the United States (US) around 1995, at which time the Internet bubble was brewing (Warschauer, 2003). It was coined by the US government in the first of its four reports titled ‘*Falling Through the Net’*, where a divide between those who have access to personal computers and those who do not was identified (as cited in Servon, 2002). While it seems somewhat superficial nowadays to have labelled the population as binary groups of ‘haves’ and ‘have-nots’ solely based on their physical access to digital technologies, such a simplistic interpretation of digital exclusion gained its popularity and had prevailed as a mainstream ideology/convention until the early 2000s (Selwyn, 2003). Under the influence of technological determinism and dot-com hype in the late 1990s, policy makers and researchers heralded that information technologies such as computers, and the Internet could help alleviate the longstanding social disparities in western countries. Governments and organisations in developed countries, in particular, regarded digital technologies as a panacea that could serve as a new economic engine to empower its citizens and, thereby, boost the labour market on the one hand, while on the other hand pushing forward the transformation of an industrialised society into an ICT-driven ‘information society’, or a ‘network society’ (Castells, 1996; Van Dijk, 2012a) and, at the same time, a ‘knowledge economy’ (Mori, 2011; Selwyn, 2004). These activists fully recognised a ‘divide’ in digital. It was regarded as an obstacle that must be removed at all costs to help the disadvantaged cross the chasm and land at what was seen as a new, parallel reality where people, society and the economy succeed and flourish in the digital age (Warschauer, 2003, p. 11). In order to achieve these goals, the then social and political agenda was filled up with movements that aimed to close the digital gaps and end old and new inequalities (see U.S. Department of Commerce, 2000).

This strand of thought from the 'techno-utopianism'[3] or 'techno-enthusiasm' (Selwyn, 2004) has been challenged by sceptics since the start of the new millennium. A number of scholars and politicians refuted the fundamental existence of a so-called 'digital divide' and contended that the dissemination of ICT is of no difference from the distribution of normal consumer goods that follows a pure market logic, therefore the differing access to digital resources is merely another additive to the already existing social inequalities just like those manifested in the distribution process of other innovations/new products such as a 'Mercedes divide' (see Compaine, 2001). It was articulated by the Bush administration officials to make it clear that the influences of a 'divide' in digital had been exaggerated as the market had reached an equilibrium where ICTs had been available at an affordable price to the audiences who indeed needed them, contrasting with those left-behinds who were considered irrelevant, as summarised by Warschauer (2003) "because those who don't have Internet access don't really need it" (p. 11). In comparison, some scholars agreed partially on the presence of a divide but argued that this so-called 'divide' was just a temporal phase in the process of ICT diffusion and would eventually disappear as digital devices become cheaper and easier to use (OECD, 2000). Their proposition was distinct from the former position on the assumption that the ICTs would achieve a population-wide adoption (Van Dijk, 2005). The proponents alleged that by transforming the 'have-nots' into 'haves' of ICT equipment, the divisions would be overcome (Tsatsou, 2011). This argument was built upon a core concept, the S-curve of adoption rate, from technology diffusion theory works raised by Rogers (1995), which explored and explained a progressive diffusion process of technology among a social network. According to Rogers' theory, an S-shaped curve depicts incremental increases in the adoption of technological innovations with different rates over time, eventually reaching a saturation status (i.e., full adoption) in the market. It encompasses four distinct groups of innovators: early adopters, early majority, late majority, and laggards. Drawing on this theory, the proponents of transforming the 'have-nots' into 'haves' of the ICT devices further argued that it would be only a matter of time before the ICT reaches the group of 'laggards', a category that the group of older people has been put in under a stereotype, who are most likely to be identified as the 'excluded' in digital

[3] Helsper (2008) brought up the term of 'techno-utopianism' in her analysis on the relationships between digital inclusion and social inclusion to refer to scholars and practitioners who maintain a positive attitude towards the power of technologies in changing social structures.

divide terms. Hence, from both camps that held sceptic views on the digital divide, the idea of making a speciality of such a concept and prompting digital inclusion policies and projects sounded untenable and should be reviewed.

In contrast to the above-mentioned ‘techno-utopianism’ (i.e., the techno-determinism) and denialism (i.e., those who either denied the existence or the persistence of digital divide), Van Dijk and Hacker (2011) noted that there was also a group of researchers, mainly those from left-wing political views, such as the social democrats, who accepted and placed an emphasis on digital divide. Nonetheless, scholars from this camp claimed that emerging high-tech products would not remedy the old social problems nor cause new ones, but rather, add another layer to already existing social inequalities such as the segregations in consumption ability caused by varying levels of household earnings in the society (Schiller, 1996). Also, they argued against others’ claim of the digital divide being a temporal phase, asserting that the divide would be sustained and updated with new and more expensive technologies replacing the old and cheaper ones (Van Deursen & Van Dijk, 2019). By pointing out that old inequalities had been exacerbated since the advent of computers and the Internet, the focus of future research, as they maintained, should remain on tackling known social stratifications, where new digital elements had been added in. This separated view of digital and social systems, as if it is oil (i.e., the digital contents) dripped into a cup of water (i.e., the social contents), received criticisms from scholars like Van Dijk and Hacker (2011) for being simplistic and underestimating the complexities embedded in our social system as well as what comes with the way the digital system blends in. Drawing on systems thinking theories[4] that tackle complex ‘soft’ and ‘hard’ systems (Forrester, 1994; Sterman, 2000; Wolstenholme, 1995), the comment from Van Dijk and Hacker suggested that the interaction between digital and social inequalities is non-linear and the input of digital may give rise to unseen or unexpected new forms of inequalities (see Bart Cammaerts & Van Audenhove, 2003).

Different from these biased views based on techno-utopianism, denialism and simplisticism, there emerged opposing accounts, which later became the mainstream voice, took middle-way positions to the apprehension of the digital divide (Wilhelm,

[4] From a systems thinking perspective, complex systems possess nonlinear behaviour patterns and the system as a whole has emergent properties that is not simply the sum of the parts.

2000). They criticised the determinists for their unrealistic assumptions and social beliefs, competed against the denialism's market-oriented and quantified perspective, and disapproved of how the simplistic view downplays the worth in digital inequality research by defending the need for and the unique value in undertaking digital divide research (Helsper, 2008). For example, Selwyn, Gorard and Williams (2001) called for a more objective view on the effects of technology on reducing inequalities in education to better understand the digital divide in the education domain and maximise digital opportunities for excluded learners. The prevailing diffusion theory of technology adoption and use by Rogers (1995) also received criticisms on the assumption of a 100% diffusion of the Internet among the population, as the opponents argued, it is too much an ideal as telephone only had achieved about 95% of adoption in developed countries after 70 years since its advent (Schement & Forbes, 2000).

Moreover, critical appraisal of the implications of the digital divide has also been achieved, with scholars like Van Dijk (2012c), who concerned on the adverse effects of a digital gap on social inequalities, compared to researchers like Mansell (2002), who held opinions on the positive potential of digital media to enhance social justice. Furthermore, with research theory reporting that the provision of required devices was found to have not alleviated divisions as originally expected (Norris, 2001), scholars from this school of thought reflected on the limitations in previous approaches and proposed a call for a theoretical re-examination of the nature of digital divide, which departed from the then simplistic 'access to infrastructure' notion and moved towards a 'beyond access' concept that includes aspects of skills and usage (Hargittai, 2002; Helsper, 2008; Selwyn, 2004; Van Dijk, 2005; Warschauer, 2003), and the extent of the digital divide, as noticed by Van Dijk and Hakcer (2011), is relative rather than absolute, complex and dynamic but not straightforward and static. This means that as society changes and technologies evolve over time, some gaps are expected to gradually diminish whilst others widen (Peacock, Kunemund, & Künemund, 2007). Such a theoretical level re-definition was echoed by philosophical developments around social justice and equality in the socio-political domain, with activists calling upon a displacement of the then prevailing 'distributive paradigm', which confined digital divide debates to trivial discussions on physical access and material goods (Eubanks, 2007). New public policy paradigms such as 'multi-relational paradigm' that recognises the social relations and structures behind the stratification of access, 'multidimensional paradigm' that seeks to explore different dimensions of exclusion, and the ‘participatory paradigm’ which prefers the terminology of ‘digital inclusion’ and calls for attention on an ‘effective-use’ of ICTs, have gained strength and have been under constant reflection and continuous construction (Goraya & Light, 2011; Helsper, 2008). It provides ongoing support to the development of digital inclusion theories and practices (Mori, 2011; Young, 1990).

Whereas this better-rounded approach to the conceptualisation of the digital divide has laid a solid foundation for contemporary research on digital inclusion and spurred remarkable progress in previous decades, the ideologies that rooted in the inception stage of this field, together with influences from the socio-political context (e.g. migration crisis, segregations) (Alam & Imran, 2015; Andrade & Doolin, 2016) and economic conditions (e.g. the 2008 financial crisis) (Polykalas & Prezerakos, 2015), however, have had a far-reaching bearing on the later political options and practical operations. In other words, the scholarly paradigm shift has failed to relay to the political and practical domains synchronously (Vassilakopoulou & Hustad, 2021). Consequently, the original notions attached to digital divide research, such as being market-oriented, equality-driven, and access/infrastructure-focused, are still evident and somewhat prioritised in contemporary digital inclusion policies and practices. For example, in terms of policies, when developing the ‘*Government Digital Inclusion Strategy*’, the UK Cabinet Office (2014) emphasises upskilling the workforce with basic digital skills for a better economy (Centre for Economics and Business Research, 2015; PWC, 2009). Likewise, the advocacy of ‘no one left behind’ remains a core value at the heart of today’s digital inclusion commissions (Green & Rossall, 2013; Hernandez & Roberts, 2018; McFarlane, 2002; Ragnedda & Muschert, 2013; Tsatsou, 2020). In terms of empirical practices, when measuring the level and the extent of digital exclusion, the supporting evidence is commonly collected through surveys and are still primarily dominated by descriptive statistics on different aspects of ‘access to digital devices’, for instance, the ability to gain access, the quality of access (e.g. speed), the location of access, and ease of access (Allmann & Blank, 2021; Office of National Statistics, 2015; Olphert et al., 2005; Vehovar, Sicherl, Hüsing, Dolničar, & Dolnicar, 2006). Being confined by these conceptual legacies is not always inevitable but not necessarily of no worth. Blindly inheriting these legacies without reflexivity and flexibility is hazardous, as such notions rest on “…a linear and incomplete contextualisation of the concept and phenomenon of digital divides” (Tsatsou, 2011, p. 320). However, under the context of population ageing and services digitalisation, such notions can be beneficial in building a better, faster, and more accessible digital network from a problem-solving perspective. As pointed out in Section 2.3.1, the 'divide' is multi-faceted and with multiple levels and changes with time (Van Dijk, 2012b). This implies that there is no one-fits-all approach to promote digital inclusion; it should always be contextual and time-dependent (Van Deursen, Helsper, Eynon, & Van Dijk, 2017). For example, widening digital participation among the older population needs some re-thinking on both practicality and suitability of general digital inclusion approaches under the context of this specific cohort (Kania-Lundholm, 2019; Kania-Lundholm & Torres, 2015; Seifert & Schelling, 2016).

2.3.2.2 Digital inclusion, digital literacy, and digital skills

The delivery of digital inclusion often involves enhancing digital literacy and digital skills for those who were digitally disadvantaged. Jaeger et al. (2012) pointed out that the three concepts of the *digital divide*, *digital inclusion*, and *digital literacy* correspond to the phenomenon, policy, and practice levels, respectively. In their study, they defined digital literacy as "…the skills and abilities necessary for access once the technology is available, including a necessary understanding of the language and component hardware and software required to successfully navigate the technology" (Jaeger et al., 2012, p. 3). Similarly, in the existing literature, many studies have used the notion of digital literacy and digital skills interchangeably to account for the competences of using digital technologies for digital inclusion (Polizzi, 2020; Schreurs, Quan-Haase, & Martin, 2017; Sum et al., 2008; Tirado-Morueta et al., 2021; Van Deursen & Van Dijk, 2009; Yolvi Ocaña-Fernández, 2020). Other similar concepts overlapped with these terms, such as digital fluency (Wang, Myers, & Sundaram, 2013), digital competences (Iordache, Mariën, Baelden, & Baelden, 2017), and digital literacy skills (Alkali & Amichai-Hamburger, 2004).

However, some scholars maintained that these concepts should be distinguished as the notion of digital literacy was developed from a more established concept of information literacy (Koltay, 2011). Information literacy was conventionally identified as the conceptual knowledge and competence of identifying, seeking, analysing, and using information (Thompson, 2008). Nevertheless, there was a turn towards the re-conceptualising information literacy to also account for the embodied skills (Cox, 2013).

In digital divide research, the term of digital skills was prioritised as it best accords with the widely-adopted digital divide indicator “skill”, which characterised a second-level digital divide (Hargittai, 2002; Hodge, Carson, Carson, Newman, & Garrett, 2016). Van Deursen and Van Dijk (2009) further classified digital skills into four areas, including “operational, formal, information and strategic skills” (p. 394). The trend of expanding and redefining the notions associated with digital skills accords with what Cox’s (2013) call for the inclusion of embodied skills. As computerisation and digitalisation continue, these concepts are becoming more intertwined in practice when addressing people’s digital inequalities for enhancing digital inclusion through empirical training programmes (Age UK, 2017; Gatti, Brivio, & Galimberti, 2017; Van Ingen & Matzat, 2018).

2.3.2.3 Refined theoretical approaches to the digital divide

Although the development of technologies and shifting social, economic and political contexts have given rise to new nuances to the constituents, structures, boundaries and dimensions of digital divides, contemporary digital divide research has been largely shaped by and based on the above introduced conceptual framework formed nearly two decades ago (Tsatsou, 2011). As digital becomes more intertwined with every aspect of daily life, studies on closing the digital divide/increasing digital inclusion have come to the fore in many academic fields, where numerous contributions ranging from general theories to specific models have been made (Pearce & Rice, 2013). As mentioned in the last section, the most significant improvement made in the conceptualisation of the digital divide is the acknowledgement of the inherent complexity in digital inclusion as opposed to previous simplistic portrayals of polarised material and physical access (Hargittai, 2002; Strover, 2003; Van Dijk, 2005; Warschauer, 2002, 2003). Subsequently, scholars have reached a consensus to appreciate the fact that the digital divide emerges from complex realities (Haddon, 2004). Indeed, when mapping an entire use case in the application scene, it is easy to realise that digital technologies are ever-changing and can sometimes be challenging to interact with, as people are complex with many different characteristics. Societies are complex, with different forms and dimensions of disparities. Not to mention that the interactions between human beings and ICTs and the relational network within a society add extra complexities. As such, research that accounted for the complexities from different entry points (e.g. access, use, skills, capabilities) and varying contexts (e.g. economic, social, cultural and demographic) have grown in number (Livingstone, 2002;

Mossberger, Tolbert, & Stansbury, 2003). Also, the preferred rhetoric of the phenomenon has shifted from 'divide' or 'exclusion' to 'inclusion', which takes the complexity into account by campaigning for gradual improvements (e.g. try best to include disconnected cohorts) other than an unrealistic once and for all quick fix (e.g., close a gap) (Tsatsou, 2011).

2.3.3 Older people and the ageing society

Demographic changes can assert a strong influence on societies in many ways. When it comes to the changes caused by population ageing, the negative impacts are the critical concerns of academics and policy makers. Like most countries around the globe, the UK is facing great challenges from an ageing society: the proportion of older people (aged 65 and over) reached 17% in 2014 and has been continuously growing since (Office for National Statistics, 2017). By 2050, the cohort of over 65 is forecast to account for 25% of the entire UK population, becoming the largest age group in the society (HSCIC, 2014). This entails a pressing need to identify current and potential problems associated with the demographic shift from micro (i.e., older people) to macro (i.e., society).

At the micro-level, older people are commonly associated with vulnerable images compared to the younger generations. Due to the effect of biological ageing, they are linked with declining mobility, cognitive functions, and overall health (e.g., fragility). As they grow older, people's health and social care needs may grow and become more complex due to a combination of multiple chronic diseases and acute needs that arise from frailty, such as sudden falls at home (Age UK, 2017, 2019). As a result, ageism is a common bias against the older population due to the common sense that the public build on incomplete understandings of gerontology, the study of the ageing process, and geriatric, the study of diseases of the elderly (Williams, 1997).

Another reason for the prevalence of ageism is rooted in economic concepts and labour policy debates. Since people are commonly retired by old age and become unfit for undertaking labour-intensive jobs, they are devalued in a sense (Walker, 2002). Hence, the definition of old age is primarily related to the age of retirement by law. Therefore, the perception of 'old age' and 'ageing' is very much cultural-, historical- and context-based. In terms of cultural influence, 'old age' is commonly recognised as 65 years and over from a chronological sense in most developed countries, whilst in African countries, due to different average lifespan, the World Health Organisation (WHO) once set the threshold of old age at 50 (WHO, 2002b). In terms of historical effect, the definition of old age has changed from 50-55 to 60-65 in China during the past twenty years and is subject to future change due to shifting retirement policies (Reuters, 2016). Meanwhile, as life expectancy grows with medical advancement, the perception of ‘old age’ in psychological and social terms also changes. For example, people in their 50s nowadays are very active and engaged in society, just like much younger people in old times (Wen et al., 2007). In terms of context consideration, it is common in the literature to define old age and the sub-groups within the ‘old age’ spectrum in accordance with the specific studies, for example, consider the onset of old age at 50+ (see Matthews & Nazroo, 2015), at 55+ (see Casado-Munoz, Lezcano-Barbero, & Rodríguez-Conde, 2015; Ma, Chan, & Chen, 2016; Sun, McLaughlin, & Cody, 2016), at 60+ (Age UK, 2017; Selwyn et al., 2003), and at 65+ (Age UK, 2017; Hage, Wortmann, Van Offenbeek, & Boonstra, 2016). This research adopts the standard of 65+, which is consistent with the conventions in digital inclusion studies on older people (see Olphert et al., 2005; Van Dijk & Hacker, 2011).

However, the focus on declining mobility and health captures only part of what is at risk for older people. If an older people’s life could be considered a soft system, there are other domains and the biological and physical aspects, including social, cultural constructs. As a result, it is essential to take a comprehensive view of the whole system of older people’s life to capture a complete picture of the problems older people face. In addition, this also indicates the importance of including older people’s perspectives, which is currently lacking in extant research, that is, understanding how they perceive old age and later life (Thomas et al., 2013).

At a macro level, the growing number of older people, particularly the growing proportion of the older-old, has placed much pressure on various aspects of society, particularly the health and social system (Hughes & Pearson, 2013; The Kings Fund, 2015). Equipping the elderly with essential digital skills is at the heart of current and future NHS strategies as this would encourage older people to use digital services such as eHealth and the NHS 111 so that non-urgent needs can be dealt with in a cost-efficient and cost-effective manner (Good Things Foundation, 2016). Hence, the NHS and the UK government advocated for the initiative of ‘Ageing in place’ with a hope that advancing digital technologies could alleviate pressures placed on scarce health resources such as hospital beds. In comparison, there is another strand of initiatives advocated mainly by local governments, that is, to build age-friendly cities and communities. This initiative is more comprehensive and includes discussions on all facets of the social system that need to adapt to accommodate the growing cohort of older people (Biggs & Tinker, 2011; Handler, 2014; WHO, 2007).

2.3.4 Active and healthy ageing

The concept of ‘active and healthy ageing’ (AHA) is mainly associated with the European Innovation Partnership (EIP) on active and healthy ageing, a pilot initiative launched in 2011 to improve the health and wellbeing of older people in Europe (European Commission, 2011). Nonetheless, the concepts this policy had drawn go back to the 1950s when ageing-related theory first began to take shape. As inferred from its literal expression, the AHA initiative includes the concepts of ‘active ageing’ and ‘healthy ageing’ (Walker, 2002), with the former denoting both notions of within-person ageing and between-person ageing, whilst the latter indicates a relatively narrower sense of within-person ageing that depicts the degenerative changes in health conditions.

Walker (2002) distinguished between active ageing and healthy ageing, arguing that these concepts are fundamentally different in terms of scope, focus, citizen engagement and power relations. Whilst healthy ageing focused on health-related problems in a top-down manner, active ageing takes a bottom-up approach and includes all kinds of engagement that support the overall well-being that transcends merely health concerns. In this sense, healthy ageing is regarded as a subset of active ageing (Foster & Walker, 2015).

Similarly, Rowe and Kahn (1997) put forward the concept of ‘successful ageing’ to measure satisfactory ageing, which was later widely adopted mainly in the field of gerontology (Bosch-Farre et al., 2018). This successful ageing model included biomedical measurements to assess mental and physical strength and health and measurements for the level of social engagement to evaluate the social wellbeing of older people. It is thus a concept that partially overlaps with both ‘active ageing’ and ‘healthy ageing’. This model was later redefined, and its conceptual framework expanded to take recent social and technological changes into account, thereby enriching the meaning of ageing 'successfully' (Rowe & Kahn, 2015). Although it was an influential model and concept in itself, the rhetoric of 'successful' was considered negative and stigmatising to some scholars as if older people who do not meet the optimal conditions set in the model are unsuccessful or have somehow failed (Martinson & Berridge, 2015). This research thus adopts the account of 'active and healthy ageing' to maintain a comprehensive concept that encompasses all daily activities that contribute towards life satisfaction.

The advancement of digital technology and its widening application in various aspects of daily life has proven to have positive impacts on older people's health and wellbeing in later life and in supporting successful ageing (Fang et al., 2019; Levy & Simonovsky, 2016; Peek et al., 2014; Sun et al., 2016; Weegh & Kampel, 2015). While such findings encouraged enthusiasm amongst gerontologists and policymakers to focus on the benefits of ICTs in facilitating active and healthy ageing, some researchers called for attention to harmful aspects, such as fear ('technophobia'), stress and anxiety ('technostress') that came along with, and in some cases outweighed, the benefits (Blank & Lutz, 2018). This strand of research that took a critical view on the role of ICTs in later life provided a basis and thinking method for reflecting on the meaning of 'beneficial outcomes' in age-related digital divide research.

2.3.5 Social practices in everyday life and the digital society

Practice theory or the theory of social practices is a family of theories that seek to address the complexity of everyday life and the social world (Cox, 2012). Although Pierre Bourdieu's far-reaching impact work did not step directly into the fields of digital sociology and digital divide, key concepts such as field, capital, and habitus that he developed in his work *Distinction* (1984) have been widely referenced to theorise the digital society (Ignatow & Robinson, 2017). A significant contribution that Bourdieu (1984, 1990, 2005) and other first-generation theorists such as Giddens (1984, 1991) made was offering an alternative perspective to social scientists on the long-standing debate over the primacy between structure and agency in determining individual behaviours. Under their proposition, instead of following the variance-centred traditions from behaviourism and cognitivism that attribute the behaviours to a person's own perceptions and decisions (i.e., agency), or a constructivist position that ascribes human behaviours to the surrounding environment (i.e., structure), social scientists should take a relational and process view that accounts for influences from both agency and structure in shaping and changing people's actions (Maller, 2015). To Bourdieu, structure influences human agency/behaviours and the tendencies of actions (i.e., the system the dispositions) through the power of resource distribution in social spaces called 'field'; in turn, human agents influence the social structures by gaining various forms of resources, termed as 'capital', that are constitutive to the fields through the performance of everyday practices (Tan & Chan, 2018). This relational thinking on the relationship between individuals and the social context was translated into a framework for comprehending information and digital-related human behaviours. For example, scholars extended the collection of capitals that Bourdieu developed (e.g., cultural capital, social capital) to include 'digital capital', which represents the digital resources such as ICT devices and access to the Internet that differentiate people in the field of ICT use (Van Laar, Van Deursen, Van Dijk, & De Haan, 2017; Yates et al., 2020). Digital inequalities in this sense are related to the possession of digital capitals and other types of capitals such as economic capital (e.g., acquire devices through purchase), social capital (e.g., receive devices as gifts) and cultural capital (e.g., gain digital skills through education) that can be transferred into digital capitals, implying an interactive relationship between the entrenched social inequalities and these newly acknowledged digital inequalities (Goedhart, Broerse, Kattouw, & Dedding, 2019; Helsper, Van Deursen, & Eynon, 2015; Van Deursen & Helsper, 2017). The originally intangible concept of outcomes as defined in the third-level digital divide was thus operationalised as the digital capitals and social capitals people gain from ICTs and the Internet (Helsper et al., 2015).

Although scholars who applied theory of practice in the investigation of digital divide discourses primarily drew upon concepts such as 'capital', 'field', and 'habitus', the concept of 'practice' itself was rarely explored (Helsper et al., 2015; Pearce & Rice, 2013; Robinson et al., 2015; Van Deursen, Van Dijk, & Ten Klooster, 2015; Van Laar et al., 2017). The series of actions that coordinate one's body and mind in the capital enhancing or consuming activities in the fields constitute social practices (Blue, Shove, Carmona, & Kelly, 2016; Loscher, Splitter, & Seidl, 2019). As the digital world is increasingly integrated and entangled with our material world, the questions in digital divide study begin to root in people's everyday social practices such as shopping, banking, getting healthcare and socialising; they are not necessarily the ‘digital practices’ that are oriented with the ‘digital’, but are becoming gradually digitally involved (Cox, 2013).

In the field of Library and Information Science, there has also been a growing attention in drawing upon practice theory and the socio-cultural approaches to rethink what constitutes knowledge, the process of knowledge curation and acquisition, and the concept of information literacy (Lloyd, 2006, 2010, 2017; Lloyd & Somerville, 2006). Comparing to Gherardi (2008, 2009, 2010) and Nicolini (2012a, 2013), who put more focus on applying the practice theory in a workplace/organisational setting, Lloyd committed to the investigation of a wider range of issues concerning the ontological and epistemological significance of interpreting information literacy as a social practice in everyday context (Lloyd, 2010). Her pioneering work on redefining information literacy as information practice laid theoretical foundation and offered empirical guidance for researching people’s day-to-day digital engagement with the emphasis she made on the *enactment* and the *situatedness* of a practice in a *social site*/social context. The former notion of *enactment* demarcated a salient difference from the still prevailing perception of information literacy as a body of internalised knowledge, a set of cognitive competences and processes that construct our way of knowing (Lloyd, 2006, 2010). Although this stream of thinking tends to be bounded with the discourses of *information behaviour*, the body, as an actor itself, that engages in the creation of corporeal information and embodied knowledge through enacting/performing “an array of information-related activities and skills” (Lloyd, 2011, p. 285) has been overlooked or ignored. The latter notion of *situatedness* not only contends for an attention again on the physical presence of the body in gaining what we know (e.g., corporeal, and embodied knowledge) but also uncloaks the surrounding social, cultural, physical and instrumental information modalities that shape the ways we know (Lloyd, 2017). To Lloyd, a practice is thus both embodied and situational.

Lloyd (2006) termed *information modality* as the information environment or the *spaces* that people create, use and access information, and *social site* as the overall landscape of different information modalities. These definitions follow Schatzki’s (2002) concept of *site* in which social practices transpire. Therefore, Lloyd’s work concerning information practice bridges the fields of information literacy study and contemporary social practice theory. Furthermore, her work highlighted the importance of looking into the embodiment and corporality of knowing, and the social site that contextualises the practising of information literacy. A range of empirical examples (e.g., fire fighter study and ambulance study) that Lloyd provided (2010) to illustrate how information literacy emerges as a complex social practice with important features such as embodiment and situatedness provided a good reference point for studies on everyday Internet use and learning. Nevertheless, Lloyd's conceptualisation of information literacy as a social practice mainly dwelled on her interest in information-centred daily activities, thus leaving gaps to fill when interpreting activities that do not start with information needs (Cox, 2013), which are taking up more weight in people's everyday lives as the digitalisation continues (e.g., online communication, entertainment, tasks management).

Both Bourdieu and Giddens did not consider the role those non-human materials played in everyday practices. This limitation was addressed in later developments on the practice theory by the second generation of theorists such as Reckwitz (2002a, 2002b) and Schatzki (1996, 2002, 2011) under the influence of Bruno Latour (1987)'s agent-network theory (as noted in Maller, 2015), and then further stressed in the contemporary theories developed by Shove, Pantzar and Watson (2012). Acknowledging the agency of non-human artefacts in shaping human behaviour was a seminal addition to the theory for its application in the field of digital inclusion/divide. One important contribution it made was recognising one's corporeal and embodied skills and knowledge (Cox, 2013; Gherardi, 2010; Nicolini, 2012b). Lloyd (2017) regarded the material dimension of a social site as the *doing spaces* that co-construct the enactment of information practice with *semantic spaces* (i.e., the sayings that is reflective of the cultural context of a setting) and *relatings* (i.e., the structure that legitimise a practice in a specific site). Materiality thus is critical for the enactment of a practice. In the digital-related daily practices, objects, and materials such as computers, infrastructures, and online contents are also key influencing factors as those from the individuals and the context; one cannot get online without a working device and online content.

Consequently, the development of ICTs also brings about the changes in daily practices at an accelerated speed as the ICTs become more embedded into the facets of everyday life (Tan & Chan, 2018). In light of this, practice is not static and determined but rather fluid and dynamic. In addition to the materiality, individual's own 'habitus', the assembly of one's own embodied history and dispositions towards future actions; it also possesses the power to manoeuvre changes in practices within the field of ICT use (Blue et al., 2016; Maller, 2015). As such, the study of encouraging and sustaining digital related practices among older people should be based on their everyday life, taking into consideration non-digital related practices, their individual histories and experience, as well as the digital materials involved.

This makes the version of practice theory developed by Shove, Pantzar and Watson (2012) an optimal conceptual tool for this particular research. A digital-related everyday practice is deconstructed into three essential elements: material, competence and meaning. Materials encompass the range of objects, goods, and infrastructure such as the devices and the Internet; competence refers to a person's practical understanding of the surrounding, knowledge, and embodied skills, for example, the knowledge of a computer and the physical skills to use it; and meanings account for the understanding of the significance of a practice, for instance, using WhatsApp on a smartphone means becoming connected with a person's social network. Such an operationalised concept and practical model has begun to gain recognition in health research where scholars have used it to understand people's health behaviours and changes such as drinking (Meier, Warde, & Holmes, 2018) and smoking (Blue et al., 2016) without stereotyping and stigmatising as it decentred such social phenomena from people's own will, or the traditional ABC (attitudes, behaviours, and choices), and instead focused on the three elements and their power in constituting and transforming human actions and social structures. This is particularly useful in the field of digital divide study where older people who are on the disadvantaged side of a divide often risk the assumptions of not caring enough or working hard enough to be included (Cotten, 2017; Wu et al., 2014). By placing it in the context of everyday life and looking into the digital-related daily practices also makes it possible to communicate with other scholarly voices in the fields of active and healthy ageing (Tan & Chan, 2018) and gerontology that is built upon the study of older people's everyday life and activities in this digital society (Connelly, Rehman Laghari, Mokhtari, & Falk, 2014; Hughes & Pearson, 2013; Seifert, Schlomann, Rietz, & Schelling, 2017).

2.4 WHAT CONSTITUTES A DIGITAL DIVIDE? - A GRADUAL ESTABLISHMENT OF THE MULTI-LAYERED VIEW

The 'what' questions represent the pursuit of a better understanding of the fundamental definitions that underpin the concept of the digital divide, for example, 'what do *divide* and *access* stand for', 'what exactly does *digital* or *ICT* mean', and 'what are the possible implications of digital divide'. Articulating and addressing the 'what' questions is an important process that helps translate abstract conceptual maps of the digital divide into more detailed descriptions of its nature and constitution, based on which theories and actionable plans can be further developed. Therefore, researchers in this field have attempted to build and refine models for digital divide to reflect the phenomenon and describe its attached problems as accurately as possible. In the 1990s, 'digital divide' was first conventionally defined as the digital disparities between two dichotomous groups of people, who were known as the 'haves' and 'have-nots', or the 'information rich' and 'information poor' from an economic sense (Wresch, 1996). As inferred from the grouping method, the 'divide' was considered, at that time, a problem in securing physical access to digital devices. In other words, 'access' to ICT products was the only known construct in the model of the digital divide at first.

2.4.1 'Access', 'use' and beyond – a reformulation of digital divide models

Warschauer (2003) deplored such binary thinking for being rather unilateral and simplistic, yet conceded that it could serve as an anchor point where researchers can organise their explorations within and beyond the 'access to devices'. He contended that, instead of being confined by a narrow sense in which 'access' was superficially interpreted as ownership of digital devices, researchers should be encouraged to take a break from that mindset and uncover what is behind the scene. This argument was built upon many case studies from around the globe, for example, the failure of transforming a small and remote town in Ireland into an "information Age Town" by solely procuring equipment (see Warschauer, 2003, p. 4), which revealed that the mere provision of devices was doomed to fail in overcoming digital and social inequalities if other important factors were overlooked. Warschauer, therefore, refined the conventional notion of access by adding elements of 'conduits' (e.g., airwave, telephone lines, the electricity that are complementary to devices for effective use) and 'literacy' to the existing ‘devices’. This improved model did not only imply a ‘multiple divides’ view which entails the co-existence of many interlocking divides (OECD, 2000; Pearce & Rice, 2013), in this case, for example, divide in consumption power (i.e., access to conduits) and divide in skills and knowledge (i.e., access to literacy), but it also enriched the meaning of ‘access’ in digital divide theory by bringing in concepts of ‘use’ and ‘skills’. As he explained the rationale behind this new model:

> *[T]he presence or absence of the computing device is only a small part of the broader context that shapes how people can actually use ICT in their lives…what is at stake is not access to ICT…but rather access in a much wider sense of being able to use ICT for personally or socially meaningful ends. (Warschauer, 2003, p. 32)*

Mossberger, Tolbert and Stansbury (2003) also conducted the identification of multiple divides, who articulated four gaps embedded within the ‘digital divide’, including divides in areas of ‘access’, ‘skills’, ‘economic opportunity’ and ‘democratic’. In the meanwhile, Warschauer’s attempt at re-defining a multi-faceted ‘access’ was also not alone. In fact, many scholars have re-considered this barometer of the digital divide in terms of aspects and forms with different typologies. For example, Clement and Shade (1998) proposed an ‘access rainbow’ model that encompasses the ranges of ‘material, software, content, services, social infrastructure and governance’, whereas Wilhelm (2000) presented a ‘various shades’ view to stress the distinctions in varying extents of access in terms of what he called ‘core access’, ‘peripheral access’ and ‘non-access’. Moreover, as noticed by Helsper (2008), a distinction had gradually been recognised in literature from the 2000s on ‘technical access’, which indicated material and medium related barrier, and ‘social access’, which was related to socio-demographic status and information literacy (Carpentier, Schrøder, & Hallett, 2014; Mossberger et al., 2003). However, although these approaches had successfully transformed an abstract conception of the digital divide into concrete obstacles or enablers, they were somehow limited to the more tangible aspects of ‘access’. In comparison, Van Dijk and Hacker (2011) extrapolated the construct of ‘access’ by including an intangible component representing user attitude. Specifically, they articulated four distinguished and successive sets of ‘access’, namely, the ‘mental access’, the ‘material access’, the ‘skills access’ and the ‘usage access’. Whilst the meaning for the second access was quite straightforward, the interpretations for the other three kinds of access (or barriers to access) were lack of mental motivation such as interest or self-efficacy, lack of digital skills to operate ICTs, and lack of chances to use ICTs, respectively. Similar to Warschauer's approach, the adoption of the term 'usage access' implied that the concept of 'use' was still nested under the umbrella term of 'access'.

Selwyn (2004) celebrated the fact that scholars were reconsidering the digital divide in a more sophisticated way from different perspectives. Yet, he reminded that caution was needed to distinguish between 'access' and 'use', whereby a new construct of 'use' should be added to the model. He further argued that the conventional notion of 'access' guaranteeing 'use' from the determinists' point of view and the assumptions that underlie the innovation diffusion theory was, in fact, problematic for having ignored a cohort of 'information want-nots', who refused to engage with technological products despite being able to. Hence, in his defence, providing the marginalised with essential equipment may appear to close the gap caused by different access to ICTs. However, at the same time, it unveiled latent and trickier gaps in 'actual use' as have evidenced by reports on the 'want-nots'. In summary, although Selwyn's findings were in line with those of other scholars' in terms of turning against previous unilateral approach to digital divide by taking more elements such as the divisions in unequal extent of 'use' of ICTs into account (Fuchs, 2009), he made distinct contributions to the development of digital divide theory in the following aspects: firstly, Selwyn explicitly pointed out the differences between 'access' and 'use', for which he refined the modelling of digital divide by adding a construct of 'use'; secondly, he discussed the causal relationships between 'access' and 'use' and contended that 'access' in fact does not dictate 'use', which was clearly against the previous presumption from the techno-enthusiasm (Selwyn, 2003; Selwyn, Gorard, & Furlong, 2005; Selwyn et al., 2003); lastly, by drawing on empirical findings (see Bonfadelli, 2002), he pushed the thoughts further and added that 'use' also does not necessarily facilitate 'meaningful engagement', whereby drawing forth research attention to other possible constructs such as 'engagement', 'outcome', 'activities' (Selwyn, 2004). Consequently, Selwyn (2004, p. 352) proposed a new model of the digital divide, including four constructs, characterised as four distinct stages based on his account, they are:

- **Theoretical access**: ICTs made available to users in intended settings in theory;
- **Use of ICTs**: Individuals can use ICTs and gain access to contents, regardless of whether they can make 'meaningful' use;

- **Engagement with ICTs**: Individuals can make effective use of ICTs and think the use worthwhile. This can be measured by user behaviours;
- **Outcomes and consequences**: Users experience “actual and perceived” benefits of use in life. This can be manifested in (positive) changes in daily activities (e.g., social, financial, political, and civic) in the long term.

Selwyn’s classification of the digital divide laid a solid foundation for research in the years that followed. His emphasis on moving research attention towards the later stages of ‘engagement’ and ‘outcomes’, in particular, had prompted researchers and practitioners to revisit and reflect on the starting point of undergoing research and project, as well as the consequences of them.

Meanwhile, some other researchers took a different view on the digital divide and modelled it differently. Norris (2001) and Mossberger et al. (2003) conceived digital divide against broader contexts ranging from the macro level (i.e. global divide between nations), meso level (i.e. social divide within society) to micro-level (i.e. democratic divide on the realisation of digital outcomes and benefits in individual’s life). Indeed, differential digital opportunities also exist at higher-level systems caused by imparity in social, economic, technological, cultural, and political capitals/resources across countries. Warschauer (2003) once approached the digital divide in a similar way in his seminal book ‘*Technology and Social Inclusion: Rethinking the Digital Divide*’, discussing digital inequalities in different countries and regions around the globe. Such disparities across countries have been a keen topic in debates on global inequalities between ‘the rich’ and ‘the poor’, or ‘the developed’ and ‘the developing’ (Wong et al., 2009). This way of thinking has successfully established a broader perspective for digital-social divide research. Nevertheless, more attention has been paid to the meso and micro levels thus far, where academic and practical resources conjoin and socio-political and socio-economic benefits can be capitalised on. Models used by contemporary researchers more or less follow the same structure as that of Selwyn’s and other scholars’ at large. However, there has been a gradual shift of focus in recent years from the construct of ‘access’, ‘skills’ and ‘use’ towards debates on more complex dimensions such as ‘engagement’ and ‘outcome’, which are likely to be carried on as core topics in trending research and practices in this field (Age UK, 2021b; Good Things Foundation & Yates, 2017; Hong, Trimi, & Kim, 2016; Ofcom, 2017; Olphert & Damodaran, 2013; Scheerder et al., 2017; Yates et al., 2020).

2.4.2 'Third-level divide' – towards a more structured approach

There exist many other variances of the models mentioned above such as that of Selwyn's in digital divide literature, for example, Bradbrook and Fisher (2004) proposed a 'ladder of inclusion' (i.e., 5Cs of digital divide) that comprises of 'Connection', 'Capability', 'Content', 'Confidence' and 'Continuity'. In this 5Cs model, 'Connection' and 'Content' resembled Van Dijk and Hacker's account of 'material access', 'Capability' referred to 'skills access', whilst 'Confidence' echoed the so-called 'mental access'. In comparison, the 'Continuity' element covered discussions on the aspect of 'usage access' and delivered a message on issues of sustained ICT usage like the discussions on the 'want-nots' from Selwyn's research. Nonetheless, due to an ample number of terminologies used and a diversity of categorisation methods adopted by scholars, there was a lack of consistency in the theoretical development in this field since authors tended to address the same concepts with whichever nomenclature that suited their study of interest. A growing number of researchers have envisaged this problem and regarded it as an impediment to a better synthesis of knowledge in digital divide research (Peek et al., 2014). Against this background, the concept of 'levels of the divide' gained popularity amongst researchers for offering a framework in which models can be classified and compared whilst improvements and trends can be captured and tracked (Scheerder et al., 2017).

The concept was initially brought up by Attewell (2001) and Hargittai (2002), who regarded the unequal access to ICTs by bipolar groups of 'haves' and 'have-nots' as a 'first' or 'first-level' digital divide. Correspondingly, they defined the 'second-level' digital divide as the inequalities in dimensions such as 'use', 'skills', 'knowledge', 'literacy', 'activities' or 'participation', when majority of the population, in developed countries in particular where most digital divide studies were undertaken, seemed to have secured 'access' to ICTs whilst the problems of utilising these devices properly and effectively became more evident and urgent (Carpentier et al., 2014; Scheerder et al., 2017; Tsatsou, 2011). In the last decade, with research in the domains of 'use' and 'skills' have yielded much useful information in the classifications of and barriers to skills and digital activities, as well as the interconnections between them, the digital divide/digital inclusion discourse has taken another step forward and formed a third-level divide, where the gap between what people can achieve and benefit from the use of ICTs became salient and growingly distinguished from gaps in 'skills', 'use' and 'literacy' (Van Deursen & Helsper, 2015b; Wei, Teo, Chan, & Tan, 2011). Although there have also been some competing terminologies used in literature in order to distinguish digital divide at different aspects or domains, for example, Berry (2011) adopted the terms of 'first-order divide' and 'second-order divide' to refer to divides in material access, and skills and usage respectively (Kim, Lee, & Menon, 2009). Scheerder et al. (2017) reviewed the historical development of this theory and concluded that a consensus had been achieved amongst digital divide theorists thus far, that is, approving that digital divides are comprised of three levels, with the first-level digital divide lying in the differentiating infrastructural access, the second-level digital divide reflecting gaps in skills and usage patterns, and the third-level digital divide concerning the differences in digital outcomes, in other words, the inequalities in securing beneficial real life/offline outcomes from access to and the use of digital devices. This framework of the digital divide made it possible to compare and contrast various models and discourses, thereby formulating a more structural and stratified approach to the anatomy and modelling of the digital divide phenomenon. It is worth mentioning that, although there is a progressive relationship from first-level to the third-level with the former one being a prerequisite for the latter, it is by no means correct to assume that the existence of a third-level divide indicates closure of the lower level divides; they often co-exist and affect one another (Scheerder et al., 2017).

2.4.3 Digital, ICTs and the Internet

Researchers such as Selwyn (2004) and Wong et al. (2009) critiqued a tendency in digital divide literature where the actual meaning of technical terms such as 'digital' and 'ICT' often left unexplained or discussed, despite it being an important element in digital divide debates. With digital technologies undergoing rapid developments in recent years, as well as their interweaving with our social system closer and more profound, a wide variety of technical terms have been used in digital divide literature, for example, ICTs (Helsper, 2008), computer (Betts, Hill, & Gardner, 2017), the Internet (Chiu & Liu, 2017), smartphone (Sun et al., 2016), and tablet (Barnard, Bradley, Hodgson, & Lloyd, 2013). However, there lacked a consistency in literature when these terms were referred to (Peek et al., 2014; Scheerder et al., 2017), for instance, some researchers regarded them as homogenous concepts and used them interchangeably in dialogues on the digital divide (Bart Cammaerts & Van Audenhove, 2003), whilst others approached from a narrow sense and distinguished between terms to capture differing characteristics of ICTs hoping to understand the implications of a particular ICT type on eventual adoption and use (Chen & Chan, 2011). Meanwhile, as the technology itself develops, the meaning of these terms also evolves, for example, the term ICT in contemporary literature includes touchscreen smart phones and tablets, which did not even exist in the late 1990s and early 2000s when digital divide research and the term ICT took off (see Selwyn, 2004). This often confused non-expert audience, making it important for the authors to explicitly clarify and address these terms wherever appropriate.

Distinguishing the nuances in these terms is not trivial, and it is meaningful and important to reflect on the 'type of divide' through the lens of adopted technological terms. For example, an elaboration on 'broadband technology' indicates a 'broadband divide' (see Mendonça, Crespo, & Simões, 2015), whereas a discussion on 'digital media' implies gaps in digital skills (Ofcom, 2017). In a broad sense, 'digital' conveys an overarching perspective that includes the contents stored on and exchanged across ICTs, the Internet, and any other technological equipment that runs on a combination of binary codes of 0 and 1 (i.e., the digits). It is, therefore a term that refers to the 'soft'-ware. In comparison, ICT can be seen as an umbrella term that encompasses 'hard'-ware such as the computers and the phones and 'soft'-ware such as the systems installed on these devices and the Internet that can be accessed from these information and tele-communication technologies. The past three decades have seen a shift in the preference of terms in literature. Back in the early 1990s, when the concept of 'digital divide' was first coined by the US government, the attention was on the 'hard'-ware such as computers at large, whereas nowadays, the Internet, a popular medium that has the power to connect anyone through any kind of digital device, is at the heart of digital inclusion discourse due to its prevalence and growing importance in daily life (Goraya & Light, 2011), which is in line with the shift towards third-level digital divide study where a more comprehensive consideration of digital outcome in offline daily living is advocated.

2.5 WHO IS BEING EXCLUDED? WHEN AND WHERE DOES IT HAPPEN? – A GROWING ATTENTION ON THE OLDER POPULATION

Alongside the 'what' questions, the exploration and identification of the cohort of the population on the disadvantaged side of the digital divide have been a primary task for digital divide theorists and practitioners (Kania-Lundholm & Torres, 2015; Olphert et al., 2005). As can be traced from the history of digital divide research, the earliest attempt to address this question produced a simplistic classification based on ownership of the ICTs, in which the cohort that had been excluded from the digital world was labelled as 'have-nots' (Cai, 2008; Bart Cammaerts & Van Audenhove, 2003; Selwyn, 2004; Warschauer, 2003). It was found that the so-called 'have-nots' were mostly those who were already marginalised in society, for instance, the aged, the deprived, the unemployed and the disabled (Hargittai et al., 2018; Mori, 2011). Initially, based on the assumption that digital resources would eventually get through the population whereby the ICT products could achieve a 100% saturation in the market, the excluded population was further classified as 'late majority' and 'laggards', compared to groups of 'innovators', 'early adopters' and 'early majority' who are likely to gain access to ICTs sooner and therefore labelled as 'haves' (Rogers, 1995). This resource-based view was thereafter expanded and formulated a 'resources and appropriation theory' (see Figure 2-1), which has illustrated briefly the causal relationships between different 'resources' (Bourdieu, 1984; Van Dijk, 2012b). 'Age', together with several other personal traits, was identified as a 'factor' that had been frequently observed in a digital divide.

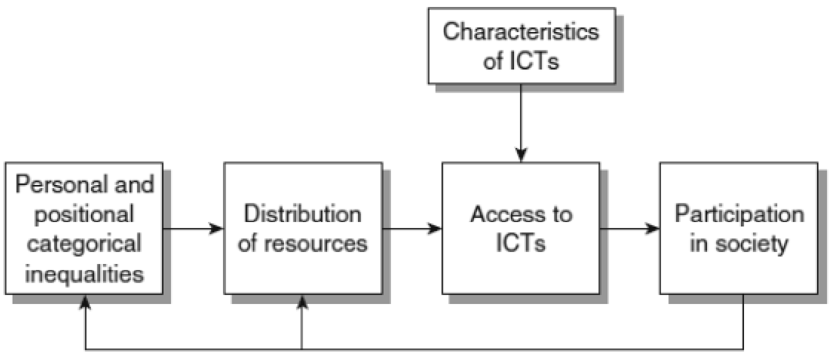


Figure 2-1 A causal model of resources and appropriation theory (Van Dijk, 2012c, p. 60)

2.5.1 Fourth digital divide

The notion of a fourth digital divide by age was brought up by Olphert and Damodaran (2013) based on their identification of a previously unrecognised phenomenon of digital exclusion that disadvantaged older people. Before explaining what the fourth digital divide means, it is important to first understand the previous three divides that Olphert and Damodaran had defined.

As shown in Figure 2-2, Olphert and Damodaran differentiated the progression or development of the digital divide in a similar approach. They found that the barriers to digital inclusion lie in ‘connectivity’, ‘capability’, and ‘content’, echoing the now widely adopted constructs of ‘access’, ‘skills and ‘motivation’ respectively (Courtois & Verdegem, 2016). However, unlike Van Dijk and other scholars who perceived the divide as a static screenshot of a phenomenon, Olphert and Damodaran examined the digital divide from a dynamic perspective based on which the next level of the divide is associated user disengagement. Hence, instead of looking forward to the greater extent one can interact with digital, they elicited another layer of the complexity embedded within the digital divide and ‘looked backward’, that is, they argued that the gradual improvement on ‘digital inclusion’ is always subject to change, like expressed in the concept of the fourth digital divide, people can discontinue digital when they crossed the barriers at any level, including lower-level divides (e.g., in a scenario where old devices stopped working, but the acquirement of a new device was not possible), and therefore join the user category of ‘previous online but not current’.

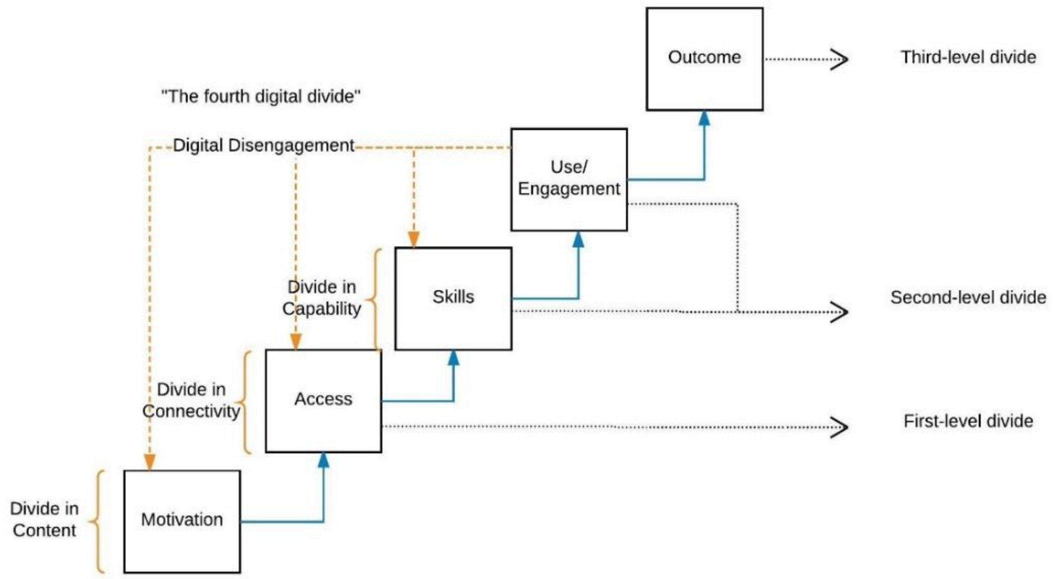


Figure 2-2 'Fourth digital divide' Vs 'Third-level divide' (Figure developed by the researcher based on the literature)

Olphert and Damodaran referred to users in the unfavourable side of this fourth digital divide as the 'digitally disengaged', whilst other scholars termed them as 'dropouts', 'ex-users', 'non-sustainers' or 'lapsed users' (see Young, Clarke, Klima, & Gadag, 2012). Different from the concentration of refining and developing the concept of 'what' constitutes a digital divide, this approach concerned more the 'who'. Hence, the authors studied the characteristics of people in this category and discovered that most of the digitally disengaged were older people, which was corroborated by the official statistics (Age UK, 2021b; Office for National Statistics, 2021). Hence, this finding illuminated this research in terms of offering different perspectives than the mainstream digital divide typology and ideology.

2.5.2 The concept of technology maintenance

Graham and Thrift (2007) coined the concept of technology maintenance, asserting that all contemporary digital systems will eventually go through a process of maintenance after breaking down. Putting it under the context of digital divide discourse, this concept unveiled a new perspective of the digital divide that needs further attention, that is, the process-based and time-dependent point of view.

Based on this concept, Gonzales (2015) further developed it into a new theory of digital divide that complementing the existing ones, contending the need to apply a ‘cycles’ view when dealing with the very basic ‘access’ level barriers. It was discovered that many users, often with lower social status and lower-income, struggled to maintain/sustain access to digital due to lack of ongoing economic support, which then caused disconnected service, or broken devices (Choi & Dinitto, 2013b; Wong et al., 2009). When this happened, the ‘haves’ returned to the other side of ‘have-nots’. Therefore, like the ‘third-level divide’ and the ‘fourth digital divide’, this theory encouraged a re-thinking of the landscape and extent of the digital divide, which was often described and presented biasedly in the quantitative-oriented survey. For instance, Smith (2014) argued that whilst it was reported that the vast majority of the population in developed countries were online, the sustainability of such an achievement was often neglected and understudied.

Indeed, by applying the concept embedded within technology maintenance theory, there emerged more factors that can cause such discontinuation of digital engagement in addition to the difficulty in maintaining physical access. All the indicators of a digital divide, such as access, skills, and motivation, can be at risk at any point in the process of engaging with digital. Hence, this encouraged the researchers to apply a dynamic view on the process of digital inclusion, and in the meanwhile, to view the digital divide as an iterative cycle other than unidirectional (Golant, 2017; Tan & Chan, 2018). In summary, this theory supports a preference towards the concept of digital inclusion over the digital divide by showing that it is not a divide/gap that one can jump across once and for all, but rather, it is a dynamic problem that requires ongoing support.

Learning has become an integral part of day-to-day ICT use and maintenance to older people (Narushima, Liu, & Diestelkamp, 2018a; Russell, 2007). Apart from direct material support on maintaining access to the Internet, such as building more accessible and stable network infrastructure (Rogers & Mitzner, 2017), teaching and training programmes for improving digital skills or intervention schemes helping older people to better manage and maintain digital technologies has been a major area of interest to scholars and practitioners (Caprani, O’connor, Gurri, & Gurrin, 2012; Casado-Munoz et al., 2015; Green & Rossall, 2013). Mubarak and Nycyk’s (2017) study, based on a systematic literature review on teaching older people digital skills, summarised the reoccurring themes on the findings that emerged in the studies reviewed in terms of the essential qualities for successful training or interventions:

1) a friendly and empathetic environment that supports older people to learn through trial and error;
2) respectful and learner-centred teaching practices that account for older people's own goals, competences, and past experiences.

Other studies have mentioned that the tutors' patience and understanding (Xie & Bugg, 2009), positive experience in learning (Campbell, 2008), supportive social network (Judges, Laanments, Stern, & Baecker, 2017; Olsson, Samuelsson, & Viscovi, 2019a) and provision of devices (H. Y. S. Tsai, Shillair, & Cotten, 2017) also facilitated a positive and productive learning experience. Woodwart et al. (2013) found that using peer tutors was more effective in teaching older people digital skills than traditional staff-directed approaches. Friemel's (2016) research echoed this finding and added that, although the peer-mentoring model was more popular than conventional classes, older people preferred to be supported with learning at home by their family and friends. Most of the studies on older people's digital learning were sampled from existing digital skills training classes in local communities (Mubarak & Nycyk, 2017), which is prevalent in the UK society (Good Things Foundation, 2018).

2.5.3 Older people's digital footprint

Establishing an understanding of older people's patterns of use and their online activities helps to crystallise the forms of otherwise intangible digital divides they experience (Quan-Haase et al., 2018). Frequency of use and time spent online were two frequently used measurements for basic use patterns (Van Deursen et al., 2015). Decreased frequency in using the Internet was a key indicator for phasing out, and thus a risk factor for becoming digitally excluded (Friemel, 2016). Depending on the particular online task or the context of Internet usage, the time that older people spent online differed; it may be a sign of (lacking) skills (Vaportzis, Clausen, & Gow, 2017) or interest (Friemel, 2016). Spending more time than their peers may signify a risk of addiction that leads to a third-level digital divide in outcomes (Mei et al., 2016).

Researchers have developed various forms of classifications to categorise online activities. Van Deursen and Van Dijk (2014) criticised some of the approaches for being too specific on individual activities, large in size, or inconsistent. They proposed a more abstract topology that included seven areas of activity: “information, news, personal development, commercial transaction, social interaction, leisure, and gaming” (p. 261). Olsson, Samuelsson and Viscovi (2017) gave a more condensed index: “media usage, production and participation, transaction, consumption, and welfare services” (p. 46). Damodaran and Sandhu’s (2014) findings provided insights on the exact activities from these categories that older people performed online, including “seeking information on hobbies and leisure activities, health-related advice, weather, and travel” in the information and leisure category, “price comparison” in the transaction and consumption category, and “digital photo storage, and emailing” in other categories. Overall, general information searches such as looking for products online, more specific information-seeking concerning health and personal interest, and email were the top reasons for older people being online (Hunsaker & Hargittai, 2018). Younger older people tended to be more active on social media than more senior older people (Anderson & Perrin, 2017).

2.6 WHY DOES THE DIGITAL DIVIDE TAKE PLACE? HOW IS IT MANAGED?

There is a plethora of literature that focuses on ‘why’ and ‘how’ when diving into the digital divide/digital inclusion debates. While addressing the ‘what’ and ‘who’ questions have contributed to the field with insightful conceptual maps, the ‘why’ and ‘how’ questions helped address the causal relationships with the identification of influencing factors and causal mechanisms.

2.6.1 Social inequality

The debates of the relationships between digital inclusion and social inclusion study the ‘why’ question at a higher level by placing it in a social context. As discussed in Section 2.3, different opinions were held by scholars, with some asserting that the social divide caused the digital divide, some believing there was a weak causal link between the two, whilst some argued that the digital divide caused a new social divide or exacerbated the old ones. These discussions on the causal relationship between digital and social divides, particularly on the understanding of why the digital divide takes place, were largely influenced by their philosophical positions and rarely do they hold solid theoretical grounds. Helsper (2008) contributed to the discourse by examining the link between social inclusion and digital engagement critically and comprehensively from theoretical and empirical perspectives. She argued that there was a mutual causal effect in place based on the distribution process between online and offline resources that can be categorised into domains of previously identified digital divide constructs (e.g., access, skill, and attitudes). In this sense, the digitally excluded and socially excluded shared many common socio-demographic characteristics, some of which were often labelled as 'factors', such as age, gender, education and ethnicity (De Veer et al., 2015; Helsper et al., 2015; Varallyai, Herdon, & Botos, 2015).

Nonetheless, from a pragmatic perspective, identifying such general types of digital resources, which were similar to known offline resources, did not generate much additional guidance for service providers and other stakeholders to improve the situation for the digitally excluded. Scheerder et al. (2017) further explored subdividing indicators (i.e., Internet skills, Internet use, and Internet outcome) layer by layer like the development of a fishbone diagram. For example, Internet skills were first partitioned into four sub-categories, including medium-related skills, content-related, safety and security operating skills, and general ICT skills (Allmann & Blank, 2021; Van Deursen & Van Dijk, 2011), each of which is then further partitioned to an empirically measurable level. Internet-outcome related factors were found to be the most influential in determining digital inclusion. This approach provided a good structure for demonstrating the relationships between these influencing factors. Although compared to the discussions on the links between the social and digital divide, it delved deeper and provided much detailed and measurable factors, it however, provided less clue on the causal relationships in between the identified factors, thereby did not explain the underlying rationale.

2.6.2 Theoretical framework

While many researchers in this field tended to formulate a 'model' or 'collection' of factors that influence the digital divide in an ad-hoc manner based on their understandings and the quality of data they have collected, others were inclined to adopt and adapt existing models and frameworks. In addition to the theorisation of the digital divide (see

Figure 2-2), the most adopted models in digital divide literature were in fact, a wide range of ‘technology acceptance and use model’ from the discipline of Information Systems. Amongst them, Unified Theory of Acceptance and Use of Technology (UTAUT) is a framework that was synthesised from eight previous influential models, such as the *Technology Acceptance Model* (TAM) (Davis, 1989), *Theory of Reasoned Action* (TRA) (Fishbein & Ajzen, 1975), and *Innovation Diffusion Theory* (IDT) (Rogers, 1995).

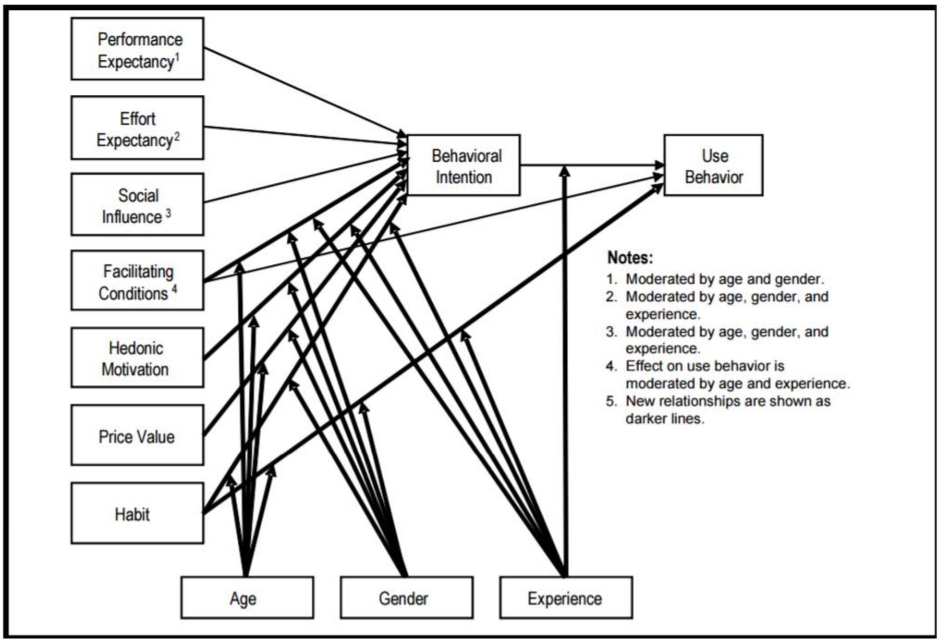


Figure 2-3 Framework of UTAUT 2 (Venkatesh, Thong, & Xu, 2012)

Venkatesh et al. (2012) extended the original UTAUT model from organisational settings to a wider consumer context, named UTAUT2 (see Figure 2-3). This framework provided a good foundation for research on digital inclusion debates with a comprehensive set of influencing factors. However, like the aforementioned models, this framework failed to show the mechanism of how exactly these factors interact and influence people’s digital decisions, behaviours, and outcomes. Moreover, a broader set of factors from the context such as environmental, social, economic and historical ones were overly simplified in these types of models (Venkatesh, Thong, & Xu, 2016; Williams, Rana, & Dwivedi, 2015), which also played a crucial role in shifting people’s mind and actions (Maxwell & Mittapalli, 2015).

Tan and Chen (2018a) proposed combining technology acceptance and using models with the practice theory from a more sociological perspective to account for both individual and environmental factors. Although social theories of practice were recognised as a complementary other than competing approach to the UTAUT model, they only drew upon the former theoretical framework in their study to gain a more nuanced understanding and contextualised perspective on the challenges older people faced in day-to-day ICT use (See Chapter 3 for an elaboration on the comparison and integration of the two camps of theoretical approaches at a philosophical level). Studies in the field of digital divide research, thus far, have mainly drawn upon Bourdieu's notions of capital, field, and habitus in explaining how people became digitally excluded (Friemel, 2016; Helsper, 2008; Ignatow & Robinson, 2017; Selwyn, 2004; T. J. Sinclair & Grieve, 2017; Tan & Chan, 2018; Van Deursen et al., 2015; Van Ingen & Matzat, 2018), lagging in the application of the latest developments in this theory developed by Shove et al. (2012) that better theorise the 'change' (see Figure 2-4), compared to other fields such as health research (Maller, 2015).

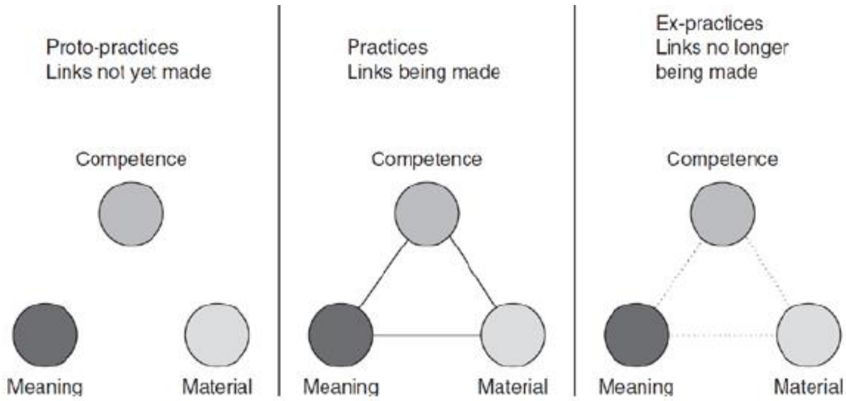


Figure 2-4 An illustration of the formation and disappearing of practices based on the three elements (Shove et al., 2012, p. 22)

The most common causes that influenced older people's use of ICTs and the Internet from various studies are categorised in Table 2-2. In these studies, factors associated with personal health conditions, perceptions and experience were most widely explored and explained concerning the corresponding technology design and support provision. In particular, health challenges older people face in later life were specified, including sight, hearing, cognition, memory, and dexterity. This conformed with reports from the field of

AHA and third-sector organisations (Age UK, 2009, 2021b; Green & Rossall, 2013; Liu & Yang, 2014), providing a basis for cross-comparison in this research.

2.6.3 Factors associated with digital inclusion

According to Scheerder et al. (2017), most studies have resorted to associating individual demographics such as gender, age, race and ethnicity, socioeconomic statuses such as education, social class or income with the digital divide at each level. Indeed, personal characteristics were the most reported factors in existing literature (Mei et al., 2016; Mitchell, Chebli, Ruggiero, & Muramatsu, 2019; Mori, 2011; Reisdorf & Groselj, 2017). Health conditions such as mobility (Nef, Ganea, Müri, & Mosimann, 2013), cognitive ability (Peral-Peral, Arenas-Gaitan, & Villarejo-Ramos, 2015), memory (Sayago, Forbes, & Blat, 2013), eyesight and hearing (Chiu & Liu, 2017) were also commonly reported as potential barriers to older people's technology adoption and use.

Attitudinal, emotional, and physiological factors (e.g., self-efficacy) (Olsson & Viscovi, 2020)were also found to be influential factors that enable or inhibit older people's digital inclusion (Cotten, Anderson, & McCullough, 2013; Neves, Franz, Munteanu, Baecker, & Ngo, 2015). For example, older people have repeatedly been reported as lacking interest in going online (Choi & Dinitto, 2013b). Doh et al. (2015b) reported that these psychological factors were, in fact, underpinned by subjective personal beliefs. Similarly, Tan and Chan (2018) found that dispositions established in earlier life stages had an impact on older people's perception of the use of ICTs and the Internet.

Some studies have examined the factors through the theoretical lens of the age-period-cohort effect from social gerontology. As explained by Fannon and Nielsen (2019), an age effect indicates the influences from the changes (e.g., deterioration in memory) through different life stages; a cohort effect refers to the particular habits and inclinations that associated with a birth cohort or a generation, like dispositions and habitus reported in Tan and Chan's (2018) study. A period effect examines the social phenomena from a particular time that affected anyone who lived in that time, such as the diffusion of the personal computer or the initiatives of 'digital by default'. There has been a stream of thoughts that ascribed the digital divide among older people to their cohort, thus arguing that the digital divide by age would dimmish as the younger generation (i.e., the digital natives) grow old (see Rogers & Mitzner, 2016). However, more studies have revealed that the cohort effect was not the only factor that has caused the digital divide among older people (Hauk, Hüffmeier, & Krumm, 2018).

The features of digital technologies and the Internet were also widely researched, particularly in computer science. Neves et al. (2015b) reported that some age unfriendly human-computer interaction (HCI) designs were responsible for poor user experiences that some older people had, causing them to think, “my hand doesn’t listen to me”. These technical features affected older people’s initial adoption and use and long-term engagement as the technologies need to be maintained (Gonzales, 2015). Some studies have found that older people also tended to find the computer jargon challenging to comprehend (Xie & Bugg, 2009). To an extent, the technical jargon has caused technophobia among older people as they felt overwhelmed and diminished by not knowing these terms (Barbara Barbosa Neves, Waycott, & Malta, 2018). In addition to the hardware, software, and the online environment were also influential factors to older people’s attitudes towards and motivations of going online (Olsson & Viscovi, 2020; Peek et al., 2014; Sum et al., 2008).

Family influence was one of the key factors to older people’s technology use/non-use reported in the existing literature. Tan and Chen (2018) referred to it as the social capitals that could be potentially transformed into digital advantages. For instance, familial support is a form of non-monetary capital that enhanced older people’s relative advantage to stay digitally included. Studies have found that encouragement from family and friends were influential in motivating older people to get online (Ma et al., 2016; Martinez-Pecino, Delerue Matos, & Silva, 2013). However, family influence can also be an inhibitor to older people’s digital inclusion. This was particularly the case when family members became older people’s proxy users because they were reluctant to teach, or wary about online scams that often trick older people (Goraya & Light, 2011; Peek et al., 2014; Tan & Chan, 2018). Table 2-3 below summarises factors from five studies that took relatively comprehensive investigations on the factors from different approaches or perspectives.

Table 2-2 Factors that influence the level and extent of older people's digital inclusion

Authors	Methods	Key criteria (age, types of digital technology, level of digital divide, and adoption of theories or models)	The main influencing factors reported
(Damodaran & Sandhu, 2014)	Questionnaire survey (n=323) and in-depth interview (n=16)	• 50+ • Digital devices with a focus on the computers • Fourth level digital divide • No	Perceived benefits, technical skills/knowledge, physical difficulties, memory, security and unwanted content, technical jargon, problems with technology
(Fischer, David, Crotty, Dierks, & Safran, 2014)	Systematic literature review (n=96)	• 65+ • Internet and health information technology (including assistive technology) • Not specified, broad sense of adoption and use • No	Familiarity and access, need for assistance, lack of trust, privacy issues, design challenges from health issues (physical, cognitive, navigation, and memory)
(Friemel, 2016)	Representative survey (n=1105)	• 70+ • Internet • First and second level of divide • No	Difficulty of use, effort and time needed, safety concerns, concerns of technical problems, proxy user, costs, access to support, health conditions (limited eyesight and hearing, memory problems, dexterity), appropriate and credible content
(Tan & Chan, 2018)	Focus group discussion and one-to-one interview	• 55+ • ICT • Not specified, broad sense of adoption and use • Practice theory	Fear of ICT, past failure, familial influence, social reinforcement
(Shirahada, Ho, & Wilson, 2019)	Survey (Japan n=182, UK n=142)	• 65+ • Online public services • Not specified, broad sense of adoption and use • No	Technology readiness (optimism, innovativeness, discomfort, insecurity), internal factors (self-efficacy, ageing satisfaction), external factors (social inhibition, social support)

2.7 SYNTHESIS OF THE LITERATURE REVIEW

Firstly, 'Digital inclusion', 'digital divide' and 'active and healthy ageing' (AHA) have been among the most intensively researched themes in academia and in practice for the pursuit of viable solutions, through which ageing-laden socio-economic problems can be tackled affordably and sustainably (Dillon, 2001; Harkness, Cameron, Latter, Ravat, & Bridges, 2012; Van Dijk & Hacker, 2011; Walker, 2002; WHO, 2002a). Indeed, good results have been reaped through tremendous hard work during the past decades. For instance, from 2011 to 2020, the proportion of older Internet users has incrementally climbed from 52% to 75% and 20% to 46% for 65-74 and 75+ age groups (Age UK, 2017, 2021b). Yet, behind these figures, little is known about how some identified factors influencing and changing older people's digital decisions and preferences, nor it is clear whether older persons will continue to use in a meaningful way and benefit from digital after going online and getting the support to remain online. Taking gain at its face value is a hindrance to possible future improvements, such as helping the 'digital dismissive' to regain trust in digital. Likewise, although digital activities of older people are studied and reported, limited knowledge has been established on the values of these digital activities from an active and healthy ageing perspective. Meanwhile, as the medium for Internet improves overtime and offers more convenience and usability, there a soar in the take-up of and the dependence on mobile devices in the older population. There was an increase by 11% for the 65-74 age group and that of 7% for the 75+ in just two years (Ofcom, 2017). However, existing knowledge on the reasons for and the implication of this change is still limited and has not kept up with the development of technologies. Hence, there is a gap in research concerning the aspects of 'time', which implies a shift to long-term informal learning (i.e., with the provision of support from family and friends and digital skills training in communities).

Secondly, although people live longer, many do not age well with their health and quality of life compromised (Age UK, 2019). Engagement in society and maintaining an independent lifestyle are related to older people's health and wellbeing (Bath & Gardiner, 2005). Therefore, it is becoming more and more important to support older people's online participation so that they can pursue an active, healthy and autonomous lifestyle in this increasingly digital world (Damodaran, Olphert, & Phipps, 2013). It thus also calls for a more people-centred and outcome-driven approach to promote positive impacts of digital on older people's daily living other than merely measuring output from those intervention projects in practice, such as simply running through checklists of gained skillsets (Helsper et al., 2015; Selwyn et al., 2003).

Thirdly, previous literature has revealed the nature and the extent of the phenomenon of ‘digital inclusion’, otherwise termed as ‘technology acceptance and use’, to be complex, multi-faceted and multi-layered, encompassing a wide range of disciplines from Human-Computer Interaction (HCI), Information Science (IS), to Sociology, Psychology and Gerontology. Therefore, many domain-specific studies have been inevitably influenced by the silos of entrenched philosophical camps as well as disciplinary epistemological priorities (Dillon & Morris, 1996). They are also constrained by practical issues such as data availability and viable methodological choices. Moreover, the evolving and adapting interpretations of concepts (Warschauer, 2003), blurring definitions (Goraya & Light, 2011), discrepant theoretical approaches (Peek et al., 2014) and various ways of empirical measurements (Centre for Economics and Business Research, 2015) altogether have led to extant literature within which the studies on acceptance determinants are often hard to compare and contrast, whereas theories and practices difficult to connect. Furthermore, while few theories and models from the field of technology adoption and use (e.g., UTAUT2) have been tested and validated in the aged population, social theories of practice with a better explanatory power have been overlooked in age-related digital divide literature. There is a dearth of a methodological approach that can capture both breadth and depth of truths that we seek after and a lack of studies that have tested the validity of existing acceptance models for the general public on the cohort of older people. In conclusion, interdisciplinary thinking and mixed methodology approaches that draw upon both theoretical fields of technology acceptance and practice theory are needed to reconcile competing interests and integrate theoretical and practical findings.

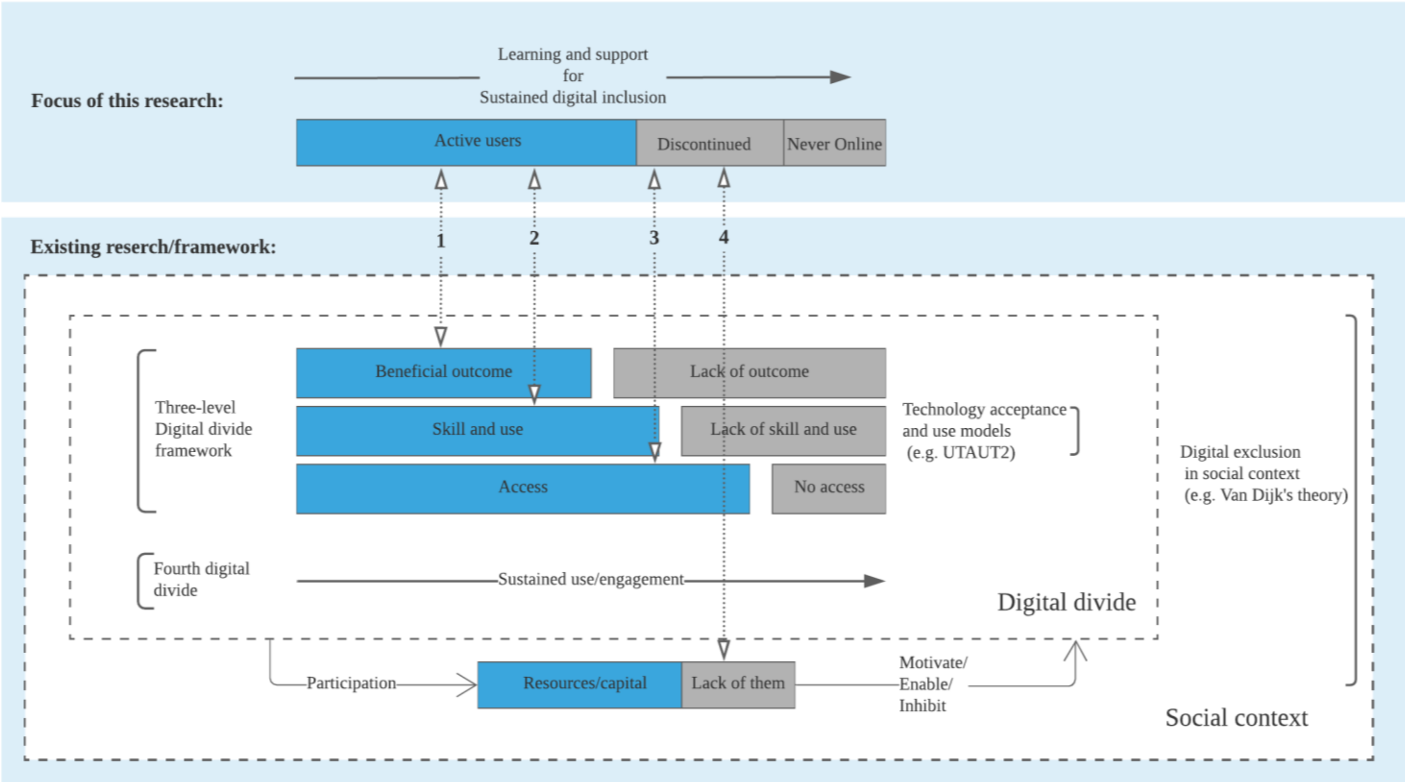
2.7.1 Theoretical and empirical gaps

Based on the above synthesis of the literature, research gaps were found in both theoretical and empirical studies. They include:

- The third level and fourth digital divide are relatively under-researched;
- The investigation of influencing factors was mainly associated with barriers or enablers concerning personal (e.g., demographics) and technological characteristics (e.g., usability). The contextual factors were paid less attention to and were often simplified;
- Previous models lack empirical verification from older people. There is a lack of older people's perspective on 'digital inclusion' and 'active and healthy ageing' concerning their daily life;
- Existing studies primarily focused on formal training/courses on improving older people's digital literacy. Knowledge on informal learning in daily life is limited;
- Few studies apply or link to the acceptance and use model (e.g., UTAUT2) and established framework from sociology such as practice theory, which makes it hard to account for the influences from the context and compare findings from different research. In addition, existing models have not been verified in the context of older people's digital inclusion;
- The lack of a mixed-methods approach makes it difficult to compare, triangulate, and complement findings from qualitative and quantitative studies, which offer different views and insights.

Overall, there is a need to delve deeper into the underpinning theories (see Figure 2-5), beliefs, and assumptions on the digital divide among older people to reflect on whether the conditions for enhancing digital inclusion in older people's daily living have changed. Accordingly, reflections should be made to check if current practices of promoting digital literacy are still coherent and fit-for-purpose. Therefore, it is imperative to keep refining the conceptual framework for digital divide research and find ways to better align research, policy, and practice in the corresponding context.

Figure 2-5 An illustration of how this research is positioned in existing digital divide research



2.8 CONCLUSION

In conclusion, understanding the concept and context of digital inclusion is of great importance. Further analysis on the groups and influencing factors is mainly dependent on the way one conceptualises them. This chapter set out the importance to be reflective of the pre-determined definitions and domains to think critically. A more comprehensive and unbiased understanding from multiple sources was sought after. The research gaps in this area were thereafter presented, based on analysis and synthesis of extent literature from multiple related fields. The next chapter sets out to describe the chosen methodology and research design to find a practical and viable way to address the research gaps.

CHAPTER 3 MIXED METHODS METHODOLOGY

3.1 INTRODUCTION

The methodology is a field of study on methods in context. It includes a system of principles to guide the interpretation of the nature of scientific inquiries, and a collection of strategies to address the research problems with appropriate methods (Teddlie & Tashakkori, 2009). The discussion of methodology thus encompasses the description of the problem domain and worldview at a foundational and philosophical level and the justification of research design, approaches, and methods adopted at the practical front (Creswell, 2014).

Building upon the research gaps and needs identified in the literature review, this chapter expounds on the methodological framework developed in this research. Section 3.2 describes the chosen research paradigm and introduces its underpinning philosophical positions. In Section 3.3, the adoption of a mixed methods approach is justified. Section 3.4 presents the sequential research design and describes the data collection and analysis. Section 3.5 Ethics-related concerns and research quality and coherence issues are discussed in Sections 3.4 and 3.5, respectively. Section 3.7 concludes this chapter and looks forward to the next one.

3.2 RESEARCH PARADIGM

This research adopted a critical realism philosophical position not only because it best accorded with the researcher's worldview but also because it appreciated the merit of different methods that are originated from competing and entrenched paradigm camps and very well supported a mixed methodology approach that this research applied. In other words, the critical realism stance refuted the paradigm incommensurability thesis that tended to divide the traditional positivism and interpretivism paradigms due to their opposing ontological and epistemological beliefs, instead of which it finds a unique position in the middle of the continuum of research paradigms where different methods, either qualitatively- or quantitatively-based, can be combined sympathetically within a single research project (Archer, 1995; Bhaskar, 1975, 1998; see Burrell & Morgan, 1979; Sayer, 1992). The rationale for turning towards this paradigm is elaborated in detail in below, where comparisons with other discarded paradigms such as positivism, post-positivism and interpretivism/constructivism are made wherever appropriate. Specifically speaking, the advantages of critical realism are first explained, following by further justifications of how it underpins this research.

Critical realism was brought up by its founding father, philosopher Roy Bhaskar in the 1970s with a modified perspective into research philosophies in the social science domain under the umbrella of post-positivism. It was later adopted by a pool of social scientists and was developed into an alternative paradigm to these long-existing schools of thought. On the one hand, like its overarching paradigm of post-positivism, it refutes the naïve ontological assumption from positivism, where the reality is believed observable and only meaningful from value-free mathematical representations (i.e. taking an empirical realism ontological and epistemological stance), so as the interpretivism/ postmodernism's belief, which asserts that the so-called reality is merely a projection of people's interpretations and feelings, hence no real-world exists on its own (i.e. taking a relativism ontological stance). By rejecting these sets of beliefs of reality and how we can approach that reality and accordingly gain knowledge about it, critical realists and post-positivists maintain that there is a standalone reality, which can only be approached imperfectly due to fallible measurements whereby triangulation of methods is needed so that to bring us as close to the reality as possible (see Alvesson & Sköldberg, 2009; Bisman, 2010; Patomaki & Wight, 2000). Whilst, on the other hand, critical realism has a unique philosophical perspective that differentiates it from post-positivism. The following sections synthesis the key aspects of critical realism based on the seminar accounts made by Bhaskar (1975, 1998), Archer (1995), Elder-Vass (2010, 2012), Mingers (2014) and Zachariadis, Scott and Barrett (2010).

First, although it also takes an ontological realism position, critical realism draws upon social constructivist's stance moderately and adopts a stratified ontology, viewing the world as three layers – the real, the actual, and the empirical (Bhaskar, 1975; Elder-Vass, 2010, 2012). The 'real' represents the deeply underlying causal powers and mechanisms that give rise to the 'actual', where events and tendencies are triggered. These events are interpreted into experiences or explain observations made by agents in the social world, thereby forming the layer of the 'empirical'. This distinctive worldview implies an appreciation of both the material world and the social world. The observed performance of digital-related practices corresponds to the domain of empirical, wherein instruments like surveys are particularly useful in identifying patterns of digital-related behaviours. It reveals causal relationships in terms of regularities. The myriad of entangled daily practices is situated in the domain of actual, where our visions are blocked or limited. There are numerous non-digital-oriented actions that exist in daily life, such as eating, driving, and shopping. They are the events that have not been directly observed but took place in life, primarily due to a pre-defined research scope, and sometimes they are just not possible to view in an empirical study (e.g., private and personal practices). The in-depth qualitative approach offers a powerful toolset here, based on which this study is built upon. The exploration of causes dives into latent, unseen causal powers and mechanisms as we move into the layer of the real. In the context of this study, it refers to the continual structuration and operation of elements in the entity of practice.

Second, unlike post-positivism, it takes a relativist epistemological position by which multi-perspective accounts that emerged from the pursuit of knowledge are all valued. Critical realists understand that gained knowledge such as theories and models are conceptually mediated, hence are intrinsically influenced by historical, social and cultural contexts (Bhaskar, 1975).

Third, critical realism gives primacy to ontological considerations and takes a relatively 'weak' epistemic position. It determines and, in turn, is reflected by its emphasis on understanding the causal powers that lay underneath our empirical experiences. Critical realism is therefore concerned with deeper causations such as structures, generative mechanisms that are relatively independent of our interpretations of events, facts, or regularities to see more accurately and comprehensively the social phenomena of interest. Nonetheless, neither the focus on ontological level exploration nor its openness to various accounts of the 'empirical' would have grounds to classify critical realism as a biased approach. Instead, critical realism mitigates bias by employing judgemental rationality, through which relative objectivism can be achieved through telling good and plausible theories from their inferior rivals. In addition, it seeks after both explanation and interpretation, with the latter as an important lens to look through and inform the former (Archer et al., 2016).

Last, due to its combination of a refined realism ontological position and an epistemological relativism position, critical realism possesses the power to deal with complex problems where social reality is entangled with material and technological reality by encouraging triangulations of perspectives and methods and by employing systems thinking, which not only has a set of processes and tools to cope with complexity but also shares the interest in the investigation of structural causations (see Mingers, 2014; Zachariadis et al., 2010).

These distinctive characteristics of critical realism are of particular importance and accord with this study. Firstly, at a conceptual level, as have presented and discussed in Section 2.4, the phenomenon of the digital divide overarches the social world as well as the material world. Whilst technology and ageing-related biology possess natural scientific qualities that can be assessed relatively objectively. The social-related layer is based mainly upon stakeholder experiences and corresponding interpretations. It is otherwise unachievable to pursue both transitive and intransitive knowledge within a paradigm which either favours realist or relativist stance.

In comparison, critical realism overcomes potential philosophical incompatibility. It has been theoretically and empirically applied, validated and recommended by social scientists from close disciplines such as Information Systems (Zachariadis et al., 2010) and business and accounting (Bisman, 2010). Secondly, at a theoretical level, this research sets out to understand better the factors that influence digital inclusion for active and healthy ageing with re-examination and combination of various strands of theories that have developed and accumulated overtime; while critical realism's unique philosophical approach makes it inherently theory-laden and concept-, cultural- and context-dependent, thereby coherently supporting such theoretical development and refinement from the philosophical sphere. Thirdly, at methodological and empirical level, enabled by critical realism positions, the researcher can capture as much reality as possible by conducting extensive and intensive research. This can help achieving a holistically and systematically richer view of digital divide amongst older population through triangulating multiple methods, for instance, data analysis, interview and site-observation, because "no matter how complex a statistical analysis or rich an ethnographic interpretation…[critical realists] get beneath the surface to understand and explain why things are as they are, to hypothesize the structures and mechanisms that shape observable events" (Mingers, 2004, p. 100). Indeed, in comparison, the inferences researchers can draw from the probabilistic analysis that is conventionally underpinned by the post-positivism risk of confusing 'what' and 'how' with 'why' and therefore understands this whole digital divide/inclusion phenomenon at a very superficial layer of reality. Moreover, since critical realist considers all accounts to be fallible and time-dependent, for example, the meanings of 'digital' and the understanding of what counts as 'active and healthy ageing' change with time, it confirms the necessity to triangulate perspectives by gathering viewpoints from older people and other stakeholders so that to keep our understandings up-to-date and relevant to the contemporary social context. Such perceptions can then be further analysed to feed into the exploration of explanatory structures (e.g., social structure) and mechanisms. These different applications of triangulations can help to confirm, corroborate and cross-validate throughout the research in terms of data collection, data analysis, and interpretation and synthesis of findings (see Archer et al., 2016).

3.3 MIXED METHODS APPROACH

This research applied a cross-sectional, mixed-methods methodology, which consisted of two or more methods within a single research project (Bryman, 2009; Creswell, 2007b; Teddlie & Tashakkori, 2010). Like that have stressed in the last section, this research aimed for obtaining a deeper and richer understanding of the digital divide phenomenon comprehensively, including reflecting upon the perceptions and theories that represent its nature, as well as investigating the underlying mechanisms that explain why and how the multi-faceted divide unfolded in the context of daily life. Thus, underpinned by a critical realism philosophical paradigm, this research accommodated both qualitative and quantitative approaches. Based on this, further triangulation and complementarity were achieved through mixing methods from different perspectives and traditions (Greene, 2007). The quantitative and qualitative approaches and methods of triangulation are discussed in more detail below.

3.3.1 The quantitative approach

The quantitative approach is usually associated with a positivist and post-positivist worldview (Alvesson & Sköldberg, 2009). According to Creswell (2014), the quantitative approach involves using numerical data to examine or test relationships between variables through statistical instruments. Thus, a quantitative approach often uses a larger sample size than that of a qualitative approach, based on which the subject under study is described and understood more systematically and extensively (Teddlie & Tashakkori, 2009). The adoption of a quantitative approach depends on multiple factors, including the research questions asked, the time scale (e.g., for data collection), the existing knowledge and theories in the field of research, the need to generalise research findings from a sample to population, as well as other practicality concerns such as available recruitment channels (Bryman, 2006). The quantitative approach is dominant in the field of digital divide research and technology acceptance and use studies (Peek et al., 2014). The commonly used theoretical frameworks are the digital divide framework that uses indicators from three levels of the digital divide (Choudrie, Pheeraphuttranghkoon, & Davari, 2018; Van Deursen & Helsper, 2015b, 2017) and the fourth digital divide (Olphert & Damodaran, 2013), as well as models such as the UTAUT and TAM (Hoque & Sorwar, 2017; Ma et al., 2016; Macedo, 2017). The quantitative approach, thus, is not only beneficial for exploratory research purposes and helpful for inquiries that aim for a more comprehensive view (i.e., the 'what' questions) on the research subject at earlier stages of a mixed-methods study (R. B. Johnson & Onwuegbuzie, 2009).

3.3.2 The qualitative approach

The qualitative approach is traditionally associated with a constructivist worldview that anchors on subjective reality, an ontological view that refutes a single truth about society and social phenomena (Creswell & Plano Clark, 2009). It is thus aligned with an interpretive epistemological approach that generates knowledge through subjective observation and interpretation. In digital divide research, a qualitative approach has been used to address the complex 'how' and 'why' questions concerning the digital inequalities through interviews or focus groups for various narratives (Malterud, 2001). By interpreting and analysing these subjective realities, a rich and in-depth understanding of the digital divide's representation in real life was gained. Compared to the quantitative approach, qualitative research is often carried out inductively to make sense of the data. Generating themes to represent the patterns in data is a common analytical approach in a qualitative study (Hargreaves, 2014). A qualitative approach has been applied in many studies in digital divide research (Ma et al., 2016; Tan & Chan, 2018; Vaportzis et al., 2017). A qualitative approach is beneficial in addressing complex problems in an open system (as opposed to a controlled environment). It is therefore often carried out in the participant's settings. In general, because a qualitative study is usually inductive and carried out in natural settings, it is helpful to bring new insights into a research topic and interpret the phenomenon in-depth.

3.3.3 Triangulation

According to O'Cathain et al. (2010), the purpose of triangulation in mixed-methods research is threefold: 1) to confirm whether the research findings are consistent, 2) to see whether they complement each other, and 3) to check whether they contradict each other. Triangulating findings from each component of this research were focused on these three aspects (see Section 6.2).

Triangulation in this research meant not only the use of multiple methods; it also entailed the triangulation of different perspectives and accounts from either theoretical or empirical grounds. Specifically, it encompassed the following ranges:

- Triangulation by methods: This included the use of both within-methods and between-methods triangulation, with the former indicating the use of different data sources within one method, whilst the latter implying the combination of different methods within one stage for the same research objective (Bisman, 2010; Denzin, 1978b, 1989);
- Triangulation by data type: This meant that both qualitative and quantitative data were collected and analysed. Findings from both types of data were compared to gain reflections upon where different forms of data agreed and supported each other, as well as where the data contradicted (Miles & Huberman, 1994);
- Triangulation by theory and story: this was adapted from the work of Bryman (2009) by adding the aspect of 'story' in addition to 'theory'. In doing so, this research managed to gain insights from multiple strands of theories and models from literature and looking for a comprehensive view of the 'empirical reality' from the synthesis of various perspectives. As discussed in Sections 2.4 and 2.6, various theories and models developed within the field of digital divide research. The digital divide framework that includes different indicators of the divide is the most adopted theoretical lens in extant literature. Concerning the 'use' of digital technologies, the UTAUT2 was a widely adopted model for technology acceptance and use research. Meanwhile, social theories have also been applied in

the digital divide research, with Bourdieu's (1984, 1990) concepts of *habitus*, *capital* and *field* heavily referenced (Helsper, 2008; Tan & Chan, 2018). In recent years, there has been a turn towards social theories of practice in information studies (Cox, 2012). This research thus triangulates these theories from different disciplinary traditions and perspectives to better understand the social phenomenon under research.

3.4 RESEARCH DESIGN

There is a wide range of classifications for mixed-methods research design. These designs reflected different perspectives and approaches on integrating the quantitative and qualitative studies, be it in the sequence that each study is carried out, in the weight of each study (e.g., one dominant of the other, or equal importance), and in interpretation and triangulation of findings (e.g., one is informed of the other) (Creswell, 2007a). These considerations are influenced by the research questions being asked and the resources available. They, in turn, dictate the process of data collection, data analysis, data integration and interpretation (Bryman, 2009).

Creswell and Plano Clark's (2009) typology of design include two major categories: sequential or concurrent. The former is underpinned by three different rationales for informing the sequence of studies: explanatory, exploratory and transformative. The latter contains three strategies as well: triangulation, nested and transformative. A sequential explanatory design usually starts with a quantitative study, while a sequential exploratory design usually beings with a qualitative study. According to Creswell and Plano Clark (2009), the first study in a sequential design is usually assigned with more weight (thus more emphasis) as it builds a foundation for the second study (i.e., a Quant + qual design). However, this is based on the scene when the data collections are related in these two studies, as they explained: "…in this design, the quantitative and qualitative data collections are related to each other and not independent. One builds on the other." (Creswell & Plano Clark, 2009, p. 185). They further explained that, although the 'Quant +qual' design is commonly adopted with an emphasis on the quantitative study, there is no such a requirement to strictly adopt this methodology total and uncritical. Depending on the differing context of each research, either of the study can be given more weight (i.e., Quant + qual design, or quant + Qual design), or, both studies are equally emphasized (e.g., Quant + Qual design).

This research adopted a sequential Quant + Qual design. This research started from an overall examination of the landscape of older people's involvement in digital skill training and digital inclusion projects with Good Things Foundation and its partners. From there, this research set out to identify the factors that influence older people's digital inclusion and understand the context that gives rise to such factors and explore and explain the changes in older people's digital behaviour (e.g., more expansive application, drop-out). This research was thus both exploratory and explanatory. Two distinctive stages of quantitative and qualitative studies were integrated for triangulation and complementarity of findings (Bryman, 2009). In other words, the data collection in this research was independent of one another. These two studies were integrated by research questions underpinned by the critical realism philosophical stance that encourages mixed-methods triangulation (Downward & Mearman, 2007). The first quantitative study was designed to answer the 'what' question that informs (but not dictates) the second qualitative study on data collection to better address the 'how' and 'why' questions. Building on existing technology use and adoption models and social theories of practice, this research aimed to develop a new framework to holistically present the influencing factors.

3.4.1 Quantitative methods

A survey is the most commonly used quantitative research method in social science (Nardi, 2018). It was the dominant research method in digital divide studies (Hacker & Van Dijk, 2000; Mendonça et al., 2015; Olsson et al., 2019b; Wresch, 1996). As a popular survey tool, a questionnaire has the advantage of reaching a large cohort for sampling and data collection free from geographical constraints (Jones, Baxter, & Khanduja, 2013). Traditionally, questionnaires were paper-based and conducted either in-person, over the phone or by post. With the prevalence of Internet access in society, an online questionnaire has gained popularity as it further removes the restrictions of time and space for large-scale studies (Sum et al., 2008). The way the questionnaires are completed implies data accuracy. For example, face-to-face or telephone data collection is often conducted by researchers or trained assistants ticking or marking the questionnaire based on the participants' answers. They can often provide explanations or guidance on the form when participants chose to answer the questions independently.

In comparison, online surveys are taken unsupervised and subject to the participants' own interpretation of and preferences over the questions. Thus, it is imperative for online questionnaires to make sure the structure is well designed and the questions are articulated clearly to mitigate misinterpretation and obtain meaningful data (Jones et al., 2013). However, because the questionnaires are online, it saves time and money compared to personal data collections (especially if there is a need to train assistants).

Some questionnaires are repeatedly taking in a longitudinal study depending on the research questions, research design, and resources available. Comparing to cross-sectional questionnaires, longitudinal data can better account for the dynamics of the phenomenon under research (Hage et al., 2016). In the field of digital divide research, it is common to use secondary data collected by the government and businesses. For example, the Office for National Statistics (2021) periodically releases data on Internet users nationwide. Ofcom (Ofcom, 2017) publishes an annual report on adults' media use and attitudes. Lloyds bank (2021) produces an annual report named "UK Consumer Digital Index".

For this research, collecting primary data through a questionnaire survey was one of the options. This method could generate the most meaningful data for this particular research. However, as this research aimed to understand older people's sustained digital inclusion through the lens of informal learning at institutions, there were several barriers to the data collection. For example, the researcher needed to gain institutional permission for data collection among their attendees. For a quantitative study that required a relatively large sample (e.g., as opposed to 30 participants in a qualitative study). Another option was to utilise secondary data collected by the government or large organisations. It has its benefits and barriers. A clear benefit would be saving time and effort. However, the usability of data is impaired because the data were collected for other purposes.

The secondary data was prioritised when connections were made with the Good Things Foundation, a leading digital inclusion organisation in the UK. Good Things Foundation's head office is located in Sheffield, which makes it accessible to the researcher and practical to work with. The Foundation designs and delivers programmes that aim to facilitate digital and social inclusion for partners ranging from the public sector to the private sector. The Foundation also runs an open learning platform called Learn My Way that helps people gain digital skills and boost digital confidence. The Learn My Way collects data from its learners through two surveys: the learner survey and the progression survey (see Section 4.3.2 for more details). Thus, this method for the quantitative study data collection was adopted. The researcher obtained a PhD placement with the Foundation to carry out data analysis.

3.4.2 Qualitative methods

There is a wide range of qualitative methods, such as interviews, focus groups study, observation and ethnographic approaches (Creswell, 2007a). Interviews are ‘conversations with a purpose’ (Burgess, 1984, p. 102) held flexibly and conversationally. In contrast to the questionnaire survey, this method is more interactive and situational and approaches acquiring knowledge and understanding from a relativist epistemological position (Bauman, Beck, Beck-Gernsheim & Benhabib, 2002). It facilitates both exploratory and explanatory studies by bringing more nuanced, in-depth findings derived from both verbal and non-verbal dimensions. Within the family of interviewing techniques and data collections methods, a semi-structured interview was adopted for this study. A semi-structured interview involves the researcher asking participants a set of pre-determined but open-ended questions (McIntosh & Morse, 2015). By doing so, the researcher retains control over the overall interview process and generates data on key themes that are of primary interest (DeJonckheere & Vaughn, 2019). In addition, this technique provides the opportunity for new themes/topics to emerge during the discussions.

These advantages, which are unique to semi-structured interviews, fit the purpose of this study: first, being the second phase of mixed-methods research, the design of this study was informed by findings from the previous quantitative analysis, as well as the literature review. In other words, the interviews were built upon a set of pre-defined themes (e.g., influencing factors from the existing literature) and therefore required a certain degree of structure and rigour; second, this study probed digital inclusion from a relatively under-researched perspective and therefore needed to allow for emerging themes and the thoughts of the informants to be unveiled. The open-ended questions enabled the researcher to pursue such information during the interview (Bryman, 2006); third, ‘experience’ (of learning and using the Internet) is a fluid and dynamic concept that can never be fully materialised and operationalised (Tan & Chan, 2018). Correspondingly, it requires a flexible and reflexive approach to address this during the data collection. Semi-structured interviews can empower the researcher to get as much relevant information as possible on the informants’ experiences in using digital devices through conversations; last, this study has time constraints as a part of a PhD project. Therefore, it required the researcher to collect valid information and data within a limited time frame. Semi-structured interviews helped avoid dispersive conversations that may hinder the progress of the research. The time-frame constraint was also another reason that this study prioritised interview over ethnographic approach.

In relation to the quantitative study, interviews can be used to address any issues or questions that arose from the quantitative study (O’Cathain et al., 2010). Interviews can also compensate for the methodological limitations of the surveys concerning the inclusiveness and accuracy of measurement instruments, allowing for a more in-depth exploration. For example, a single question with binary answers on access to the devices cannot capture important nuances that relate, for instance, to the quality of access (Hunsaker and Hargittai, 2018). Moreover, although the quantitative study could develop a sketch of participants’ digital behaviours, more information is being left out as only static information could be captured. As discussed in Section 2.3.2, the concept of digital inclusion is shifting. It is considered a dynamic process (from a within-person perspective) and a relative status (from a between-person perspective). The experience of using digital technologies is expected to have a strong influence on older users’ continuous adoption of technology. Because of their dynamic nature (Schreurs et al., 2017), interviews were identified as a more appropriate tool to collect such information.

3.4.3 Data collection and analysis

For the quantitative study, the following information regarding the Learner and Progression survey data was identified before analysis.

Data collection method. All data were anonymised at the point of collection and was administered by a third-party research organisation. Learner survey participants were self-selected. They completed the survey online, whereas the professional research organisation collected progression survey data over the telephone. Data collection for the progression survey took place three months after the completion of learning.

Data accessibility. The researcher could access all available SPSS files for the two surveys and aggregated files for the surveys in Excel format.

Data update interval. Data for the learner survey was updated monthly, whilst data for the progression survey was updated quarterly.

The assessment of data quality and accuracy and the methods used for data analysis are detailed in Sections 4.3 and 4.4. All data analyses were conducted with the help of SPSS software.

The qualitative study aimed to collect intensive qualitative data/information from the accounts of older people themselves regarding their digital-related decisions, behaviours and online/offline outcomes so that to seek explanations and illustrations on the statistical findings gathered in the quantitative study, thereby "putting meat on the bones of dry quantitative findings" (Harrison & Reilly, 2011, p. 10). In the meanwhile, by incorporating older people's perceptions on topics of 'digital inclusion' and 'active and healthy ageing', triangulation of perspectives can be exercised by adopting a 'bottom-up' approach that values older people's opinions, in addition to a conventional 'top-down' manner where perspectives from scholars and policymakers are frequently amplified and prioritised (see Sayago & Blat, 2010; Sourbati, 2009; Stenner, McFarquhar, & Bowling, 2011).

As the existing literature revealed (see Section 2.5), the cohort of older people is heterogeneous and is consisted of numerous sub-cohorts, depending on the partitioning criteria (Rogers & Mitzner, 2016). Hence, a combination of purposive and snowballing sampling methods was used (see Thompson, 2012). Details of the data collection and analysis for the qualitative study are presented in Section 5.3. More specifically, study design, research setting, sampling and recruitment can be found in Sections 5.3.1 to 5.3.3. Details of the pilot study, data collection, data saturation, transcription and anonymisation are presented in Sections 5.3.4 to 5.3.7. In addition, the method for data analysis (i.e., template analysis) and reliability and validity (see Table 5-1) of the study are demonstrated in Section 5.4. The integration of the two studies is detailed in Section 6.2.

3.5 ETHICS CONCERNS AND REFLECTIONS

In addition to adherence to the ethics-related codes of practice from the University (see ethics approval letters in Appendix 2-4, the Good Things Foundation also had its data protection policy that provided essential guidelines and governance on research and work, encompassing ranges of data collection, data storage, data retrieving, data analysis, and data sharing. These protocols have prompted the researcher to consider the following ethical challenges and mitigation actions.

Table 3-1 Ethical concerns and mitigation actions

Ethical concerns	Mitigation actions	Risk level after action
Survey data Missing; Leaking; Unauthorised use	The researcher obtained permission from Good Things Foundation for conducting data analysis; The data were transferred with encrypted USB and were only analysed on password-protected laptop; Only aggregated and anonymised data were taken from Good Things Foundation office for further analysis, which was carried out on password-protected laptop; no paper-based material was produced, and all data were securely stored in University drive.	Low
Qualitative data collection	The researcher ensured the anonymity of participants and obtained an informed consent form before commencing research.	Low
Safety hazards	The locations of interviews were carefully selected against the criteria of convenience, safe, comfortable, and quiet; The researcher updated supervisors before and after each interview as additional safety measures.	Low

3.6 QUALITY OF THE RESEARCH

The set of criteria for the assessment of the quality of research were articulated differently for qualitative research, and quantitative study, with the former, includes concepts of ‘credibility’ and ‘trustworthiness’. The latter includes ‘reliability’ and ‘validity’ (Guba & Lincoln, 1994). Since this research adopts a mixed methods approach, both sets of criteria were deemed as relevant.

Referring to the research design in Section 3.4, methods employed are stated explicitly by stages of research. Hence they can apply by quantitative-set of rules and qualitative-set of rules with ease. However, by employing a mixed methodology, the integrity, coherence, and quality of the whole research were also subject to the quality of integration. In doing so, the quality of this study can be improved as the whole can provide more information than an aggregation of the parts (O’Cathain et al., 2010). In addition, by mixing methods, this research achieved triangulation and complementarity that seek corroboration between different forms of data so that to ensure confidence in the conclusions drawn and initiation that discovers contradictions, from where new perspectives and insights can be attained so that to further develop the research. Furthermore, the researcher kept reflexivity to adapt the research design to the shifting environment (e.g., pilot study in 5.3.4). In this way, the quality of research was preserved.

3.7 CONCLUSION

In conclusion, this chapter has described how the articulated research questions were practically approached. Section 3.1 briefly introduced the logic and structure of this chapter, followed by Section 3.2 that discussed the chosen research paradigm and its rationale. Section 3.3 set out the mixed methodology, and Section 3.4 presents the research design with the reasoning of the methods chosen. Section 3.5 and 3.6 explored ethical issues and the quality of research involved in this study. The next chapter provides findings of the quantitative study.

CHAPTER 4 THE QUANTITATIVE STUDY

4.1 INTRODUCTION

The rationale for undertaking a quantitative study and the corresponding methodological design (Section 3.5.1) were discussed in the previous chapter. As part of a more extensive mixed-methods research, this chapter is dedicated to present the findings from two survey datasets ('Learner' survey and 'Progression survey') from this quantitative approach. The Good Things Foundation (n.d.) (see Section 1.2) collected these two datasets from the learners of the 'Learn My Way' (LMW) platform. This free online platform offers various structured courses for digital novices to learn about the concepts of and operations around computers and the Internet. Statistical analyses were performed on the datasets to understand the digital divides among older survey respondents (aged 65+ years) and the factors that influenced their status of digital engagement. The conceptual models of the digital divide and technology acceptance model, the unified theory of acceptance and use of technology (UTAUT2) (both presented in Chapter 2), were used as the theoretical lens to guide the process of analysing and interpreting the datasets as well as structuring the findings from subsequent data analysis.

This chapter is organised into eight sections. Following this introductory section, Section 4.2 sets out the aim and research questions for this quantitative study. In Section 4.3, the setting against which the surveys were undertaken is explained. The sampling methods, the survey structure, and the coding processes are also clarified. Section 4.4 presents the statistical techniques applied in the data analysis. Findings from the learner survey are detailed in Section 4.5, while these from the progression survey are shown in Section 4.6. Section 4.7 triangulates the results from both surveys and further explores the factors that influence the level of digital engagement among the older learners of the LMW courses. Section 4.8 concludes this chapter and looks forward to the qualitative study in Chapter 5.

4.2 AIM AND RESEARCH QUESTIONS

Following the research design in the previous chapter, this study aims to understand the level of digital divide among older people and how they sustain their access to and use of the Internet through learning and training. Therefore, this study sets out to take an extensive and quantitative-oriented approach to meet the following objectives:

1) To characterise who were the older learners of the LMW courses;

2)To uncover the extent of the digital divide among older people who undertake digital skills training courses;

3) To understand how older people engage in digital skills learning and thus enhance their level of digital inclusion;

4) To identify factors that are potentially associated with the digital divide.

With the help of the Good Things Foundation, a UK leading digital inclusion charity (described in Section 1.2), two survey datasets collected from the learners of LMW, a digital learning platform used by both online and offline learners, were obtained for data analysis. Before beginning to introduce the digital skills training landscape, the LMW courses, and the two datasets, the research questions are stated as follows:

RQ1: What is the landscape of the digital divide among older people engaged in the informal learning of digital skills?

1. What were the profiles of the older digital skills learners of the LMW courses? What were their motivations to start learning on the LMW platform?
2. To what extent were they digitally included or excluded before and after undertaking digital skills training?
3. In what ways did they use the training courses to manage their daily life and maintain their online participation?
4. What were the factors that influenced the level of their digital inclusion and learning?

4.3 THE SETTINGS AND THE DATASETS

4.3.1 Digital skills training in the UK

Maintaining a sustained and meaningful use of ICTs and the Internet requires one to learn how to keep up with the technological developments (in both hardware and software) and a growing list of digital skills that are deemed to be 'basic' or 'essential' in society (Department for Education, 2019). There is a diversity of digital skills initiatives in the UK. A variety of digital skills training has been developed, ranging from offline to online courses and structured forms to an informal drop-in session (Morris et al., 2007). However, the abundant resources do not all translate to equal learning opportunities and support for older people. As Sandhu et al. (2013) observed, many of the courses have been designed for the working force to boost the digital economy, while others targeted novice computer learners of all age groups. They concluded that most retired people found the former types of courses less relevant and the latter, with mixed age groups, challenging to follow. A plethora of courses thus emerged to address the specific learning needs of older people. Organisations such as Age UK (2021a), Good Things Foundation (together with Online Centres Network) (2021), libraries (Department for Education, 2019), University of the Third Age (U3A), local community centres and other government-, or local council-funded agencies are among the leading providers of tailored digital learning support for older people (Sandhu et al., 2013).

4.3.2 The Learn My Way courses

Although collecting primary data through a purposefully designed questionnaire would have been ideal to best fit the study aim, this was challenging to operationalise during the timeframe of a PhD. Because this study used the lens of digital skills learning to examine the extent of the digital divide among older people, sampling and data collection would require gaining access to and approval from the course providers or other authorities and obtaining consent from the participants. Secondary data from relevant parties in the digital inclusion sector was therefore prioritised and sought after for this study. The Good Things Foundation, a Sheffield-based leading digital inclusion charity, was approached partly for the convenience of location and a strong network of resources in the very frontline of digital inclusion projects.

Developed by the Good Things Foundation (GTF), the LMW is a free online digital learning platform for beginners of all age groups. It encompasses a wide range of subjects on using ICTs and the Internet, such as ‘using your computer or device’, which teaches the learners how to operate digital devices (e.g., turn on the computer), the ‘online basics’, which teaches them how to search for information and fill in forms online, and other media resources that guide them through using online services and support for everyday life and work. These include managing health and finance, use of public services, online shopping, and job searching.

In addition to serving as an open-access online resource, the LMW is also utilised in offline digital skills training sessions delivered by course providers from the Online Centres Network (the Network). The Network, formerly known as UK Online Centres, is organised by the GTF to promote digital inclusion by providing public access to computers and courses for digital skills development. It consists of more than 5000 partner centres around the UK. The centres are based in various organisations, including libraries, local community centres, faith groups and other less conventional settings for teaching and learning, such as cafés and restaurants. Compared to completely self-directed learning of digital skills, learners who take the LMW courses benefit from additional support from tutors and/or volunteers. In particular, older people with less experience and knowledge of computers can benefit the most from taking the LMW courses at a centre rather than learning at home. Some centres within the Network specifically tailor their training sessions for older people with varying learning needs. Referring to the definition of informal learning in Section 1.3, the structured learning contents on the LMW thus facilitated both formal and informal types of learning based on how the learning sessions are delivered at these various organisations. Many older people, being retired but still very socially active, tend to use the LMW for informal digital skills learning for day-to-day activities. This is supported by results presented in Sections 4.5.2.1 and 4.6.2.4.

In summary, the LMW system has the potential to reach a broad audience of digital skills learners of all age groups, not only online but also offline at various types of venues, some of which adapt their sessions and prioritise the needs of older people. The LMW is a good example of the UK's overall landscape of digital skills training (as introduced in the above Section 4.3.1). Learning how older people access, make use of, and progress from the LMW courses provides an excellent perspective to understand the many facets of the digital divide among older people.

4.3.3 Methods

Existing secondary data for this study were derived from two ongoing surveys of registered LMW learners across the UK, namely the Learner Survey and the Progression Survey. The GTF initially developed the surveys to monitor and improve learner satisfaction and outcome. The researcher was granted access to all available SPSS files of both surveys and aggregated data files in Excel format during a three-month placement at the GTF between January and April 2018 (see Appendix 2 for ethics approval from the University of Sheffield). Both surveys were conducted on a rolling basis from learners of seven age groups, including older people aged 65 and over. Data collected from the group of older people were used as the primary source for statistical analysis. In comparison, data from learners of younger age groups were referred to as necessary to gain an understanding of the context in which older people approached the learning support.

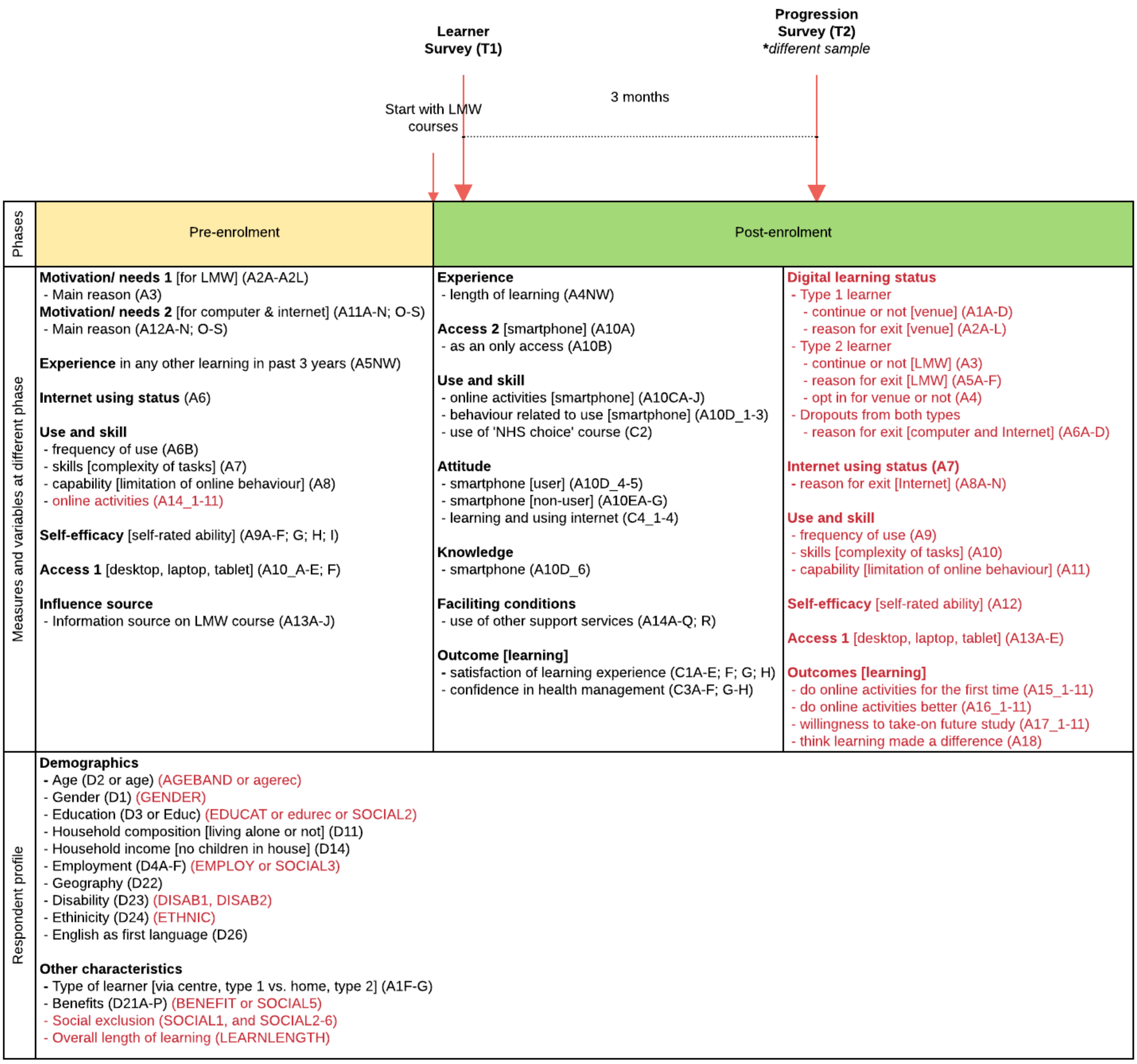
Learner survey participants were self-selecting and completed the survey online. The learners were invited to the survey through a pop-up link shortly after their registration on the LMW website. They were given the flexibility to finish it before, during, or after the learning sessions. Questions in the learner survey[5] include demographic profiles, indicators of previous levels of computer literacy, past learning experience, motivations of learning, general attitudes toward computers and the Internet and so on.

The progression surveys were conducted over the telephone by a professional third-party organisation using the base of learner survey participants. This happened three months after the learner survey. The progression survey was developed to gain information on the respondents' improvements in using the Internet. The questions included changes in learning and use of online services before and after the LMW courses, the impact of taking the courses and so on. (see Footnote 5).

[5] By the time of thesis submission (10/07/2021), it is still under review by the Good Things Foundation and its partnering research company that designed the surveys whether permitting an inclusion of survey questionnaires in this thesis would cause any IP issues. Therefore, both survey questionnaires (i.e., learner survey and progression survey) are not attached as appendices before an approval is granted by the Good Things Foundation.

Survey questions and measures from the two surveys were first studied thoroughly to make sure they would adequately address the research questions. After the first round of assessing the survey datasets, a breakdown of potentially useful variables and corresponding codes from both surveys was developed (as shown in Figure 4-1). The variables/measures are placed along a basic timeline, with a font in black representing the learner survey and a font in red representing the progression survey.

Figure 4-1 Breakdown of measures in the survey by timeline (black font indicates the measures in the learner survey, while red font indicates the measures in the progression survey)



For both types of surveys, the participants are entered into a monthly prize draw where participants could win £25 vouchers to be used either at high street stores or online. Each learner of the platform can only participate in the survey once. All data were anonymised at the point of collection and were administered by a third-party organisation. All the original files were password-protected for data security. Additional measures were taken to ensure data security for this study, and this included:

1) the researcher analysed the raw data at the GTF head office;

2) the researcher was supported by her departmental IT service with the provision of a password-protected laptop for data analysis.

Data accuracy was ensured by:

1) the design of the questionnaire. For example, the questions were articulated with clarity to avoid confusion;

2) the reflective process. The surveys were first in use in 2011 and have since been revised and adapted under critical reviews to mitigate measurement inaccuracy;

3) using a professional survey team. A third-party professional research team monitored the survey and used trained staff to conduct the progression survey via telephone.

4.3.3.1 The learner survey dataset

The learner survey was organised into five sections: learner history, employment, satisfaction, demographics, and closing questions on willingness to participate in the progression survey. For personal data protection, the survey participants were anonymised at data collection and were not tracked for their progress in the progression survey. One implication of this approach was that the two surveys could not be linked but were treated as separate surveys from the same sample. For this reason, the final section from the learner survey was excluded from further data analysis in this study.

Previous studies have shown that age is one of the main moderating factors for older people's digital-related attitudes, beliefs, decisions and activities (Hauk, Hüffmeier, &

Krumm, 2018; Helsper, 2009; Wang & Sun, 2016). According to the latest official data on Internet users in the UK, the proportion of active Internet use dropped considerably from the age group of 65-74 (85.5%) to older people aged 75 and over (54.0%) (Office for National Statistics, 2021). In both surveys, all respondents were asked their age band instead of their actual age in the demographics section. Older people were clustered into a grand age band of '65 or over'. Thus, there was a limitation in seeing older people as a homogeneous group by age. This limitation will be addressed later in the qualitative study in Chapter 5: the Internet use among older people in a younger generation (i.e., those aged over 65) was compared with those at more senior age (i.e., those aged over 80). In this study, other indicators, such as education, were used to reflect the heterogeneity in digital engagement within the cohort of older people. In addition, a more comprehensive understanding of older people's use of the Internet and learning was achieved by comparing the age group of 65+ with the other six younger age groups.

4.3.3.1.1 Sample

As introduced earlier in Section 4.3.3, the learner survey participants were self-selected learners registered with the LMW courses from across the UK. Due to a mixed delivery model (i.e., both online and offline) based on a wide-reaching network of centres, the participants comprise a sample of the UK population who undertake digital skills learning for digital inclusion. Data collected from a period of seven months, from April to October 2017, formed a convenience sample for two reasons. First, the survey questions had been amended and updated since their first use in 2011. As a result, there was a need to reconcile the discrepancies in the datasets collected for different versions of surveys *post hoc*. Second, the group of older people was found, in general, to be under-represented (approx. 10.0% of all age groups) in the survey. There was a lack of a large enough sample size in the monthly survey data concerning this age group (n=16-22 monthly participants during the seven months). This might have resulted from a low response rate from older people, considering the difficulty of completing this survey online. This, nevertheless, also conformed to the general background of digital skills training introduced in Section 4.3.1 in that many training opportunities benefit the workforce more than older people. Therefore, the selected data spanning seven months in 2017 provided an optimum balance between data consistency and sample size. After aggregating the monthly data, a total of 1,217 participants were included in this study, of which 10.2% were people aged 65 or above (n=124).

4.3.3.1.2 Mapping the learner survey assessments

To address the research questions in this study by means of the learner survey data, the survey questions were further examined and mapped against the conceptual model of the digital divide (i.e., the first-, second-, and third-levels of the digital divide and a fourth digital divide) and a technology acceptance and use model, the UTAUT2 (described in Section 2.6.2). The conceptual model of the digital divide provides a good framework to identify varying forms of the divides as dependent variables (i.e., motivation, access, skills, use and outcome) from the survey (Van Deursen & Helsper, 2017). The UTAUT2 is a refined model of the UTAUT, a widely accepted model for predicting technology acceptance in the MIS field (Ma et al., 2016; Venkatesh, 2003). Both UTAUT and UTAUT2 are focused only on the digital divide in 'use'. Compare to its precedent, the UTAUT2 was adapted and extended for the consumer use context other than an organisational setting (Venkatesh et al., 2012). It included constructs from the personal domain such as 'hedonic motivation', also known as 'enjoyment expectancy', and additional relationships between the indicators and dependent variable (e.g., 'facilitating conditions' exert a positive impact on the 'behavioural intention' to adopt and use the ICTs) to improve the explanatory power of the model on technology use. In summary, the conceptual model of the digital divide phenomenon and the explanatory model of the digital divide in use (i.e., UTAUT2) built a framework for examining the relationships among existing measurements in the dataset.

The two models were not adopted in their complete versions. A subset of their constructs or concepts were used wherever variables to represent these were available in the dataset (i.e., the constructs were fitted to the available data as the questions were not designed to measure these concepts). This is not uncommon in existing publications that apply the models of the digital divide (Van Deursen & Helsper, 2015b; Van Deursen & Van Dijk, 2019), or the UTAUT2 (Macedo, 2017; Venkatesh et al., 2012). The measurements in the survey that corresponded to the concepts from these two models were identified through mapping. In addition, the survey brought new insights on digital skills learning, an essential dimension of the concept of technology maintenance or sustained use of the ICT in the fourth digital divide (Damodaran et al., 2014; Gonzales, 2015; Olphert & Damodaran, 2013; Pihlainen, Korjonen-Kuusipuro, & Kärnä, 2021; Sandhu et al., 2013; Selwyn et al., 2003), which was underdeveloped and not operationalised in extant models for the digital divide and technology adoption. Hence, measures on digital skills learning in the learner survey were also included in the statistical analyses to extend the current models. Not all measures of the digital divide were taken in the learner survey; some were reflected in the progression survey and detailed later in this section. The relevant parts of the learner survey are described below.

Motivation. Motivation was assessed through two dimensions: motivation for learning with the LMW, and motivation for learning about computers and the Internet. The former was first measured with 12 questions using a dichotomous response scale (i.e., yes/no). The participants were then asked to select one out of the 12 items as the main reason that drove them to uptake the LMW courses. Similarly, the latter was first measured with 14 questions using a binary response scale of yes or no, and these corresponded to the following concepts of the UTAUT2: *hedonic motivation* ("learning for personal interest" and "online entertainment"), *social influence* ("keeping in touch with friends and family"), *performance expectancy* ("online shopping", "saving money", "online banking and budgeting", "finding health information online", "work-related learning", and "using government or council services online"). These questions were further grouped into five dimensions: general, financial, health, work, and online services.

Access. Access was defined as physical access to an Internet-connected device before commencing the LMW courses. The devices measured included desktop computers, laptop computers, tablet computers, and smartphones. The questions were asked in a straightforward manner using a dichotomous response scale of yes or no. In addition, the place of access to the learning courses also reflected access to devices since most of the centres provided learning equipment.

Skill. The survey participants were asked for their level of digital skills prior to the LMW courses. It was measured in two dimensions: the complexity of use and self-efficacy. *The complexity of use* was assessed by three categories indicating the ability to use the Internet: "one or two simple things like sending email, using a search engine, or posting on Facebook", "a few more complicated things like filling in an online form, making an online purchase", and "I could not do any of these things". *Self-efficacy* is one's belief in his/her ability to achieve a particular goal (Doh, Schmidt, Herbolsheimer, Jokisch, & Wahl, 2015a). In this survey, it was simplified as the self-rated level of digital skills. It was measured by a 5-point scale (i.e., excellent, good, fair, poor, or bad).

Use. Participants were first asked for their prior use of the Internet before taking the LMW courses (i.e., an active user of the Internet, a discontinued user of the Internet, or never used the Internet before). The status of being an active user of the Internet or not is an indicator of sustainability in digital inclusion. The dimension of use was measured by two items: frequency of use and breadth of use for active users. The former was assessed by using a 4-point scale ranging from "daily", "weekly", "less than once a month", to "monthly". The latter was measured using the following categories: "only use websites visited before", "use maybe one or two sites that haven't visited before", and "use lots of websites that haven't visited before". In addition, four statements concerning general attitude towards using the Internet were asked and coded on binary categories of "agree" and "disagree".

Smart phone use. Participants were asked questions specifically about their use of smartphones, including the online activities, attitude towards using smartphones to go online. All the categories were coded as dummy variables, that is, to assign the value of 1 to indicate the presence of each category and the value of 0 to indicate the absence of that category. For example, for a categorical variable 'online activity' that has seven values, including 'finding health information', the category of 'finding health information' is then coded as a dummy variable (1/0) indicates yes or no to the online activity of 'finding health information'.

Outcome. It was defined as the outcome of learning in this survey and was assessed through two dimensions: satisfaction of learning experience (measured in a 5-point scale from excellent to poor) and increased confidence in health management (measured in a 5-point scale from strongly agree to strongly disagree).

Learning. The participants were asked through which channels they learned about the learning opportunity. The channels were coded as dummy variables ranging from word of mouth, local library, leaflet to media like television, etc. The participants were also asked if they had undertaken other digital skills learning three years prior to the LMW training. In the UTAUT2 model, *experience* is defined as the familiarity of a targeted technology for adoption. For example, it was operationalised as the time (e.g., less than one year) of Internet usage (Macedo, 2017). In this survey, the length of Internet use was not directly measured. However, because this study aims to understand how older people sustain their digital inclusion through the lens of digital skills learning, and that previous studies have found that learning was closely coupled with ICT use among older people (Damodaran, Gilbertson, Olphert, & Sandhu, 2015; Ramondt, Sandhu, & Damodaran, 2013; Selwyn, Gorard, & Williams, 2001), the *length of learning* was assessed as an alternative measure. It was defined as the duration of learning on the LMW from registration until the time of taking the survey. It was coded on a 5-point scale ranging from "the first day" to "more than two months".

Facilitating conditions. The *facilitation conditions* from the UTAUT2 were defined as the access to resources and support that facilitates the process of technology adoption (Vassli & Farshchian, 2018). When matching the variables from the survey to the concept of *facilitating conditions,* those that measured the contextual influences from the site of digital skills training were used. The participants were asked if they also used other services or support at the centre they attended in the corresponding survey questions. The responses were coded into a set of dichotomous variables such as "socialising and seeing other people". This approach drew upon previous studies that pointed out participation in non-digital related activities also facilitated digital skills learning among older people (Pihlainen et al., 2021; Sandhu et al., 2013).

In addition, the demographics of the participants were collected in the survey. *Age* was coded in seven categories from "under 15" to "65 or over". *Gender* was assessed by two categories (male and female). *Education* was assessed by five categories from "no qualifications" to "degree level or higher". *Household composition* was measured by categories of "just me" or "myself and one or more others". *Household income* (5-point scale ranging from up to £8,499 to £13,000 and above), *employment* (full time, part-time, self-employed, retired, or unable to work), *geography* (city, large town, small town, or village), *disability* (a condition that limits basic physical function, learning disability, mental health problem), *ethnicity* (white British, white Irish, BAME and other), and *English as first language* (yes/no) were also measured.

4.3.3.2 The progression survey dataset

As mentioned earlier in Section 4.3.3, the progression survey was conducted quarterly by telephone by a third-party market research organisation. The progression survey used the base of learner survey respondents and took place three months after the original data collection from the learner survey. For example, if learners participated in the learner survey on 1st June, they were contacted by telephone for a follow-up progression survey from 1st September.

The survey was organised in four sections: changes before and after the learning, impact of learning on employment, use of online services, and closing questions on participation in follow-up studies in the future. Data collected from the first and third sections were prioritised for this study under considerations of sample size and relevance. Data were coded in SPSS similar to those from the learner survey. Compared to the learner survey, the progression survey retained the majority of the demographic measures and indicators of the digital divide (e.g., access, digital skills, use and outcome). However, it differed from the learner survey in its scope. It brought new perspectives through questions on how learning was associated with using and maintaining Internet-enabled ICTs. The differences in measures are detailed below.

4.3.3.2.1 Sample

The response rate was around 10.0% of the base of the learner survey and was therefore aggregated over time to attain a larger sample size. In the end, a rolling file that consisted of data collected between July 2015 and June 2017 (n= 1153, of which people 65 or above n=275, 23.9%) was selected for analysis. The participants from the above-specified duration of eight quarters correspond to those included in the learner survey between April 2015 and March 2017. As previously explained in Subsection 4.3.3.1, the progression survey did not track the progress of individual learners since the learner survey due to data protection. Thus, the progression survey was treated as a survey separate from the learner survey, i.e., they were not longitudinal but were repeated cross-sectional surveys. It was, however, possible to reflect on the changes in learning and use of the Internet among the participants from the section of ‘before and after’ questions. In addition, findings from analysis on each dataset are compared and triangulated wherever possible in Section 6.2.1. This also sheds light on the influences of learning on sustaining the participants' Internet access and use. Such a methodological approach is supported by the underpinning philosophical beliefs from critical realism explained in Section 3.2.

4.3.3.2.2 Mapping the progression survey assessments

The process of mapping the learner survey questions to the theoretical framework (i.e., the models of the digital divide and the UTAUT2) was repeated for the progression survey. The relevant parts of the progression survey are described below.

Access. Access was defined as physical access to an Internet-connected tablet, laptop, or desktop computer where the participants lived. Access to each type of device was coded as a dummy variable. The type of centre that the participants accessed for their learning was also recorded as a variable for access to equipped devices at the centres.

Skill. The survey participants were asked what they were able to do online without any additional support. Similar to the learner survey, this was measured by two dimensions: the complexity of use and self-efficacy. *The complexity of use* was assessed by three categories indicating the ability to use the Internet: "one or two simple things like sending email, using a search engine, or posting on Facebook", "a few more complicated things like filling in an online form, making an online purchase", and "I could not do any of these things". *Self-efficacy* was simplified as the self-rated level of digital skills and was measured using a 5-point scale (i.e., excellent, good, fair, poor, or bad).

Use. Participants were first asked for their *status of Internet use* at the time of taking the progression survey (i.e., an active user of the Internet or a discontinued user of the Internet). The discontinued users were asked why they stopped using the Internet. The reasons were coded as dummy variables, including *interest* ("I am just not interested"), *access* ("I have no longer got an Internet connection", "I no longer have a computer available"), *attitude* ("It's not for people of my age", and "it's not for people like me") and concepts that can be mapped to the UTAUT2, including *effort expectancy* ("It was too difficult to use"), *performance expectancy* ("It was not useful"), *price value* ("It was too expensive"), *experience* ("I had bad experiences with spam or viruses", and "I was worried about my privacy") and *habit* ("I don't have enough time", and "I was spending too much time on it"). For active users, the dimension of use was measured by two items:

frequency of use and breadth of use. The former was assessed via four categories ranging from “daily”, “weekly”, “less than once a month” to “monthly”. The latter was measured by the following categories: “only use websites visited before”, “use maybe one or two sites that haven’t visited before”, and “use lots of websites that haven’t visited before”.

Outcome. In addition to health-related outcomes in the learner survey, the outcome was assessed in further domains in the progression survey. First, data were collected for the online activities that participants performed before learning. It was set as a baseline to compare with the participants’ online engagement after learning. Second, the participants were asked if they had used the Internet for a particular activity for the first time since starting learning. Third, they were asked if they had learned to perform a particular online activity better since learning. Fourth, the participants were asked if they were interested in learning how to do things online in the future. All four dimensions were assessed by 11 items: finding work online, gaining work-related qualifications, doing things of personal interest, accessing online entertainment, keeping in touch with family and friends, online shopping, using price comparison to save money, online banking, finding health information, claiming benefits online, and using other government or council services online. All these items were coded as dummy variables. Outcomes from learning with the LMW were also investigated.

Learning. On the one hand, participants who took the LMW courses at an offline class in the centres (i.e., Type 1 learner from Figure 4-1) were asked if they were still attending the centre where they did their learning. They were asked the reasons for still going to the venue, including “yes, to learn about computers and the Internet”, “yes, for other learning”, “yes, for other support or service” or “no”. These corresponded with the *facilitating conditions* from the learner survey and were coded as dummy variables. For those who stopped learning, they were asked for the reasons for discontinuing. These reasons were also coded as dummy variables, ranging from course-related reasons such as “I had got all the help I needed”, “It didn’t seem to be useful to me” to circumstantial reasons such as “personal circumstances” or “centre shut down”. On the other hand, participants who took the LMW online independently (i.e., Type 2 learner from Figure 4-2) were asked if they were still learning, including “still learning about computers on the LMW”, “still learning about computers and the Internet but no longer on the LMW” and “no longer doing any learning about computers and the Internet”. The participants who discontinued the LMW courses and those who stopped digital skills learning completely were asked follow-up questions on the reasons for dropping out, respectively (dummy variables created for each reason). Moreover, the overall length of learning was measured by two categories: less than four weeks, and more than four weeks.

The demographics of the participants were also collected in the progression survey. *Age* was coded on a 7-point scale from "under 15" to "65 or over". *Gender* was assessed by two categories (male and female). *Education* was assessed by binary categories of "low level of education" (i.e., those who had no qualifications or received Level 1[6] education) and "high level of education"(i.e., those who had Level 2 to 4 educational background). *Employment* (retired or not), *disability* (a condition that limits basic physical function, learning disability, mental health problem), *disability with adverse effect* (yes/no), indicators of social exclusion such as *income* (yes/no), *benefits* (yes/no) and *housing* (yes/no), and *ethnicity* (white British, white Irish, BAME and other) were also measured.

4.4 METHODS FOR DATA ANALYSIS

Data from both surveys were screened, merged, and cleaned before the analyses. The steps included merging files to add additional cases, checking and renaming the variables wherever necessary, deleting the irrelevant variables, and recoding existing variables (e.g., creating binary variables from categorical variables), and screening for errors or missing values. Preliminary analyses and inferential statistical analyses were thereafter performed using IBM SPSS version 24. The selected statistical tests are introduced below.

4.4.1 Descriptive statistics

Conducting descriptive statistics refers to describing sample characteristics by a number of statistics such as frequency (categorical variables) and the range, mean, standard deviation (SD) for continuous variables. In this study, descriptive statistics were used to

[6] Level 1 refers to 1 to 4 GCSEs or O Level at any grade, Foundation GNVQ, NVQ Level 1 or equivalent. Level 2 refers to 5 or more GCSEs or O Levels at grades A-C, Intermediate GNVQ, NVQ Level 2 or equivalent. Level 3 refers to A Levels, Advanced GNVQ, NVQ Level 3 or equivalent. Level 4 refers to degree level or higher.

create profiles for the sample and for testing the associated statistical assumptions before running further tests (e.g., the correlation between variables).

4.4.2 Pearson Chi-square test

The Pearson Chi-square test is a non-parametric statistical technique used to explore the associations between two discrete variables that are either nominal (categorical) or ordinal (ranked). It calculates expected counts of each category of the variables of interest based on the assumption that the two variables are independent of each other. Both expected and observed counts can be displayed on a cross-tabulation table by categories (i.e., a Row by Column table). Test results consist of two values, the Pearson Chi-square value (χ^2) and the significance value (p). This test has been used to test associations between discrete variables from the survey, such as gender and Internet user types (i.e., active or discontinued).

4.4.3 Cronbach's alpha

It is common that, in a survey, each concept or construct to be investigated may need more than one item/question to measure its different dimensions. For the validity and accuracy of statistical tests on the survey constructs, it is essential to have a good level of inter-item correlation to make sure that the items measure the same concept as intended. Cronbach's alpha, also known as coefficient alpha (α), is used to test the internal consistency or scale reliability of a set of items (Bentler, 2009). The coefficient alpha scores between 0 and 1, with a higher number indicating a better level of internal consistency among the test items (Cho & Kim, 2015). Statisticians and researchers have previously reported and recommended different standards (between 0.7 and 0.95) as an acceptable α value (Tavakol & Dennick, 2011). It is, however, a generally accepted rule to set the standard at 0.7, that is, to have a minimum α of 0.7 to show the unidimensionality of the set of test items (Nunnally & Bernstein, 1994). In this study, the surveys investigated were initially designed for a different purpose. During the recoding process, the variables with multiple items were first classified from theoretical interpretation. They were then tested with the Cronbach's alpha score to examine the inter-item correlation before further analysis.

4.4.4 Mann-Whitney U test (two independent samples)

Mann-Whitney U Test is a non-parametric statistical test that is equivalent to independent samples T-test. While the independent samples T-test examines whether there is a statistically significant difference between two independent groups based on their means, the Mann-Whitney test compares the rankings of these two groups (Field, 2013). The T-test is based on the assumption that the continuous variable is normally distributed. This is, however, not required in the Mann-Whitney U test as it is based on the ranks of the groups. There are a few assumptions that the data needs to pass for performing a Mann-Whitney U test, these include:

- Assumption 1: The data type for the dependent/outcome variable should be ordinal or continuous in nature.
- Assumption 2: The independent variable should have two independent categories.
- Assumption 3: The observations are independent of each other.
- Assumption 4: Although there is no requirement on normal distribution, the shape of the distributions for both groups in the independent variable should be assessed before interpreting the results. For distributions that have the same or similar shape, the medians should be compared and reported. For distributions that have a different shape, the mean ranks should be used.

In this study, the Mann-Whitney U test was used for assessing the differences of a set of outcomes between active and discontinued users of the Internet from the progression survey.

4.4.5 Binary logistic regression analysis

Logistic regression analysis can be used to assess the explanatory power of a set of independent variables (i.e., predictors) on the variance of a categorical dependent variable. Binary logistic regression can be used when the dependent variable is dichotomous (i.e., only two categories). Before using the logistic model, it is necessary to determine whether the following seven assumptions are met (Stoltzfus, 2011):

- Assumption 1: The dependent/outcome variable should be binary (i.e., with a value of either 0 or 1) in nature.

- Assumption 2: There is more than one independent variable. The data type for the independent variable should be categorical or continuous.
- Assumption 3: All observations should be independent of each other. Each category of any categorical variable should be mutually exclusive. It applies to both dependent/outcome and independent variables.
- Assumption 4: Through the influential work conducted by Peduzzi et al. (1996), the minimum sample size is required to have a minimum EPV of 10. EPV stands for 'events per variable'. It is the ratio of the number of outcome events in the dependent variable to the number of independent variables (i.e., the predictors) (Concato, Peduzzi, Holford, & Feinstein, 1995). However, Ogundimu et al. (2016) observed a minimum EPV ranging from 5 to 20 to obtain reliable results in studies that applied logistic regression. They suggested that the minimum EPV should be considered case by case.
- Assumption 5: If the data type of an independent variable is continuous, this independent variable should have a linear relationship with the logit conversion value of its dependent/outcome variable.
- Assumption 6: There is no multicollinearity between the independent variables.
- Assumption 7: There are no obvious outliers.

In this study, this statistical technique was used to test the predictive variables for a participant's status of use (e.g., continued using the Internet or not, coded as binary values of 1 for yes and 0 for no) and outcomes.

4.4.6 Cluster analysis

Cluster analysis is an exploratory analytical method that identifies homogenous groups of items with similar attributes (Field, 2013). It is thus also known as an analysis tool for data segmentation or taxonomy. SPSS offers three types of cluster analyses: 'K-means Cluster', 'Hierarchical Cluster' and 'Two-step Cluster'. Unlike the classical K-means approach, which only works with continuous variables, the two-step cluster algorithm can handle data types from nominal, ordinal to scale. K-means require the researcher to pre-set the number of clusters in advance. In comparison, two-step cluster analysis measures the distance (by default, the SPSS uses Euclidean distances for continuous variable and Log-likelihood for if categorical variables are also used) between potential groups first to pre-cluster the cases and then compute hierarchical clusters by running probabilistic calculations to choose the optimal model of clusters (Benassi et al., 2020). In this respect, two-step cluster analysis is a combination of the other two approaches. As a result, a two-step cluster analysis was chosen to identify potential constitutive clusters among the older survey participants based on categorical and continuous variables specified in the analysis, such as *learning*, *skills*, and *use* of the Internet. It is worth noting that the optimum model of clusters that SPSS gives is just a form of classified data based on calculating the distances between groups. The goodness of the model is dependent on a researcher's interpretation of the results post hoc. This is presented in Section 4.6.4.

4.5 FINDINGS FROM THE LEARNER SURVEY

4.5.1 Sample characteristics of older people from the Learner Survey

Overall, 1217 people completed the learner survey during the seven-month rolling period between April 2017 and October 2017. The proportion of older respondents was 10.2% (n=124). Most of the participants were aged 45 and over (n=711), representing 58.4% of the whole sample. In addition to the socio-demographic profile of the older survey respondents (n=124), the respondent profiles for all the participants (n=1217) are also reported in the table below to place the group of older people in context.

As can be seen from Table 4-1, 58.9% (n=73) of older respondents were female and 40.3% (n=50) were male. Most of the older people who participated in this survey had no educational qualifications (n=35, 28.2%), but there was still a good distribution of older people from different levels of educational background. A higher proportion of respondents lived with others (n=75, 60.5%) than those who lived alone (n=47, 37.9%). Participants had differing household income levels, with 4.4% (n=5) who had less than £8,499 each year and 21.7% (n=25) who had more than £13,000 annually. The vast majority of participants aged 65 and over were retired (n=109, 87.9%). There were, however, ten participants (8.1%) who were still employed. The sample had a good mix of participants from different dwellings, although more than half lived in suburban areas (n=70, 56.4%), compared to those who lived in more urban areas with more easily accessible learning resources and more reliable ICT infrastructure (n=50, 40.4%). Nearly half of the participants indicated that they had a form of disability (n=59, 47.6%), and 23.4% (n=29) reported an impact of disability on carrying out self-care activities of daily living (e.g., eating, mobility). The majority of the participants were from white (n=107, 86.3%), English-speaking (n=119, 96.0%) ethnic backgrounds. Albeit small in proportion, older people from minority ethnic groups were also represented in the sample, with six (4.8%) from BAME ethnic group and four (3.2%) who spoke English as a second language.

Overall, the sample had a good spread of data in most demographic variables, including gender, education, household composition and residency. In some of the variables, the data were skewed, from which it could be learned that the majority of the learners were retired, white and spoke English as their first language.

Table 4-1 Socio-demographics of the older respondents (n=124) and all age groups in the learner survey (n=1217)

Characteristics		**Number of cases (N)**		**Percentage of total (%)**	
		Aged 65+	**All age**	**Aged 65+**	**All age**
Gender	Male	50	527	40.3	43.3
	Female	73	669	58.9	55.0
	Rather not say	1	21	0.8	1.7
Level of Education[7]	Level 1	19	256	15.3	21.0
	Level 2	13	179	10.5	14.7
	Level 3	18	175	14.5	14.4
	Level 4	25	204	20.2	16.8
	No qualifications	35	262	28.2	21.5
	Rather not say	14	141	11.3	11.6
Household Composition	Living alone	47	463	37.9	38.0
	Living with others	75	675	60.5	55.5
	Rather not say	2	79	1.6	6.5
Household Income[8]	Up to £8,499	5	164	4.4	13.5
	£8,500-£9,999	9	43	7.8	3.5
	£10,000-£11,499	9	33	7.8	2.7
	£11,500-12,999	8	25	7.0	2.1
	£13,000 or above	25	104	21.7	8.5
	Do not know	12	190	10.4	15.6
	Rather not say	47	213	40.9	17.5
Employment status	Employed	10	312	8.1	25.6
	Not in paid work	109	705	87.9	57.9
	Rather not say	5	200	4.0	16.4
Residency	City	24	336	19.4	27.6
	Large town	26	237	21.0	19.5
	Small town	36	384	29.0	31.5
	Village/ rural	34	186	27.4	15.3
	Do not know	2	34	1.6	2.8
	Rather not say	2	40	1.6	3.3
Disability[9]	Yes, and affect ADLs	29	338	23.4	27.8
	Yes, do not affect ADLs	30	196	24.2	16.1
	None of the listed	54	541	43.5	44.5
	Do not know	2	55	1.6	4.5
	Rather not say	9	87	7.3	7.1
Ethnicity	White	107	982	86.3	80.7
	Black, Asian and minority ethic	6	144	4.8	11.8
	Other	4	32	3.2	2.6
	Rather not say	7	59	5.7	4.9
Linguistic diversity	English as the first language	119	1062	96.0	87.3
	English as a second language	4	119	3.2	9.8
	Do not know	1	36	0.8	2.9

[7] Level 1 refers to 1 to 4 GCSEs or O Level at any grade, Foundation GNVQ, NVQ Level 1 or equivalent. Level 2 refers to 5 or more GCSEs or O Levels at grades A-C, Intermediate GNVQ, NVQ Level 2 or equivalent. Level 3 refers to A Levels, Advanced GNVQ, NVQ Level 3 or equivalent. Level 4 refers to degree level or higher.

[8] This only refers to respondents that have no children in the household (older people n=115; all age groups n=772).

[9] Types of disabilities measured in the survey include deafness or hearing impairment, blindness or visual impairment, a condition that limits basic physical activity (e.g., walking, climbing stairs or lifting), a learning disability, a specific learning difficulty (e.g., dyslexia) and mental health problem.

4.5.2 The digital divide emerged from the learner survey

The digital divide phenomenon has been debated and modelled in many forms by scholars across disciplines. As discussed in Chapter 2 (Section 2.4), the early indicators used for the digital divide research include motivation, access, skills, and use (Hargittai, 2002; Lutz, 2019). In the last decade, the focus has been extended to offline outcomes resulting from meaningful use of online digital services (Robinson, 2015; Van Deursen & Helsper, 2015b). Studies have also revealed the importance of looking into the time-dimension of the digital divide that had been overlooked, leading to the investigation of the sustainability of digital inclusion (Olphert & Damodaran, 2013). Van Deursen and Van Dijk's (2019) findings on the new forms of the first-level digital divide (i.e., access) highlighted this issue. They further pointed out this development of the digital divide over time affects not only access but also skills, uses, and outcomes. This makes the group of older people even more susceptible to the digital divide and, as a result, even more reliant on resources that help them learn and harness digital skills than before (Damodaran & Sandhu, 2016; Ramondt et al., 2013).

It was built on these theoretical developments and empirical findings that this study unfolded. The various forms of the digital divide in the context of digital skills learning among older people were investigated. The results of the statistical analyses are presented below with reference to the models discussed in Section 4.3.3.

4.5.2.1 Motivation

4.5.2.1.1 Motivation for learning the LMW courses

The participants were asked a set of 12 questions on the reasons that prompted them to start learning with the LMW platform. These questions were coded as dichotomous variables (yes=1, no=0). Table 4-2 presents the frequency of the counts and percentage of the sample (n=124) for each question. A good proportion of participants (n=86, 69.4%) indicated that they "wanted to do some informal learning". More than 25% of participants also agreed with the following statement of reasons for learning: keeping active and socialising with people ("It's a nice way to meet other people and be social" n=39, 31.5%), loss of proxy user ("someone used to do online tasks for me but not anymore" n=33, 26.6%), and family influence ("A friend or family member recommended it" n=31, 25.0%). Few participants indicated that they started learning digital skills for work-related purposes. This may be because that only 8.1% (n=10) of them were still employed by the time of taking the survey. It is worth noting that 22.6% (n=28) of older people claimed that there were other reasons behind their motivation not covered in the survey.

The participants were also asked to choose one main reason out of 12 items. This was to examine the primary driving force for them to attend the LMW training on digital skills. A total of 108 participants answered this question, and feeling the need "to do some informal learning" was selected most frequently (n=68, 63%). Following this, 11.3% (n=14) were there because of the loss of proxy users (i.e., "someone used to do online tasks for me"), 8.1% (n=10) followed the recommendation from family or friend, and 5.6% started learning to meet other people. Older people who indicated that they were referred by the Jobcentre or Work Programme provider continued to choose these options as the main reason for learning with the LMW.

Table 4-2 Statistics on questions concerning the participants' motivation for learning on the LMW (n=124)

Motivational factors	**Count**	**%**
(M1) Someone used to do online tasks for me but not anymore	33	26.6
(M2) A friend or family member recommended it	31	25.0
(M3) It is a nice way to meet other people and be social	39	31.5
(M4) I wanted to do some informal learning	86	69.4
(M5) I wanted to get a qualification	10	8.1
(M6) I needed to find a job	5	4.0
(M7) I need some help with my finances	5	4.0
(M8) I was referred by the Jobcentre	1	0.8
(M9) I was referred by my Work Programme provider	1	0.8
(M10) I was referred by my GP or other healthcare provider	2	1.6
(M11) I was referred by another organisation	5	4.0
(M12) Another reason	28	22.6

Based on the above statistics, it can be implied that many older people attended the LMW courses for "informal learning" (M4), but also for other reasons like "meet other people" (M3), change of personal circumstances (M1) and family influence (M2). When examining the most frequent motivations in more detail, M1 and M2 were related to exogenous factors, where the older people were pushed forward by uncontrollable changes or influences from their social network. In comparison, M3 and M4 were more reflective of the endogenous factors that pulled older people's individual initiative. A set of Pearson Chi-square tests were performed to test the associations among any of the two variables from M1 to M4. The Pearson Chi-square test results in Table 4-3 confirmed the theoretical interpretations, indicating statistically significant relationships between attending the LMW courses for "informal learning" (M4) and "to meet other people" (M3), as well as between change of personal circumstances (i.e., M1, loss of proxy user) and family influence (M2).

Table 4-3 Pearson Chi-square test results for the associations between top motivational factors. In the table,
M1=Change of personal circumstances in terms of losing proxy Internet user
M2=Family or friend influence
M3=To meet other people and be social
M4=To do some informal learning

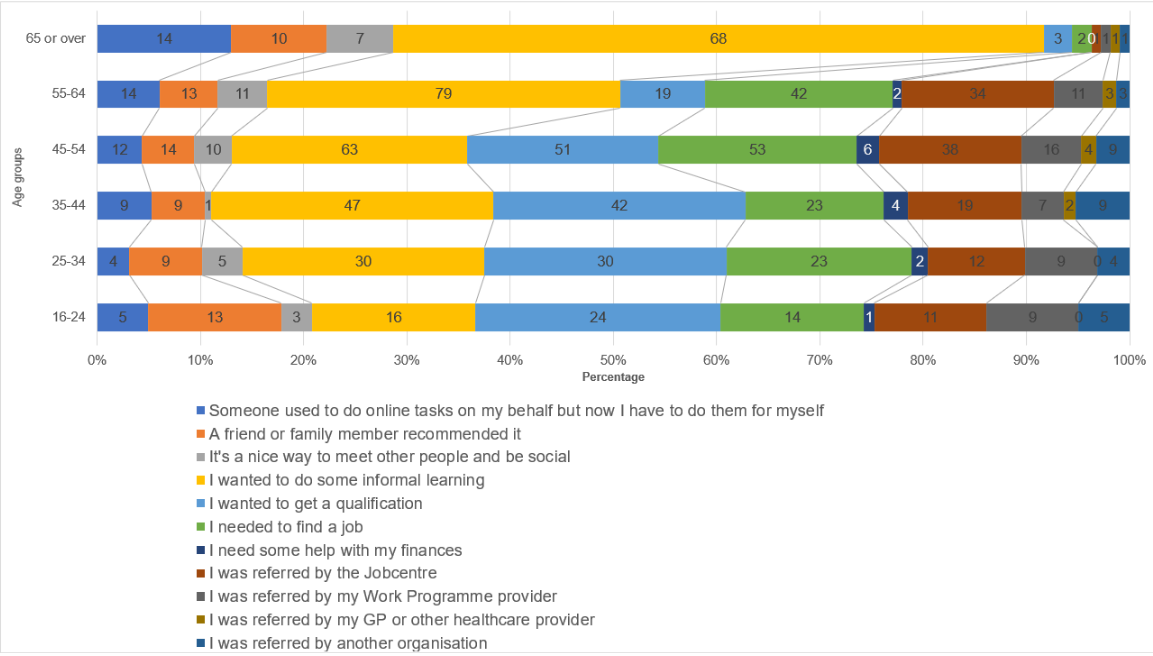
Motivational factors	**M1**	**M2**	**M3**	**M4**
M1	n.a.	$\chi2=4.969$, $p=0.026$, df=1, n=124	Not significant	Not significant
M2	$\chi2=4.969$, $p=0.026$, df=1, n=124	n.a.	Not significant	Not significant
M3	Not significant	Not significant	n.a.	$\chi2= 6.234$, $p=0.013$, df=1, n=124
M4	Not significant	Not significant	$\chi2= 6.234$, $p=0.013$, df=1, n=124	n.a.

The associations between "informal learning" (M4) and "to meet other people" (M3) can be explained by the *site* of learning. On the one hand, as explained in Section 4.3.3, the participants were asked whether they were attending other services or support available in the centre and the digital skills learning. The services included social activities and other informal events (e.g., handcraft sessions) that enabled the older people to meet other people. On the other hand, the LMW courses, although structured in contents, were delivered informally. Older people could socialise with their tutors and peer learners during the digital learning sessions. The site of learning thus became an anchor to which the older people were attached for various kinds of learning and social activities.

The associations between a change of personal circumstances in terms of losing proxy Internet users (M1) and family influence (M2) may be resulted from the long-standing reputation of the UK online centres. In an earlier study on Internet use and non-use among older people in the UK, Morris et al. (2007) reported the pervasiveness of online centres across the country for the public to access computers and the Internet. Older people, their family and friends may be well aware of the availability of such resources in their local libraries or community centres. Therefore, when the need arose or was triggered by external influences, older people, like those who participated in the survey, were motivated to use the available courses, such as the LMW, at the online centres.

Compared to other age groups, from which respondents were more goal-oriented for learning with LMW (e.g., to increase employability and to fulfil requirements from referrals), older people, most of whom were retired, were more motivated to pick up some informal learning with no specific aims set (see Figure 4-2). Older people were influenced mainly by the loss of proxy users of the Internet (i.e., variable M1 in Table 4-2) than their younger counterparts. Being able to meet other people was also a factor that stood out in the 65+ age group compared with other age groups. Nonetheless, this accounted for less than 10% of the respondents within the 65+ age group.

Figure 4-2 The primary motivation on learning with LMW across age groups



4.5.2.1.2 Motivation for learning computers and the Internet

Participants were also asked about their motivation for learning about computers and the Internet in general. A set of 14 questions were asked and were coded as binary variables. Drawing on the classification of Internet usage types developed by Van Deursen et al. (2017), 11 of the questions were summarised into five factors by the type of activity they assessed: work (two items, Cronbach's α=0.62), daily activity (general use) (four items, Cronbach's α=0.75), financial (two items, Cronbach's α=0.64), health (single item), and civic (services) (two items, Cronbach's α=0.58). According to Litwin (1995) and Macedo (2017), internal consistency is only considered good if the Cronbach's alpha coefficient, also known as the α value that assesses reliability, is greater than 0.70. Therefore, only the factor accounted for daily activity (general use) (Cronbach's α=0.75) was used in further statistical analysis. Although the other four factors did not meet the standard, they provided valuable theoretical insights and were used for descriptive statistical analyses. Drawing on the coding approach taken by Van Deursen and Helsper (2015b) in their survey, these new variables were coded in a dichotomous scale: the value 1 was assigned to the variable if any of its constitutive items received the answer "yes", whereas the value 0 was assigned if all the answers in its subordinate questions were "no". The frequency of counts and percentage of cases are reported in Table 4-4.

Learning computers and the Internet for general use in daily life was agreed upon by 90.3% of the older survey participants (n=112). Learning “for personal interest” (n=91, 73.4%) and to “keep in touch with friends and family” (n=84, 67.7%) were the two most common reasons. They corresponded with two explanatory constructs for technology acceptance and use from the UTAUT2 models, which are *hedonic motivation* and *social influence*, respectively. Around half of the participants agreed with reasons for performing task-oriented activities online, including “online shopping” (n=62, 50.0%), “using government or council services” (n=57, 46.0%), “finding health information” (n=53, 42.7%), and “saving money” (n=50, 40.3%). These task-oriented variables conformed with the UTAUT2 construct *performance expectancy* with explanatory power over the eventual use of technologies. Two variables in the *Work* category (i.e., MC1 and MC2 in Table 4-4) and MC11 (see Table 4-4) in the *Civic* category also fit in the concept of *performance expectancy*, but did not accord with the participants. This again may be because most of the older survey participants were retired. Sixteen participants (12.9%) reported there were other reasons for learning about computers and the Internet. These reasons were not captured in the survey due to a lack of open-end questions.

There was one participant who differed from all others in stating, “I do not want to learn more about computers and the Internet”. By examining the raw data for this particular case, it was found that this participant indicated that the reason for joining the LMW courses was to “do some informal learning”. Thus, learning about computers and the Internet was not a driver for them. Instead, it was the *learning experience* itself that drew the participant to the course.

All 124 participants were also asked to choose one main reason out of the 14 items listed in Table 4-4. This was to examine the primary driving force for them to learn about computers and the Internet. Performing daily activities for general use ranked the highest (n=95, 76.6%), while the rest of the categories each had fewer than 10 participants. Within the category of *daily activity (general use)*, items that had the highest scores were “learning for personal interest” (n=40, 32.3%) and “keeping in touch with family and friends” (n=45, 36.3%). By contrast, none chose “finding health information online” as the main priority for gaining digital skills, and there were only a few (n<8) who had chosen activities related to financial management online.

Table 4-4 Statistics on questions concerning the participants' motivation for learning computers and the Internet (n=124)

Dimension/ Item	Count	%
Work	**11**	**8.9**
(MC1) Finding work (e.g., searching for jobs online)	5	4.0
(MC2) Work-related learning (e.g., getting a qualification)	8	6.5
Daily activity (general use)	**112**	**90.3**
(MC3) For personal interest (e.g., digital photography)	91	73.4
(MC4) Online entertainment (e.g., watching TV and films)	32	25.8
(MC5) Keeping in touch with friends and family (e.g., email, FB)	84	67.7
(MC6) Online shopping (e.g., Amazon, eBay, Tesco)	62	50.0
Financial	**69**	**55.6**
(MC7) Saving money (e.g., using price comparison)	50	40.3
(MC8) Online banking and budgeting	40	32.3
Health	**53**	**42.7**
(MC9) Finding health information online	53	42.7
Civic (services)	**58**	**46.8**
(MC10) Claiming benefits online	7	5.6
(MC11) Using other government or council services	57	46.0
Other	**n.a.**	**n.a.**
(MC12) Another reason	16	12.9
(MC13) I am not sure	0	0.0
(MC14) I do not want to learn more about computers and the Internet	1	0.8

Participants were asked to select the main reasons that motivated them to start learning about computers and the Internet. Table 4-5 presents a comparison of the main reasons across different age groups. It can be seen that older people were mainly doing the learning to keep in touch with their social network (n=45, 36.3%) and for their interests, while the other groups were primarily learning for enhancing their employability.

Table 4-5 A comparison of main motivations across age groups
(Note: darker blue denotes the motivational reason that received the highest proportion, lighter blue denotes the second-highest motivation)

Dimension	Motivational reasons	16-24		25-34		35-44		45-54		55-64		65 or over	
		Count	% within group	Count	% within group	Count	% within group	Count	% within group	Count	% within group	Count	% within group
Work	(MC1) Finding work	35	**29.4%**	49	**32.9%**	71	**33.3%**	134	**42.1%**	92	**34.2%**	3	2.4%
	(MC2) Work-related learning	24	**20.2%**	46	**30.9%**	51	**23.9%**	63	**19.8%**	52	**19.3%**	3	2.4%
Daily activity	(MC3) Learning for personal interest	10	8.4%	5	3.4%	20	9.4%	23	7.2%	39	14.5%	40	**32.3%**
	(MC4) Online entertainment	1	0.8%	4	2.7%	3	1.4%	5	1.6%	5	1.9%	5	4.0%
	(MC5) Keeping in touch with friends and family	11	9.2%	5	3.4%	23	10.8%	22	6.9%	29	10.8%	45	**36.3%**
	(MC6) Online shopping	2	1.7%	3	2.0%	2	0.9%	8	2.5%	6	2.2%	5	4.0%
Financial	(MC7) Saving money	0	0.0%	3	2.0%	3	1.4%	5	1.6%	2	0.7%	2	1.6%
	(MC8) Online banking and budgeting	2	1.7%	1	0.7%	3	1.4%	3	0.9%	10	3.7%	8	6.5%
Health	(MC9) Finding health information online	2	1.7%	1	0.7%	2	0.9%	9	2.8%	5	1.9%	0	0.0%
Civic	(MC10) Claiming benefits online	2	1.7%	4	2.7%	2	0.9%	9	2.8%	4	1.5%	1	0.8%
	(MC11) Using other government or council	1	0.8%	2	1.3%	2	0.9%	3	0.9%	6	2.2%	3	2.4%

4.5.2.2 Access

4.5.2.2.1 Access to devices

In the learner survey, respondents were asked if they had access to a desktop, laptop or tablet that allowed them to be connected to the Internet.

Emerging from the results in Table 4-6, physical access to an Internet-enabled computer was still a barrier to some older participants. Twenty-two participants (17.7%) reported that they did not own a desktop, laptop, or tablet, highlighting that the digital divide in terms of physical *access* to devices still existed. Laptop computer was adopted by most of the participants (n=57, 46.0%), followed by desktop computer (n=44, 35.5). Similarly, Luijkx, Peek and Wouters' (2015) also noticed a preference for laptops (and tablets) over desktops among older Internet users in the Netherlands. Nearly 80% of the participants had access to at least one type of device (n=99). Some of them owned more than one type of listed device. It is worth noting that three participants indicated that they did not know if they had access to these types of devices. It could be due to a lack of understanding of the jargon and a low level of computer literacy (Vaportzis et al., 2017).

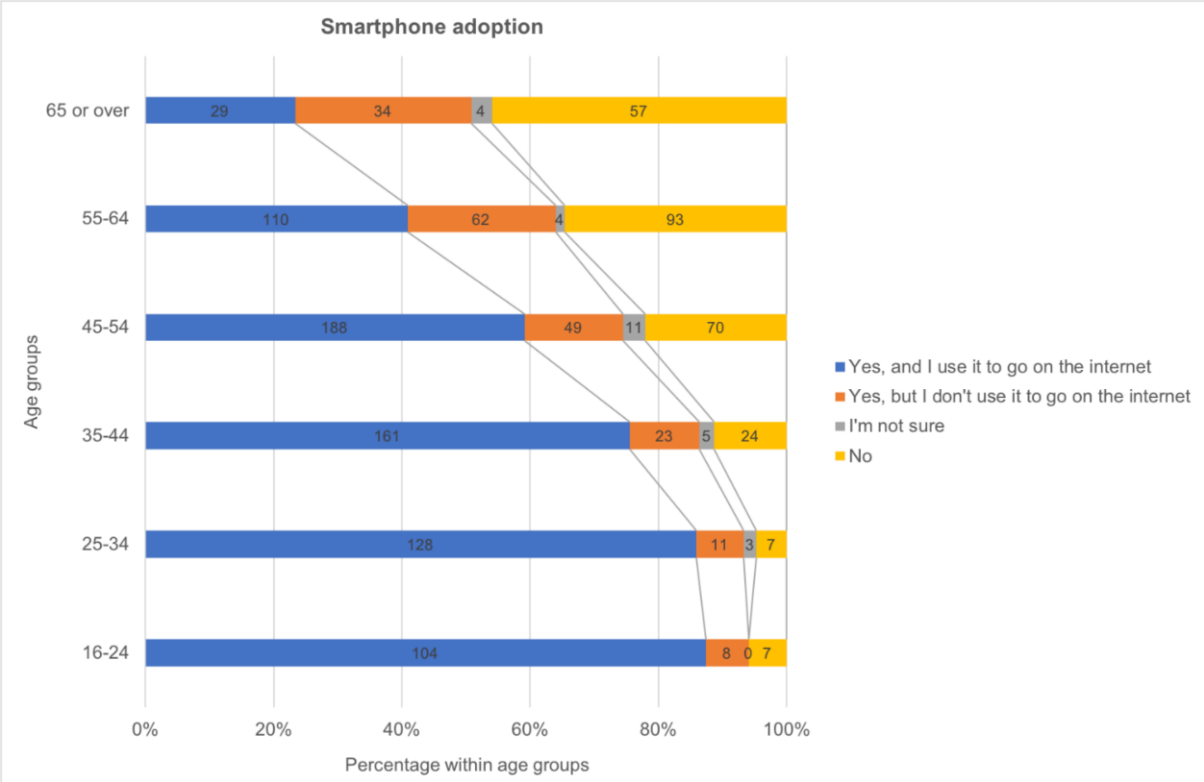
Table 4-6 Statistics of the ownership of desktop, laptop, and tablet computers (n=124)

Ownership of devices	**Count**	**%**
Desktop computer	44	35.5
Laptop computer	57	46.0
Tablet computer	37	29.8
None of the above	22	17.7
At least one of above	99	79.8
Do not know	3	2.4

In addition to the above-listed devices, participants were also asked about their access to a smartphone. Nearly half of the participants (n=57, 46%) did not own a smartphone. A total of 29 participants (23.4%) reported that they owned a smartphone and used it to go on the Internet, while 34 participants (27.4%) had a smartphone but did not use it to go online. Two of the 29 participants stated that the smartphone was the only way to get on the Internet, suggesting that the rest had alternative means to access the Internet. For those who owned a smartphone but did not use it to go online, reasons varied from lack of literacy/skills (n=10, 29.4%), lack of support on training (n=7, 20.6%), screen too small to use (n=13, 25.0%) and preference for other devices (n=15, 28.8%). Previous studies (see Gamberini et al., 2006; Zhou, Rau, & Salvendy, 2014) suggested that a lack of user-friendly features (e.g., small size, touch screen, operating system) could be the reason for a low smartphone take-up rate for going online among older people. This was supported by survey data as 25.0% of those who own a smartphone did not use it for accessing the Internet because of a small screen.

When looking at the whole sample, a Pearson Chi-square test indicated that an association between age (six age groups from 16 to aged 65 or over) and ownership of any traditional Internet-enabling device (i.e., laptop, desktop, or tablet), (χ^2=14.903, p=0.011, df=5, n=1192). There was also a significant association between age and smartphone adoption and use, (χ^2= 224.454, p<0.001, df=15, n=1192). Figure 4-3 below visualises the gradual changes with a decrease in age.

Figure 4-3 Comparison of smartphone adoption by age group



In summary, it emerged from the learner survey that, although a variety of devices ranging from desktop computers to smartphones was accessible to most of the respondents (n=99-101, 79.8%-81.5%), there were still gaps between people who owned none of these devices, who had at least one of these devices and those who had more than one device.

4.5.2.2.2 Place of access

As discussed in the Literature Review Chapter, *access* in the context of a digital divide conversation does not narrowly imply physical access to a range of digital devices. Instead, it refers to the capitals or resources that enable people to get across the first hurdle to digital inclusion (Helsper et al., 2015). In this sense, access to places that help the disadvantaged gain digital literacy and harness digital skills also holds great significance.

Figure 4-4 Distribution of users' preferred places for accessing digital training resources by age groups

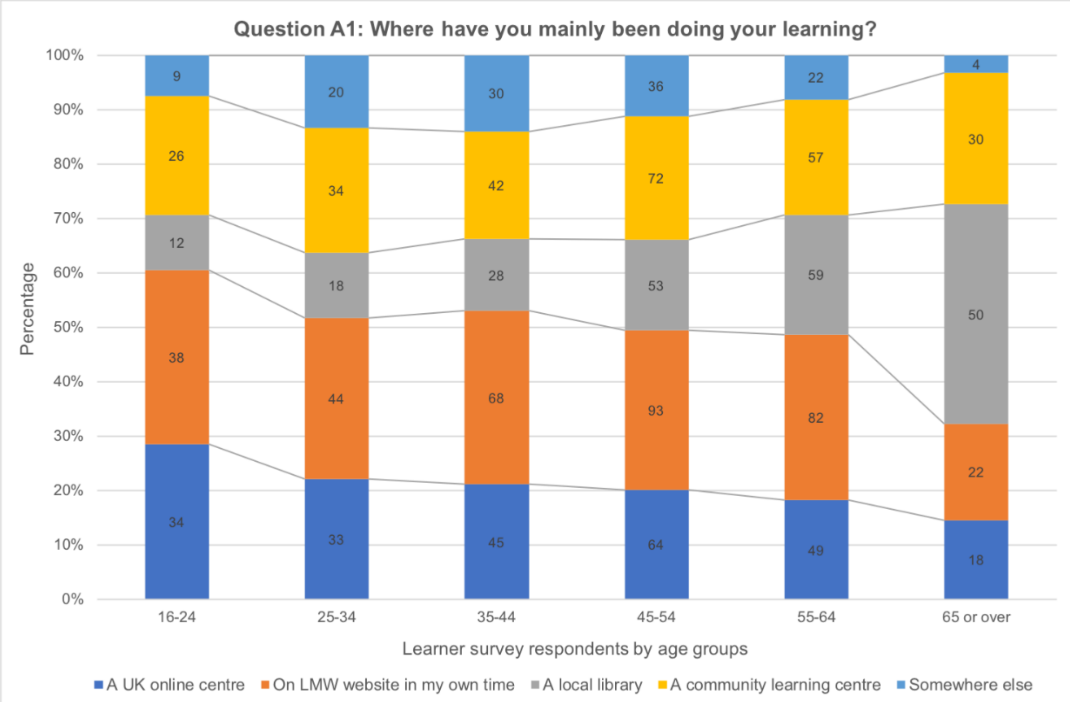


Figure 4-4 above illustrates the distribution of places that learners of different age groups go for their digital skills learning. Compared to other age groups, older people preferred a more formal learning environment to a home setting, with only 17.7% (n=22) of them studying through the LMW platform in their own time. Of all the possible training centres, the cohort of older people exhibited a strong preference towards their local libraries (n=50, 40.3%).

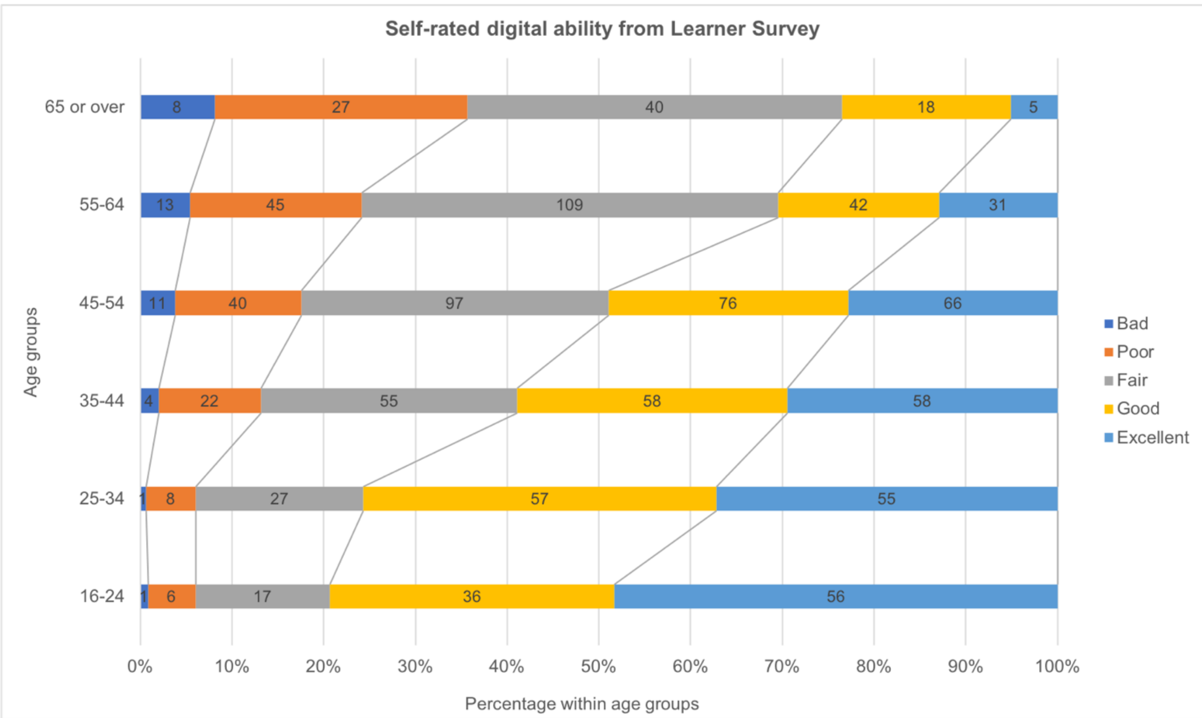
4.5.2.3 Skills

As introduced in Section 4.3.3, *skills* in the learner survey were measured by *complexity of use* and *self-efficacy*. To assess the complexity of their Internet use, the participants were asked if they could perform either simple online activities or slightly more complicated ones before they started learning with LMW. The descriptive statistics revealed that more than one-third of the participants (n=48, 38.7%) "could do one or two simple things like sending email, using a search engine, or posting on Facebook". A total of 36 participants (29.0%) could perform a few more complicated online tasks, such as filling in an online form or making an online purchase.

Self-efficacy was measured as self-rated ability to use the Internet on a five-point scale from excellent to bad (i.e., excellent, good, fair, poor and bad). Most participants rated their online ability before learning as fair (n=40, 32.3%). In general, more people considered themselves to have poor or bad Internet skills (n=35, 28.2%) than excellent or good (n=23, 18.5%).

A comparison was made between different age groups on self-rated ability on Internet skills (see Figure 4-5). Only five respondents from the group of 65 years of age or over considered their ability to use the Internet as "Excellent", compared to nearly 50.0% (n=56) from the age group of 16-24 years. Participants who rated their skills as "Fair" grew in proportion with age. A Pearson Chi-square test for association indicated a significant association between age and self-rated ability, (χ^2=171.029, p<0.001, df=20, n=1089).

Figure 4-5 A comparison of self-rated ability on using the Internet by age groups



4.5.2.4 Use

A question was first asked to learn whether participants were active users of the Internet. Almost half of the participants (n=61, 49.2%) reported that they regarded themselves as "an active user of the Internet", compared to around one third (n=38, 30.6%) who identified themselves as "past users of the Internet" who had stopped using the Internet. Around one-fifth of the participants (n=25, 20.2%) reported that they had "never used the Internet" before starting the LMW courses. Based on this, the active users (n=61) were asked further questions concerning their Internet use, including the *frequency of use* and *breadth of use*.

Since the "past users of the Internet" had already discontinued going online by the time they completed the learner survey, they were excluded from the question concerning their use behaviours. The sample size for frequency of use and breadth of use was thus 61. As shown in Figures 4-6 and 4-7, variations emerged in using the Internet amongst active users. Most active users used the Internet daily (n=38, 62.3%) and explored new and unfamiliar websites regularly (n=23, 37.7%). Yet, many of them used the Internet in a limited way, with more than one-third ("weekly" n=18, "monthly" n=3, "less than once a month" n=1) using it once a week or less, and more than 60% visiting more or less the same online spaces that they were familiar with ("only use websites visited before" n=18, "use maybe one or two sites that haven't visited before" n=20).

Figure 4-6 Frequency of Internet use by active users from the learner survey

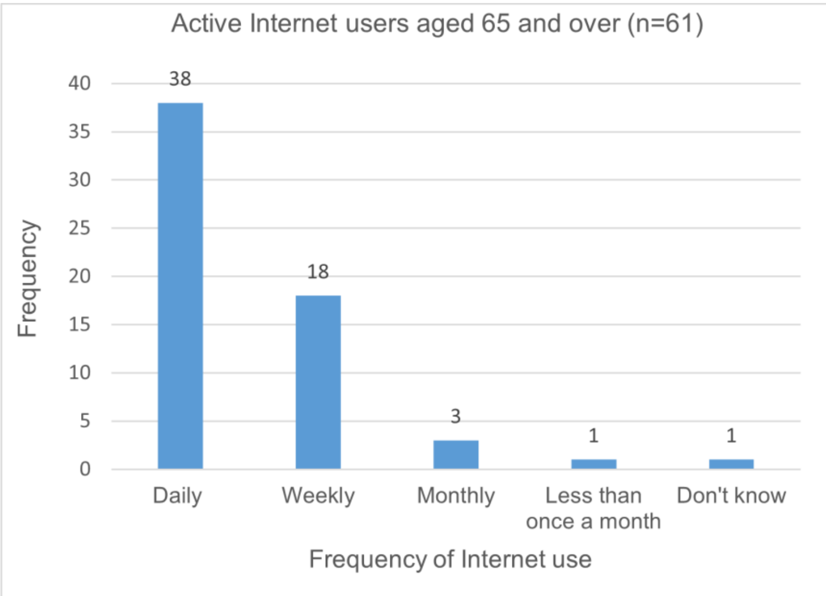


Figure 4-7 Breadth of Internet use among active users from the learner survey (n=61)

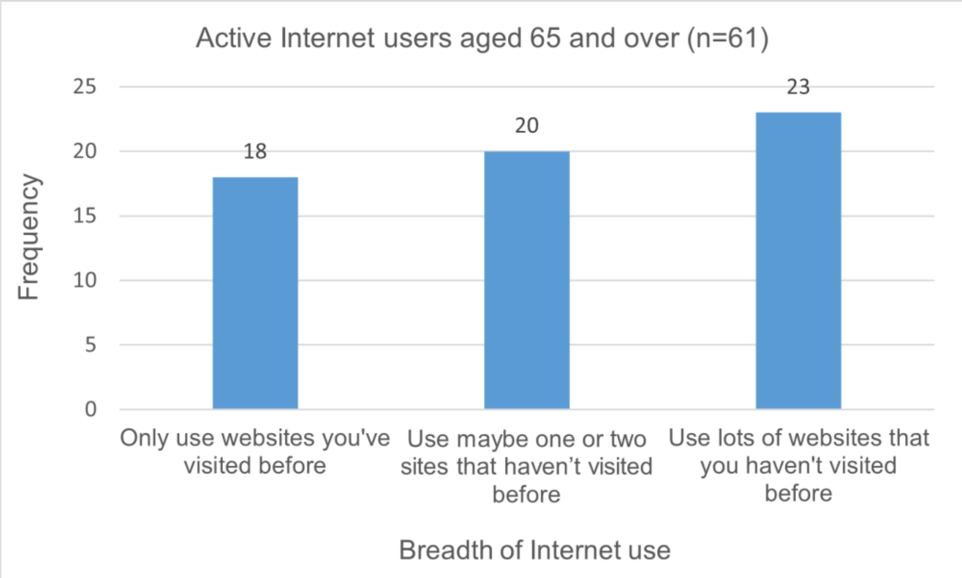
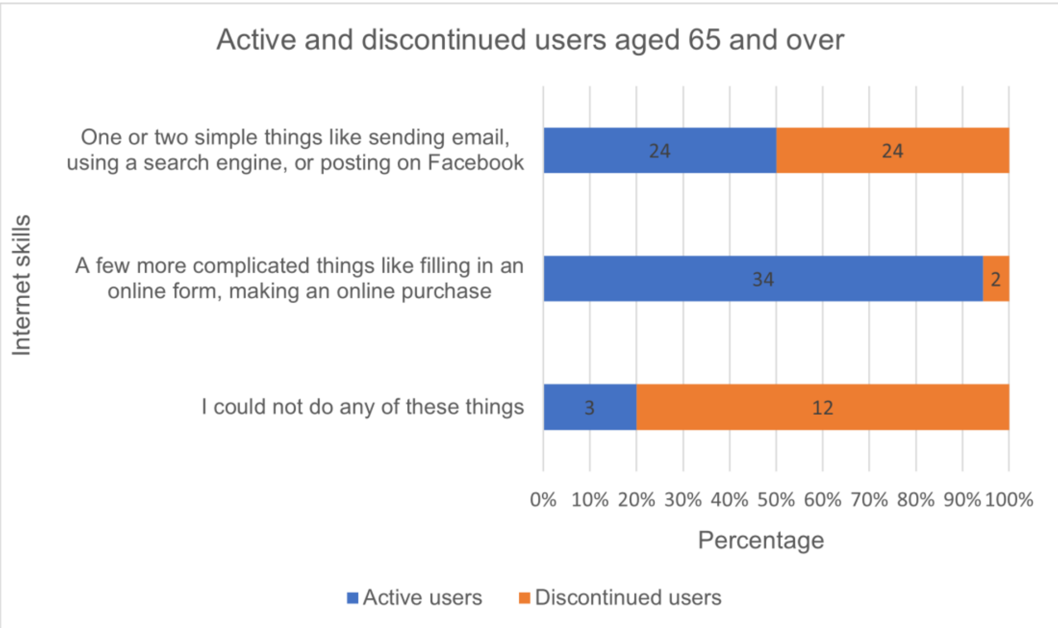


Figure 4-8 Internet skill of the participants by user types from the learner survey (active users n=61, discontinued users n=38)



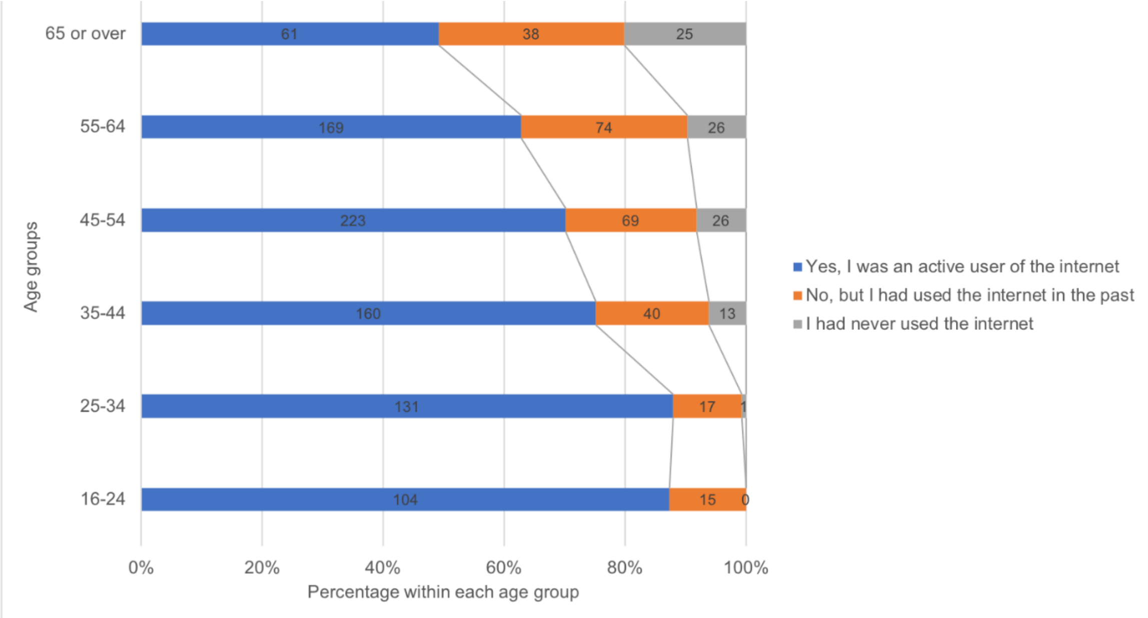
The skills of both active and discontinued users were compared in Figure 4-8. Most of those who had skills to perform more complicated tasks appeared to be active users, whereas those who had no skills were mostly discontinued users of the Internet. This suggested a possible association between these two variables. A Pearson Chi-square test confirmed this assumption (see Table 4-7), reporting a statistically significate relationship between Internet skills and a participant being an active Internet user or not, (χ^2=30.127, p<0.001, df=2, n=99).

Table 4-7 Crosstabulation between Internet skills and user type (active user n=61, discontinued user n=38)

	User type		
Internet skills	Yes, I was an active user of the Internet	No, but I had used the Internet in the past	Row Total
One or two simple things like sending email, using a search engine and FB	24	24	48
A few more complicated things like filling in an online form	34	2	36
I could not do any of these things	3	12	15
Column Total	61	38	99

A comparison between older people and other age groups regarding their status of Internet use (i.e., being an active or discontinued user before attending the LMW courses) was also made. It can be seen from Figure 4-9 that data from this survey corresponded with results from national surveys (Office for National Statistics, 2021; Office of National Statistics, 2015) and organisation reports (Age UK, 2017; Ofcom, 2016; Yates et al., 2020), i.e., that older people are behind other age groups in the wave of digitalisation. Not only do they have a higher proportion of non-users who have no experience with the Internet, but, in addition, they accommodate a more significant percentage of discontinued users. As shown in Figure 4-9, the proportion of older people was higher in the group of discontinued users or non-users compared to younger people. A Pearson Chi-square test confirmed a significant association between age group and the type of Internet users, (χ^2=89.865, p<0.001, df=10, n=1192).

Figure 4-9 Comparison of Internet use before the learning across age groups (n=1192)



Furthermore, other indicators of Internet use were also compared within the age groups. In doing so, more insights were gained for a better understanding of older people's digital engagement in context. A series of Pearson Chi-square tests were conducted to examine statistically significant associations between age and these indicators (see Table 4-8). The results showed significant associations between age and frequency of use (when recoded into a binary variable of “daily use” and “less frequent than daily use”), as well as between age and scope/complexity of Internet use.

Table 4-8 Test results from crosstabulation between age and indicators of Internet use

Indicators of Internet use	**Age** (Coded in seven age groups, including a group of older people aged 65+)			
	χ^2	p	df	Sample size
Frequency of Internet use (coded in four categories from “daily use” to “less than a month”)	24.060	0.064	15	840
Frequency of Internet use (coded as binary “daily use” and “less frequent than daily use”)	14.287	0.01*	5	840
Breath of use (coded as “only use familiar websites”, “use one or two new websites”, and “use a lot of new websites”)	8.782	0.553	10	806
The complexity of use (coded as three categories “can do a few simple things”, “can do a few more complicated things”, to “none of these”	52.530	<0.001*	10	1101

Figures 4-10 to 4-12 further illustrate such comparisons between age groups and the use of the Internet. It can be seen that, among those who had prior experience with the Internet before turning to the training courses, there were differences in their levels of interactions with the Internet across age groups: older people tended to go online less often, had lower levels of operational skills, and explored less online spaces.

Figure 4-10 A comparison of the frequency of use before learning by age groups

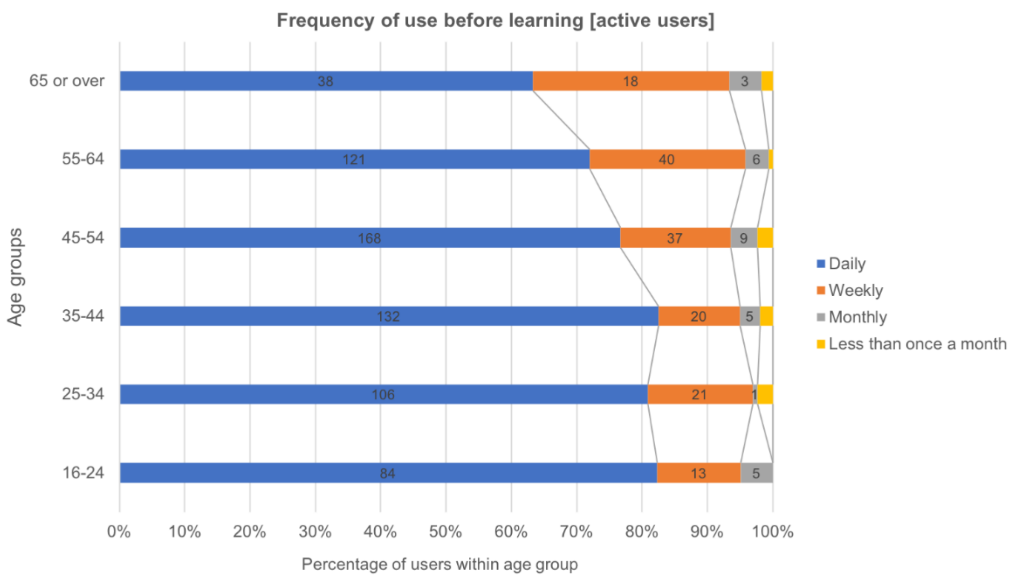


Figure 4-11 A comparison of breath/centrality of Internet use before learning by age groups

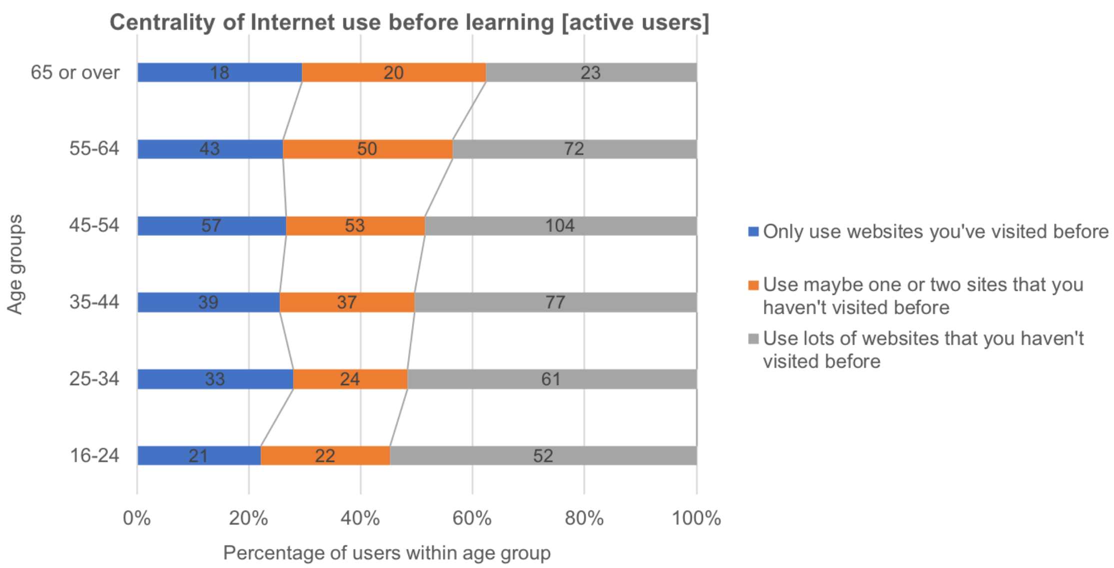
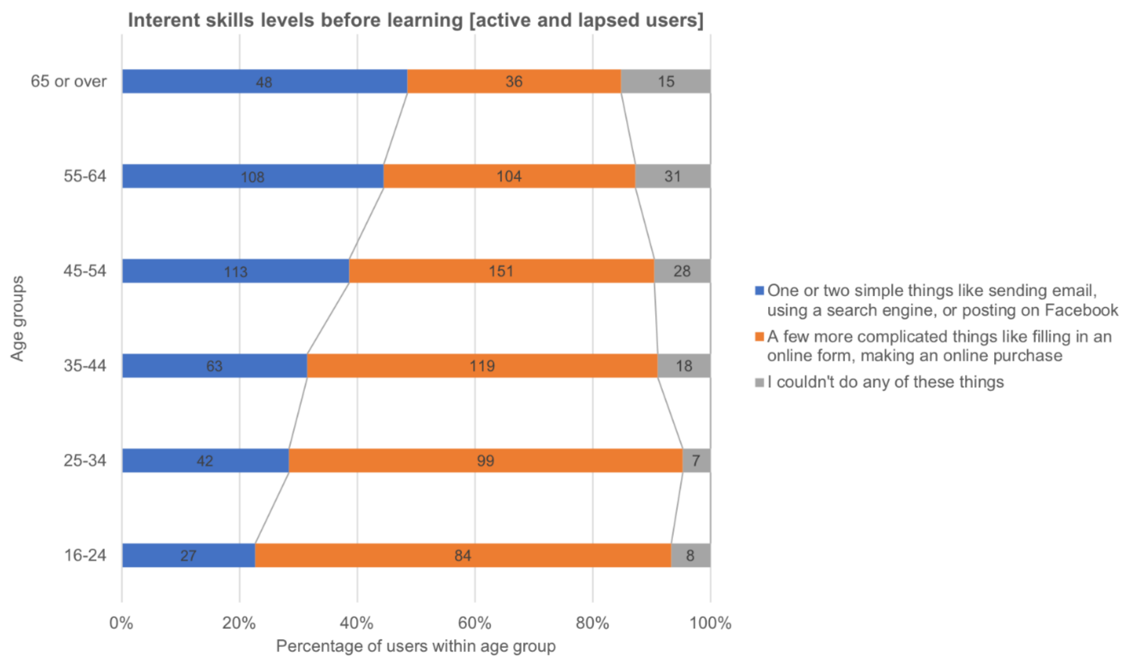


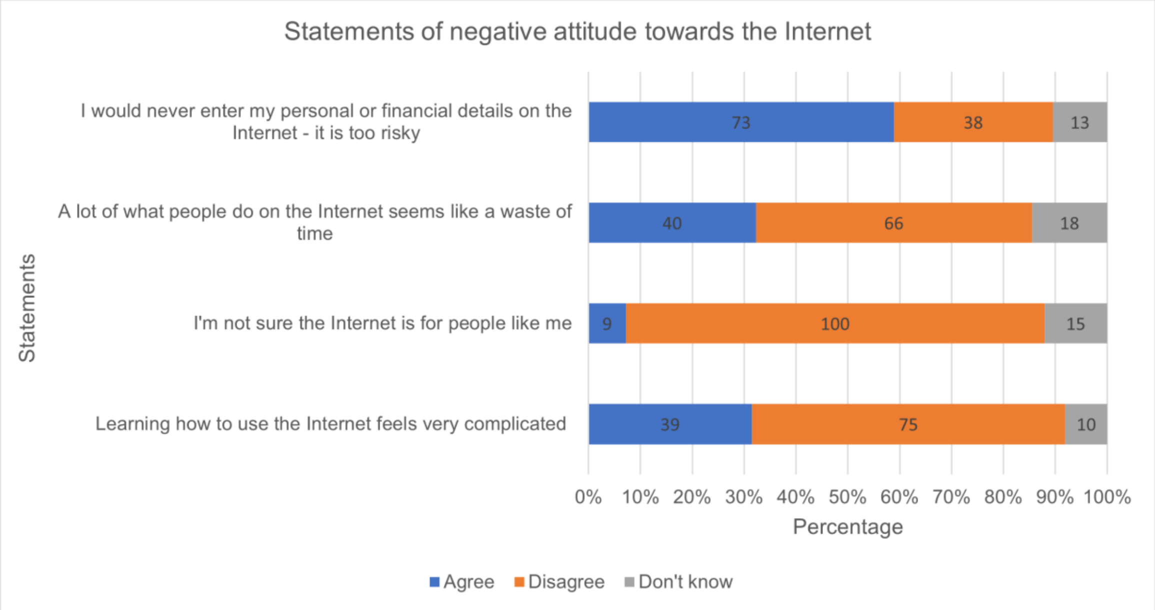
Figure 4-12 A comparison of scope/complexity of Internet use before learning by age groups



4.5.2.4.1 Attitudes towards the use of the Internet

The learner survey included a set of four statements measuring the respondents' attitudes towards using the Internet. In general, the older participants appeared to be very careful or risk-averse, with nearly 60% (n=73) of them not trusting the Internet for storing personal or financial information. Around one-third of the participants experienced frustrations when interacting with the Internet for being either time-wasting (n=40) or too complicated (n=39), which aligns with the constructs of *effort expectancy* and *performance expectancy* from the UTAUT2 model that explain the intention of technology use. Only less than 10% (n=9) of participants agreed that the Internet was not for people like them. The results revealed that older participants using LMW were, in general, optimistic about using the Internet in later life. However, it was evident that where sensitive information such as personal or financial details was involved, older uses were warier to use the Internet. This echoed findings from previous studies that revealed a lack of involvement in online banking, online shopping, and social media use among the older generation (Choi & Dinitto, 2013a; Harris, Cox, Musgrove, & Ernstberger, 2016; Van Deursen et al., 2017).

Figure 4-13 General attitudes towards the use of the Internet (n=124)



A series of Pearson Chi-square tests were performed to assess the association between attitudes and the sustainability of Internet use: first on three categories of participants and then on two categories of participants. The results in Table 4-9 suggested an association between statements one ("too risky") and four ("too complicated") between different types of participants, whether they were assessed in three groups or two groups. When only two groups/types of participants were taken into consideration (i.e., active user vs discontinued user), there emerged an association between statement three (performance expectancy) and the type of participant. The odds ratio were calculated for the two-by-two contingency tables. Results suggested that, first, active users were 87.7% less likely to "never enter my personal or financial details on the Internet" because it is too risky compared to discontinued users (see the row for S1 in Table 4-9). Second, active users were 88.6% less likely to think that the Internet is not for people like them than discontinued users (see the row for S3 in Table 4-9). Finally, active users were 70.6% less likely to think that learning how to use the Internet feels very complicated than discontinued users (see the row for S4 in Table 4-9). The results suggested that older people's sustained use of the Internet is related to the level of digital skills and confidence, trust, and a sense of safety in using the Internet.

Table 4-9 Results of Pearson Chi-square tests between statements and categories of the Internet (non) user

Statement Agree/disagree	**Three categories of participants**: active, discontinued, or non-user of the Internet			**Two categories of participants**: active user of the Internet/discontinued user of the Internet			
	χ^2	df	*p*	χ^2	df	*p*	OR
S1: I would never enter my personal or financial details on the Internet – it is too risky	12.465	2	0.002**	12.293	1	<0.001**	0.123, 95% CI (0.034,0.450)
S2: A lot of what people do on the Internet seems like a waste of time	0.025	2	0.988	0.013	1	0.910	n.a.
S3: I am not sure the Internet is for people like me	*n.a. 3 cells have an expected count less than 5.*			4.721	1	0.044*	0.114, 95% CI (0.012,1.073)
S4: Learning how to use the Internet feels very complicated	8.860	2	0.012*	7.136	1	0.008**	0.294, 95% CI (0.117,0.736)

*Significance level at 0.05
**Significance level at 0.01

4.5.2.4.2 Use of smartphone

When asked whether they had a smartphone and whether they used it to go online, 29 participants (23.4%) gave positive answers. Among these people, only two indicated (6.9%) that smartphones were the only way they could easily get on the Internet. In contrast, 27 used their smartphones as another channel to go online in addition to a desktop, laptop, or tablet. A total of 34 older participants (27.4%) claimed that they had an Internet-enabled smartphone but did not use it to go online, while 46% of the participants (n=57) did not have a smartphone. Therefore, for almost three-quarters of the participants, going online was dependent on less portable devices. This inevitably constrained their access to the Internet in many life scenarios such as on a bus, at a friend's or community events. It was worth noting that four participants (3.2%) answered they were unsure whether they had a smartphone. This may be related to a lack of understanding of the concept of a smartphone.

The 27 participants who used a smartphone to go online were asked what they used the smartphone for. The results suggested that they use their smartphone for a range of online activities via, including "email" (n=25, 86.2%), "social media such as Facebook and Twitter" (n=14, 48.3% of the 27 participants), "finding health information" (n=12, 41.4%), "using government services such as car tax, council tax" (n=12, 41.4%), "video calls" (n=10, 34.5%), "playing games" (n=10, 34.5%), "watching TV or video" (n=5, 17.2%). Only one participant used it to look for jobs, while three used it for creating or editing documents. Two participants chose the option "none of these above". Overall, emailing was the most highly selected online smartphone activity. This accords with findings from previous studies that suggested emailing as a popular online activity among older people (Choi & Dinitto, 2013a; Zhang, Grenhart, McLaughlin, & Allaire, 2017).

The 34 participants who had a smartphone but did not use it for the Internet were asked whether they agreed with a list of possible reasons. The most agreed reason was "I would rather use a different device (laptop, desktop or tablet)" (n=15, 44.1% of the 34 participants). Other reasons included "The screen is too small to use easily" (n=13, 38.2%), "I would like to, but I don't know how" (n=10, 29.4%), "I don't know where to go for help to learn how to do this" (n=7, 20.6%), and "It is too expensive" (n=6, 17.6%). These results are in line with the barriers to general Internet adoption and use that have been reported in the literature: cost (Vaportzis et al., 2017), device operability or design issues (Rogers & Mitzner, 2016; Sayago & Blat, 2010), the ageing-related decline in health such as dexterity and sight (Gatti et al., 2017; Helbostad et al., 2017), and lack of skill or support (Helsper, 2009; Neves, Amaro, & Fonseca, 2013; Vaportzis et al., 2017).

4.5.2.5 Outcomes

Outcomes in the digital divide model are defined as the offline returns on people's use of the Internet through achieving relevant objectives. For example, suppose a person successfully attends an in-person GP appointment by securing a slot online. In that case, this person is considered to have gained a beneficial outcome from performing online tasks (i.e., make a booking through an online system). In previous studies, outcomes have been measured under the same classifications of Internet use, spanning across the life realms of economic, social, educational, political, cultural and personal (Helsper et al., 2015; Scheerder et al., 2017; Van Deursen et al., 2017).

In the learner survey, the measure that corresponded with these operationalised concepts of outcome was a question concerning managing health with NHS Choices[10]. In addition to this, a measure of the *satisfaction of learning experience* was also used as an indicator

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[10] It was an online service provided by the national health service (NHS) to support self-management of health.

for the outcome. In this sense, the definition of outcome in this study was extended to account for the fourth level of the digital divide (i.e., sustained use of the Internet). Learning is a key process to address the gap in sustainability. This extended concept of outcome is further developed in the progression survey, where further data were collected (e.g., a change in daily practices for a healthier diet and more exercise).

A total of 35 participants of the learner survey indicated that they had taken the LMW training on health management and practised on the "Managing your Health with NHS Choices" course. They were asked to rate whether they had gained confidence in using online tools to manage their health on a five-point scale from "Strongly Disagree" (1) to "Strongly Agree" (5). Based on 32 valid cases, this measurement had a mean score of 4.16 (SD=0.72). The most frequent answer was "Agree" (n=18, 56.3%), followed by "Strongly agree" (n=10, 31.3%). In total, 28 respondents (87.5%) tended to agree (i.e., "agree" and "strongly agree") that they had gained more confidence in managing health online after the training, compared to only one respondent (3.1%) who disagreed.

4.5.2.6 Digital skills learning

In addition to the above analyses on existing indicators of the digital divide at different levels, data concerning digital skills learning were also assessed for insights on how older people accessed and used the training opportunities to maintain their digital inclusion.

Table 4-10 A breakdown of the source of influence for joining the LMW courses (n=124)

Source of influence	**Count**	**%**
I heard about it through word of mouth	44	35.5
I was told about it by a Jobcentre	4	3.2
I was told about it at the post office	0	0.0
I was told about it at my local library	46	37.1
I saw a poster or a leaflet	25	20.2
I read about it from local media (paper, radio, or television)	11	8.9
None of these	17	13.7
Any of the above sources	105	84.7

The source of influence that led the participants to the LMW courses was first assessed. As shown in Table 4-10, older LMW learners heard about the learning opportunity through their personal and local resources, such as their social network (i.e., "word of mouth", n=44, 35.5%) and local services (i.e., "local library" n=46, 37.1%, "poster or leaflet" n=25, 20.2%, and "local media" n=11, 8.9%). In comparison, few older people joined the courses under the influence of organisations such as the Jobcentre or post office. This can be explained by the demographics of older people sampled, as most of them were retired. The statistics, in general, revealed that older people retrieved and evaluated information on digital skills learning from sources that were more relevant to their daily living (e.g., socialising, engagement in community activities, and using library services).

A measure of the length of learning was also taken in the survey. Participants were asked a straightforward question of the time they had studied on the LMW by the time of taking the survey. Most of the participants had engaged with learning for more than two months (n=34, 27.4%), followed by "more than four weeks" (n=31, 25.0%), "between two and four weeks" (n=20, 16.1%), "less than two weeks" (n=19, 15.3%) and "this is my first day" (n=18, 14.5%). The participants had the flexibility to take the survey at any time during their course up to the point of completion. Therefore, some learners were engaged in the LMW learning courses for at least two months. Learning how to use a computer and the Internet, in this respect, was a long-term commitment for these older people and was a part of their daily life.

Following this thread, questions were also asked about learning facilitating conditions, such as the location of the courses they attended and whether they were also using other services at the same venue. Data collected on these questions helped build a more contextual understanding of the arrangement of digital skills learning activities based on site/setting. The results are shown in Table 4-11 and Table 4-12.

Table 4-11 A breakdown of the site/setting for LMW learning (n=124)

Site/setting	Count	%
At a centre	**102**	**82.3**
At a local library	50	40.3
At a community learning centre	30	24.2
At other UK online centre	18	14.5
Somewhere else	4	3.2
At home (On the LMW website in my own time)	**22**	**17.7**

As shown in Table 4-11, most of the respondents (n=102, 82.3%) attended learning at a centre where additional support was available from a tutor or volunteer. The most popular site to take LMW courses was a local library (n=50, 40.3%). Other sites around the learner's own community, such as a local learning centre (n=30, 24.2%), was also highly attended. There were also 22 respondents (17.7%) who indicated that they took the courses at home. Overall, it emerged from the data that older people from the learner survey sample were mostly attending the offline courses with their local course providers. Table 4-12 offered some explanation to the preferences in the site of learning. According to the data, among older people who attended offline courses (n=102), at least half of them (n=71, 69.6%) were also using other support or services. A total of 44 participants (43.1%) attended activities to socialise and meet with other people, while 27 (26.5%) joined other courses to do some informal learning. This is consistent with the top motivations listed in Table 4-2 (i.e., to do some informal learning and to socialise).

Table 4-12 A breakdown of other support or services the participants used at the venue for digital skills learning (n=102)

Use of other support at the site of digital skills learning	**Count**	**%**
ESOL (English for speakers of other languages)	1	0.8
Help with reading and writing	5	4.0
Help with maths	5	4.0
Other informal learning (e.g., family history or a craft group)	27	21.8
Socialising and seeing other people	44	35.5
Parenting classes	1	0.8
Exercise classes	9	7.3
Healthy eating classes	5	4.0
Gaining a qualification	12	9.7
Help with finding and applying for work	3	2.4
Help with becoming a volunteer	20	16.1
Managing my finances	15	12.1
Advice on HMRC benefits and services	10	8.1
Advice and support to use the Universal Credit system	5	4.0
Any other support service	12	9.7
None of these	26	21.0
Accessed any of the above support services	71	57.3

As shown in Table 4-12, the top non-digital learning-related activities that the participants attended at the site of learning were also "socialising and seeing other people" (n=44, 35.5%) and acquiring "informal learning" (n=27, 2.8%). In addition, 20 older people (16.1%) used other support or services to become a volunteer. This, like socialising and informal learning, exemplified the active lifestyle that older people pursued. Some older people (n=9, 7.3%) also attended exercise classes for physical health. Moreover, some older people sought advice and help to enhance their financial and economic status, such as through gaining qualifications (n=12, 9.7%) and learn how to better manage finances (n=15, 12.1%) and HMRC benefits (n=10, 8.1%).

Tables 4-11 and 4-12 illustrate the facilitating conditions to older people's digital skills learning. The results revealed the critical role that the *site* or *venue* played in engaging older people in various activities, including learning about digital skills, for a more active and healthy later life.

4.5.3 Sustained use and levels of digital divides

In the previous subsection, the levels of digital divides from the learner survey were reported. In addition, relationships between some indicators of the divides were also tested, for example, the association between two motivations in Table 4-2. To gain a more nuanced understanding on the relationship between indicators of the traditional levels of digital divide (i.e., first-, second-, and third-level digital divide) and an indicator of sustained use (i.e., a participant being active or discontinued with Internet use), further Pearson Chi-square tests were performed. Moreover, the demographic variables that had enough sample size were also tested for association with the indicator of sustained use. The results are shown in Table 4-13.

Table 4-13 Results of Pearson Chi-square test between traditional indicators of the digital divide and an indicator of sustained Internet use

Indicators of the digital divide	**Type of Internet user** (Active user of the Internet/discontinued user)			
	χ^2	df	Sig	OR
Motivations for learning with LMW (No/Yes)				
(M1) Someone used to do online tasks for me but not anymore	10.715	1	0.001**	4.818 95% CI (1.802,12.883)
(M2) A friend or family member recommended it	Not significant			
(M3) It is a nice way to meet other people and be social	4.067	1	0.044*	2.442 95% CI (1.015,5.874)
(M4) I wanted to do some informal learning	4.123	1	0.042*	2.680 95% CI (1.016,7.071)
(M5) I wanted to get a qualification	Not significant			
(M6) I needed to find a job	Not significant			
(M7) I need some help with my finances	Not significant			
(M8) I was referred by the Jobcentre	Not significant			
(M9) I was referred by my Work Programme provider	Not significant			
(M10) I was referred by my GP or other healthcare provider	Not significant			
(M11) I was referred by another organisation	Not significant			
(M12) Another reason	7.085	1	0.008**	0.224 95% CI (0.070, 0.717)
Motivations for learning computer and the Internet (No/Yes)				
(MC1) Finding work (e.g., searching for jobs online)	Not significant			
(MC2) Work-related learning (e.g., getting a qualification)	Not significant			
(MC3) For personal interest (e.g., digital photography)	Not significant			
(MC4) Online entertainment (e.g., watching TV and films)	Not significant			
(MC5) Keeping in touch with friends and family (e.g., email, FB)	Not significant			
(MC6) Online shopping (e.g., Amazon, eBay, Tesco)	Not significant			
(MC7) Saving money (e.g., using price comparison)	Not significant			
(MC8) Online banking and budgeting	Not significant			
(MC9) Finding health information online	Not significant			
(MC10) Claiming benefits online	Not significant			
(MC11) Using other government or council services	Not significant			
(MC12) Another reason	5.214	1	0.022*	0.123 95% CI (0.015, 0.994)
(MC13) I am not sure	Not significant			
(MC14) I do not want to learn more about computers and the Internet	Not significant			
Access to devices (No/Yes)				
Desktop computer	Not significant			
Laptop computer	19.958	1	<0.001**	0.130 95% CI (0.051, 0.335)

Table 4-13 continued				
Indicators of digital divide	**Type of Internet user** (Active user of the Internet/discontinued user)			
	χ^2	df	Sig	OR
Access to devices (No/Yes)				
Tablet computer	Not significant			
None of the above	12.045	1	0.001**	21.429 95% CI (2.614, 175.691)
At least one of above	20.458	1	<0.001**	0.032 95% CI (0.004, 0.258)
Access to training (No/Yes)				
Access through a centre	4.214	1	0.040*	3.284 95% CI (1.012, 10.662)
Access from home	4.214	1	0.040*	0.304 95% CI (0.094, 0.989)
Skills				
Complexity of tasks (One or two simple things/a few more complicated/none of these)	30.127	2	<0.001**	n.a.
Self-rated ability: Excellent (No/Yes)	Not significant			
Self-rated ability: Good (No/Yes)	13.705	1	<0.001**	n.a.
Self-rated ability: Fair (No/Yes)	Not significant			
Self-rated ability: Poor (No/Yes)	6.841	1	0.009**	3.306 95% CI (1.321, 8.270)
Self-rated ability: Bad (No/Yes)	Not significant			
Self-rated ability: Any positive (No/Yes)	15.560	1	<0.001**	0.177 95% CI (0.072, 0.432)
Self-rated ability: Bad and poor (No/Yes)	13.711	1	<0.001**	5.077 95% CI (2.087, 12.350)
Use (Data only collected from active users of the Internet)				
Outcome (Lack of sufficient data)				
Source of influence (No/Yes)				
I heard about it through word of mouth	Not significant			
I was told about it by a Jobcentre	Not significant			
I was told about it at the post office	Not significant			
I was told about it at my local library	Not significant			
I saw a poster or a leaflet	Not significant			
I read about it from local media (paper, radio, or television)	Not significant			
None of these	4.004	1	0.045*	0.227 95% CI (0.048, 1.077)
Demographics				
Gender	Not significant			
Household composition (living alone or not)	Not significant			
Level of education	Not significant			
Disability (yes or no)	Not significant			
Residence	Not significant			

*Significance level at 0.05
**Significance level at 0.01

As shown in Table 4-13, the indicators of the classical digital divides that were found associated with the indicator of sustained use (i.e., measured by if the older participant was an active user of the Internet or not) include:

- Motivational factors M1 (loss of proxy Internet user), M3 (to socialise), M4 (do some informal learning), and M12 (indicating the existence of more reasons that were not measured in the survey) for joining the LMW course;
- Motivational factor MC12 (indicating the existence of more reasons that were not measured in the survey) for start learning about computers and the Internet;
- Access to a laptop computer, access at least one type of Internet-enabled devices or no access to any computers;
- Learning digital skills at a centre or home;
- The level of skills to perform tasks online, and self-rated ability (positive or negative);
- And the source of influence on taking up the training course.

Compared to active users, the discontinued Internet users among the older survey participants were 4.82 times more likely to have motivated to start learning because of the loss of proxy Internet user (M1), 2.44 times more likely to join the learning courses for social purposes (M3), 2.68 times more likely to join the learning for some informal learning, and 21.43 times more likely to have none of the listed computes (i.e., desktop, laptop, and tablet), 3.28 times more likely to have accessed learning at a centre, 3.31 times more likely to have rated their ability to use the Internet as poor, and 5.08 times more likely to have considered their ability to use the Internet negative (i.e., rated bad and poor).

On the other hand, compared to discontinued users, the active users of the Internet were more likely to have other reasons for learning with the LMW (M12) and learning for computer and the Internet (MC12) that were not already covered in the survey, 7.69 times more likely to have access to a laptop computer, 31.25 times more likely to own at least one of the listed computers, 3.28 times more likely to have accessed learning at home, and 5.65 times more likely to hold positive opinions about their ability to use computers and the Internet.

These findings highlighted the fact that the conventional levels of the digital divide, such as access, skills, and motivation, were intertwined with the sustainability of Internet use among older people that took part in the survey. The digital skills training courses, as one of the ways to sustain the level of digital participation, were different for active and discontinued users of the Internet in terms of expectations on the courses and the site of attendance. However, there was not much difference in terms of how both types of users heard about the training opportunities and the performance expectation on computers and the Internet (i.e., what they can do on the Internet).

4.6 FINDINGS FROM THE PROGRESSION SURVEY

4.6.1 Sample characteristics of older people from the Progression Survey

Overall, 1153 people completed the progression survey during the two-year rolling period between July 2015 and June 2017. Of these, 275 were aged 65 and over (23.9%). In addition to the socio-demographic profile of the older survey respondents, the respondent profile for all the participants is also reported in the Table 4-14 below to place the group of older people in context.

Table 4-14 Socio-demographics of the older respondents (n=275) and all age groups in the Progression Survey (n=1153)

Characteristics		**Number of cases (N)**		**Percentage of total (%)**	
		Aged 65+	**All age**	**Aged 65+**	**All age**
Gender	Male	148	573	53.8	49.7
	Female	127	575	46.2	49.9
	Not stated	0	5	0.0	0.4
Level of Education[11]	Low	161	579	58.5	50.2
	High	114	574	41.5	49.8
Social exclusion indicator: income[12]	Excluded	71	380	25.8	33.0
	Not	204	773	74.2	67.0
Employment status	Retired	216	251	78.5	21.8
	Not	59	902	21.5	78.2
Social exclusion indicator: benefits	Receive benefits	120	767	43.6	66.5
	Not	155	386	56.4	33.5
Social exclusion indicator: housing	Social housing	70	480	25.5	41.6
	Not	205	673	74.5	58.4
Disability	Disabled	146	608	53.1	52.7
	Not	129	545	46.9	47.3
Disability with adverse effect	Yes	55	355	20.0	30.8
	Not	220	798	80.0	69.2
Ethnicity	White	248	948	90.2	82.2
	BAME[13]	25	189	9.1	16.4
	Rather not say	2	16	0.7	1.4

As can be seen from Table 4-14, 53.8% (n=148) of the older respondents were male, compared to a proportion of 46.2% (n=127) of females in this age group. Most of the

[11] Low: Level 1 and no qualifications. High: Levels 2 to 4. Level 1 refers to 1 to 4 GCSEs or O Level at any grade, Foundation GNVQ, NVQ Level 1 or equivalent. Level 2 refers to 5 or more GCSEs or O Levels at grades A-C, Intermediate GNVQ, NVQ Level 2 or equivalent. Level 3 refers to A Levels, Advanced GNVQ, NVQ Level 3 or equivalent. Level 4 refers to degree level or higher.

[12] This was measured by indicators of social exclusion in income (Department for Work and Pensions, 2016).

[13] Abbreviation for black, Asian, and minority ethnic.

older people who participated in this survey had a low educational background (n=161, 58.5%). A proportion of 25.8% (n=71) respondents was socially excluded by income, while 25.5% (n=70) were living in social housing, and 120 older respondents (43.6%) were receiving benefits. The majority of the respondents were retired (n=216, 78.5%). Among the 146 (53.1%) disabled respondents, 55 (20.0%) experienced adverse effects from their disability that impacted their daily activities. Like the ethnicity mix from the learner survey, most of the progression survey respondents were from a white ethnic background (n=248, 90.2%).

Overall, the measures from the progression survey differed slightly from that of the learner survey. Nevertheless, the sample had a good spread in most socio-demographic variables, including gender, education, disability, and levels of social exclusion.

4.6.2 The ‘divides’ emerged from the progression survey

As set out in subsection 4.3.3.2, the measures of the digital divide in the progression survey prioritised towards *access*, *skill*, *use*, and *outcome*. As an important indicator of *facilitating conditions* that help to maintain a sustained connection to the Internet, learning was also assessed in the analyses. The results are reported below.

4.6.2.1 Access

4.6.2.1.1 Access to devices

Similar to the learner survey, respondents to the progression survey were also asked if they had access to a desktop, laptop or tablet that allowed them to be connected to the Internet. Data concerning the ownership of smartphones was not collected in the progression survey. As shown in Table 4-15, physical access to an Internet-enabled computer remained an indicator of digital inclusion to some older participants, as 10.2% of the participants (n=28) reported that they did not own a desktop, laptop, or tablet. More than 60% of the participants (n=166) had access to a laptop, followed by 42.2% reporting ownership (n=116) of tablet computers and 31.6% reporting ownership (n=87) of a desktop computer. Two participants indicated that they did not know if they had access to any of the listed types of devices. This may suggest a lack of understanding of computer-related terminology.

Table 4-15 Statistics of the ownership of desktop, laptop, and tablet computers from the progression survey (n=275)

Ownership of devices	Count	%
Desktop computer	87	31.6
Laptop computer	166	60.4
Tablet computer	116	42.2
None of the above	28	10.2
Do not know	2	0.70

4.6.2.1.2 Place of access

Offline course providers of the LMW training, in particular public libraries, are equipped with devices for learners who lacked access at home, and learners who could not bring a computer to the learning sessions (e.g., desktops, bulky laptops, or tablets) (The Open University, 2021). The place of access was thus also investigated to examine the overall access to devices and other support. In the progression survey, 208 older people (75.6%) attended an offline LMW session, amongst whom 111 (40.4%) took the courses at a local library.

Figure 4-14 Distribution of site of learning among progression survey respondents by age groups (older people n=275)

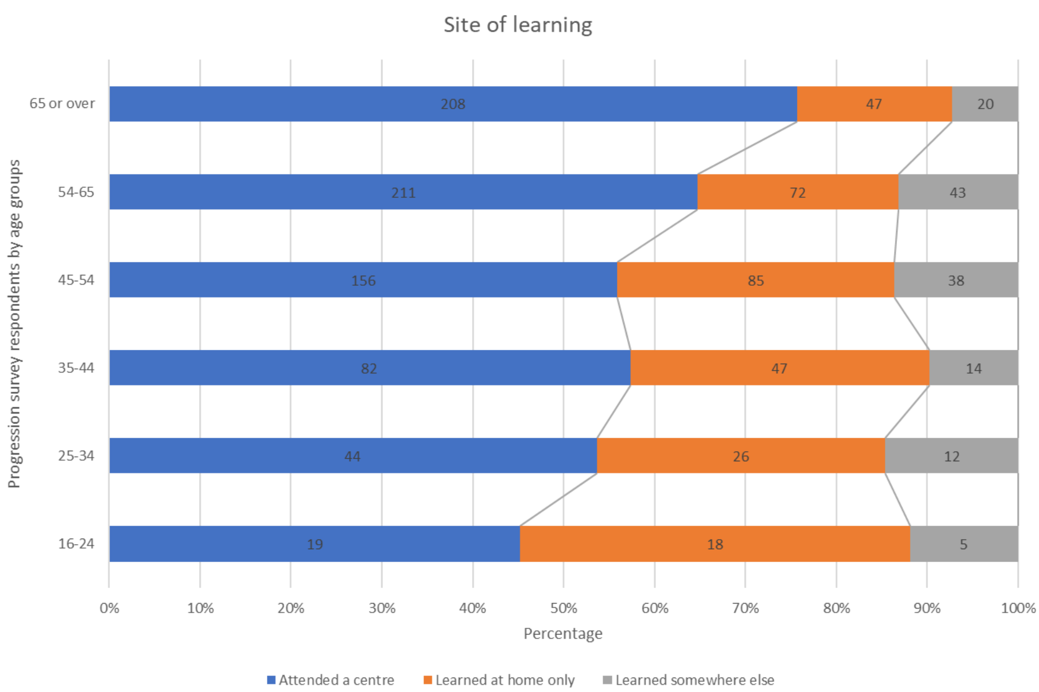
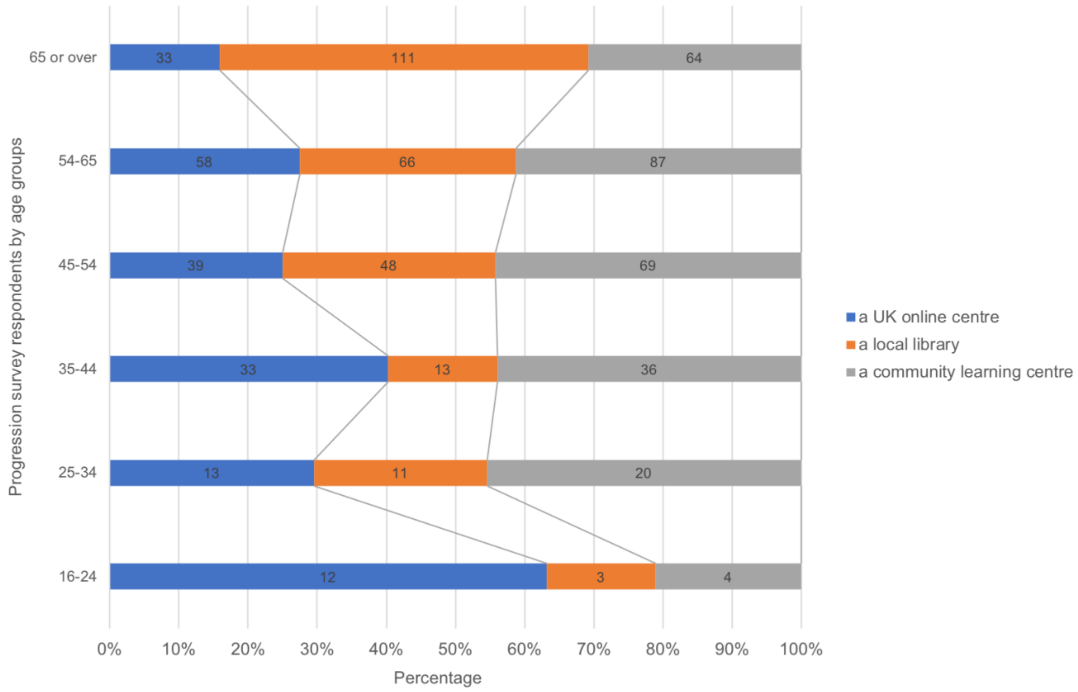


Figure 4-15 Distribution of centre types among progression survey respondents by age groups (older people n=208)



Course attendance by the site of learning and centre types were also compared among different age groups (Figures 4-14 and 4-15). Compared to their younger counterparts, older people had the highest proportion of attendance at libraries. Results from Pearson Chi-square tests suggested that there was an association between age group and site of attendance (χ^2=41.800, p<0.001, df=10, n=1147) as well as the type of learning centres that the participants attended, (χ^2= 66.114, p<0.001, df=10, n=720).

4.6.2.2 Skills

In the progression survey, respondents were asked a set of questions to self-rate their Internet skills. Questions concerning the ability to complete online tasks of varying levels of complexity and self-efficacy (on a 5-point scale) were asked. To assess the complexity of use, the participants were asked whether they could perform a set of simple online activities to slightly more complicated ones before they started learning with LMW. The descriptive statistics revealed that most participants (n=162, 58.9%) could perform tasks that involved more complicated procedures like filling an online form or making online purchases. Approximately one-third (n=91, 33.1%) could do one or two simple things, e.g., emailing or online information searching. There were 16 participants (n=5.8%) who felt that these tasks were beyond their level of Internet skills.

Participants were asked to self-rate their ability to use the Internet on a five-point scale, including “excellent”, “good”, “fair”, “poor”, and “bad”. Most participants (n=109, 39.6%) rated their ability to use the Internet as “fair”. Over one-third of the participants (n=98, 35.6%) regarded their level of Internet skills as “good”. Few participants considered themselves either “excellent” (n=27, 9.8%), “poor” (n=25, 9.1%) or “bad” (n=10, 3.6%) at mastering the Internet.

The measure of the age groups of the participants was recoded into a binary variable (older people or younger). A Pearson Chi-square test was carried out to investigate an association between age and self-rated ability. The result suggested a significant association between these two measures, (χ^2=41.719, p<0.001, df=4, n=1130).

4.6.2.3 Use

Participants were asked to distinguish whether they were active users of the Internet or not by the time of the progression survey. Of the 275 respondents, 252 (91.6%) reported to be active users, 17 (6.2%) reported to be discontinued users, and 6 (2.2%) reported that they had never used the Internet. Frequency of use was assessed among the active users, while the breadth of Internet use (also known as the centrality of Internet use) was examined among active and discontinued/lapsed users.

Figure 4-16 shows that most of the 252 active Internet users (n=167, 66.3%) maintained daily use of the Internet, while a quarter (n=69, 27.4%) used the Internet weekly. Although remaining active on the Internet, a small proportion of older respondents only went online monthly (n=12, 4.8%) or even less frequent (n=4, 1.6%).

As shown in Figure 4-17, the breadth of use on the Internet varied in both groups of active users and discontinued users. A Pearson Chi-square test did not show a statistically significant difference between types of users and the breadth of Internet use. However, it can be seen from the figure that most active users (n=128, 48.1%) explored one or two new websites they were not familiar with, while most discontinued users (n=8, 3%)

always visited the same few websites whenever they went online. It emerged from the data that not all active users were using the Internet's full potential, with 66 (24.8%) going online only to browse the same few websites.

Figure 4-16 Frequency of use by active Internet users aged 65 and over from the progression survey (n=252)

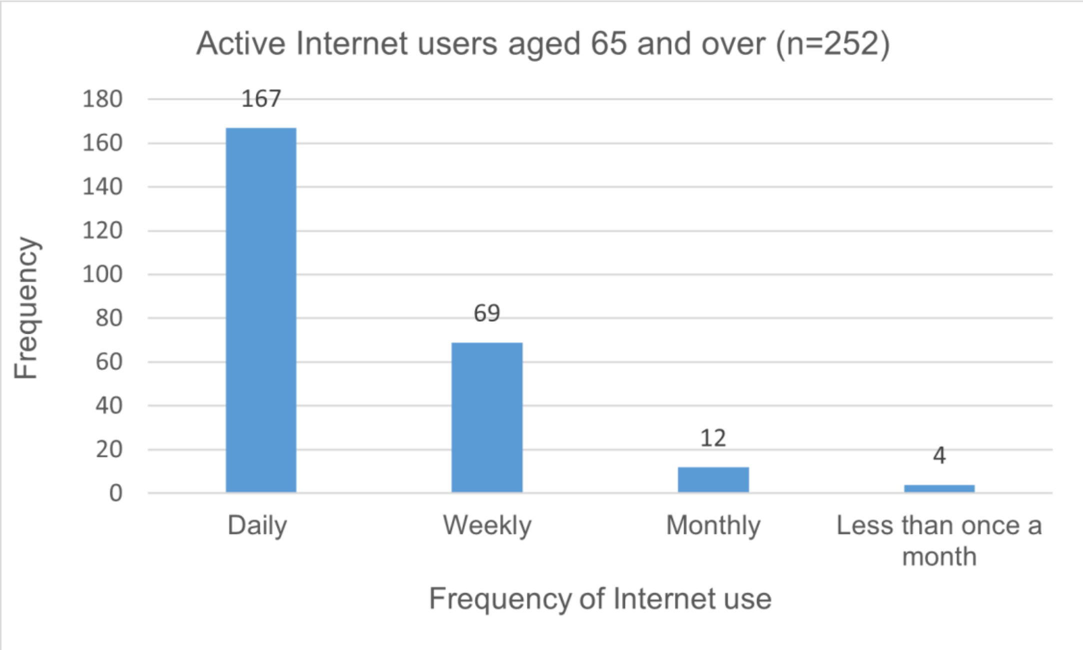
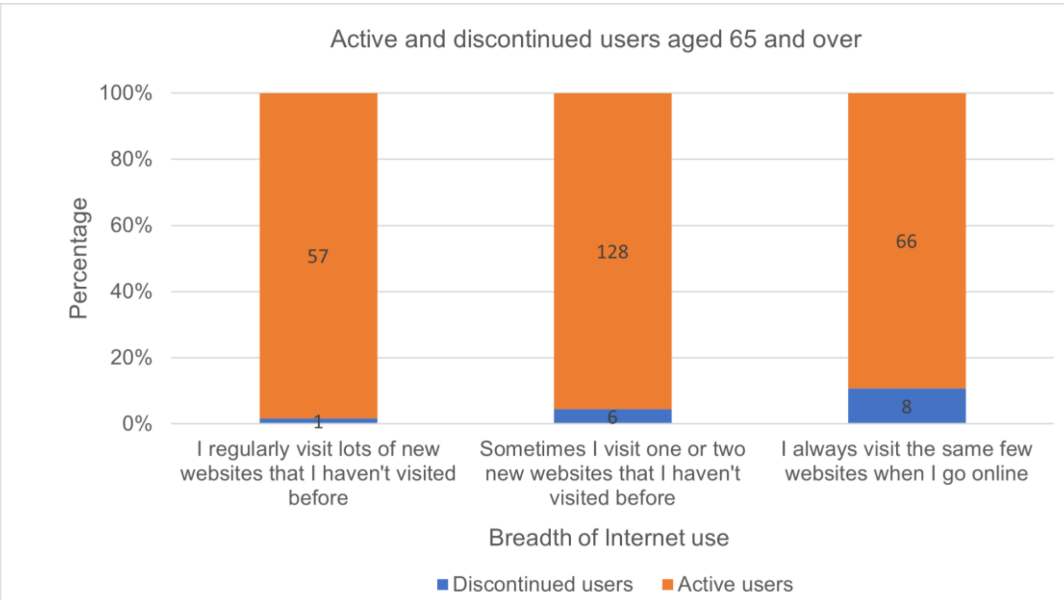
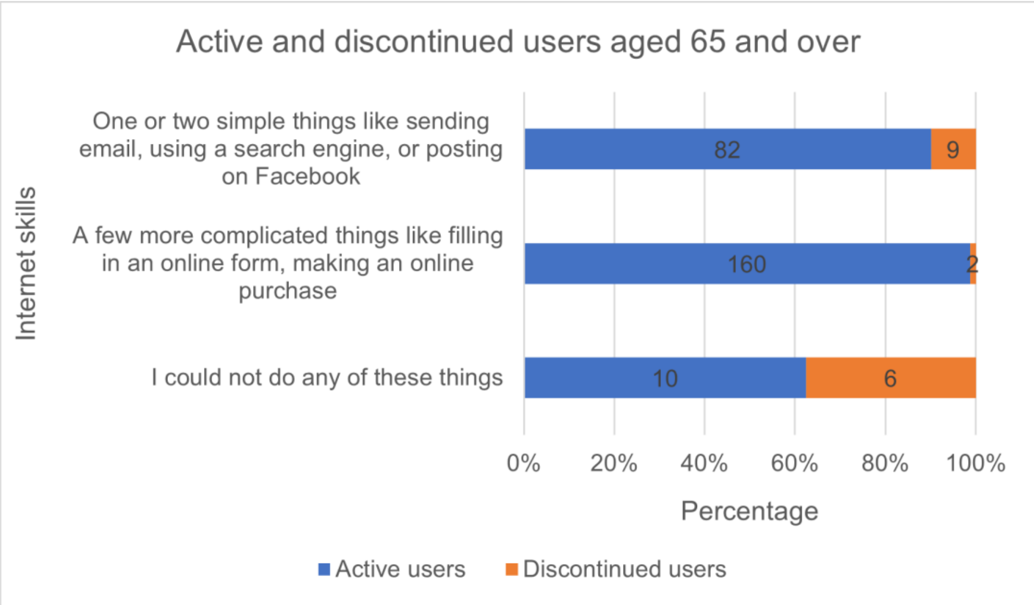


Figure 4-17 Use of websites by user types from the progression survey



Furthermore, Internet skills reported in the above subsection (i.e., skills) were compared between the types of users on sustained Internet use. The statistics are presented in Figure 4-18. A higher proportion of active users had the skills to perform more complicated online tasks (n=160, 63.5% within the group of active users), compared to a higher proportion of discontinued users who had limited skills to complete one or two simple online activities (n=9, 52.9% within the group of discontinued users). A Pearson Chi-square test was conducted to investigate the association between these two variables shown in Figure 4-18. The result suggested a statistically significant relationship between the type of users and their Internet skills, (χ^2=25.346, p<0.001, df=2, n=269).

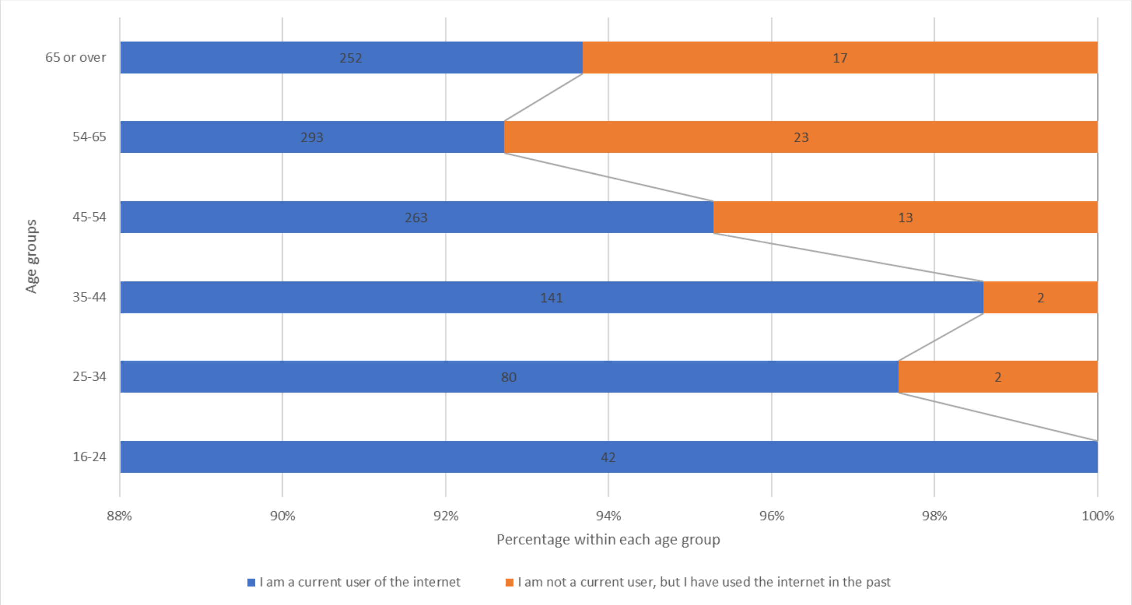
Figure 4-18 Internet skill of respondents by user types from the progression survey (n=269)



Similar to the learner survey, a comparison between older people and other age groups on their status of Internet use (i.e., being an active or discontinued user) was also performed. As illustrated in Figure 4-19, the data suggested that younger people had a higher proportion of active users compared to the older age groups. A Pearson Chi-square test suggested a statistically significant difference between active and discontinued users across age groups, (χ^2=15.093, p=0.01, df=5, n=1128). In addition, frequency of use was compared with a binary variable of age groups (i.e., older people/younger). The Pearson Chi-square test result suggested a statistically significant association between being an older person aged 65 or over and frequency of use, (χ^2=20.875, p<0.001, df=3, n=1071).

Compared to younger participants, older people had a lower proportion of daily Internet users but more weekly and monthly users.

Figure 4-19 Comparison of types of Internet users across age groups (n=1128)



The discontinued users of the Internet were asked for the reasons for stopping going online. From the set of reasons listed in Table 4-16, the most frequent were: lack of interest (n=5), lack of time (n=5), and difficulty in use (n=3). There were also older people quitting the Internet for loss of access to a computer (n=1), addiction (n=1) and for thinking that the Internet is not for people in their later life (n=1). Five participants also suggested that there were other reasons. These reasons, however, were not addressed in the survey due to a lack of open-ended questions. Insights on this were later gained in the qualitative study and will be reported in Chapter 5.

These results highlighted the risks of older people returning to be digitally excluded after being brought online. Sustained use of the Internet, thus, is compounded with other levels of digital divides such as motivation (i.e., a lack of interest), access (i.e., the possibility of losing access), skills (i.e., the possibility of not being able to keep the skillset up to date), use (i.e., addiction and overuse) as evident from the data. Sustained use of the Internet also seemed to be related to the user's habit in terms of how time is spent and prioritised on daily activities.

Table 4-16 Reasons for stopping going online from the discontinued users of the Internet (n=17)

Dimension/ Item	**Count**	**%**
Interest		
I am just not interested	5	29.4
Access		
I have no longer got an Internet connection available	0	-
I no longer have a computer available	1	5.9
Effort expectancy		
It was too difficult to use	3	17.6
Performance expectancy		
It was not useful	0	-
Price value		
It was too expensive	0	-
Experience		
I worried about my privacy	0	-
I had bad experiences with SPAM or viruses	0	-
Habit		
I do not have enough time	5	29.4
I was spending too much time on it	1	5.9
Attitude		
It is not for people of my age	1	5.9
It is not for people like me	0	-
Other	5	29.4

4.6.2.4 Outcomes

4.6.2.4.1 Health outcomes

Similar to the learner survey, health outcomes from using the Internet were investigated. In the Progression Survey, the participants were asked whether they had gained health-related outcomes by performing some online activities. A total of 53 older respondents (19.2%) stated that using the Internet had saved at least one phone call to their GP in the past three months; among these, sixteen (5.8%) had saved five or more phone calls. The number of participants who had saved calls to the NHS 111 phone service was 11 (4.0%). Using online services also benefited 51 participants (17.8%), who reported paying fewer visits to their GP in the past three months.

After learning how to manage health online, the older participants also gained relevant health outcomes from a range of health-related online activities, including "finding health-related information" (n=45, 16.4%), "booking a GP appointment online" (n=22, 8.0%), "ordering a repeat prescription online" (n=18, 6.5%), "finding health service online" (n=15, 5.5%) and "rating health services received" (n=11, 4.0%). In a scenario of needing non-urgent medical advice the following week, participants were asked the first place they would go for help. A total of 23 participants (8.4%) stated that they would use the Internet to look at sites such as the NHS website. This was only second to the number of people opting to visit their GP (n=29, 10.5%).

Participants not only achieved health outcomes from online activities but also gained benefits offline through the adoption of health-enhancing daily activities, such as "explored ways to manage stress" (n=35, 12.7%), "started eating more healthily" (n=34, 12.4%), "increased the amount of exercise or physical activity" (n=29, 10.5%), "cut down or give up smoking" (n=3, 1.1%), and "cut down the amount of alcohol intake" (n=10, 3.6%). In addition, the "unintended benefits" of Internet use, defined by Van Deursen et al. (2017) as tangible outcomes that occurred in a domain (e.g., economic) that is different from its initial domain of online activity (e.g., personal), were also observed in the progression survey. Twenty-five participants (9.1%) reported that they had saved money from paying fewer visits to the doctor and managing health online.

According to the survey data, being able to search for health-related information online also helped a small number of participants to be more knowledgeable about food or healthier diet (n=4), exercise (n=5), and their conditions and symptoms (n=12). Similar to the above-discussed outcomes from health-related Internet use, the proportion of older people that used and benefited from using the Internet in such ways was still very low.

4.6.2.4.2 Outcomes from learning

In the progression survey, an additional set of questions was designed to better understand the outcomes from learning. The participants were first asked for their rating of a list of statements of outcomes. They were then asked further about their ability to perform a wide range of online activities before and after learning. Table 4-17 presents the results of this.

Table 4-17 Outcomes from learning with the LMW

Statements (Measured on a 5-point scale)	**Count**	**%**	**Mean**	**SD**
You are more enthusiastic about learning	273	99.3	4.24	1.05
The course has improved your general self-confidence	272	98.9	4.11	1.12
You can help other people because you have improved your confidence	260	94.5	3.56	1.33
You feel more independent because of the computer and internet skills you have learned	272	98.9	3.86	1.19
You have or will take part in more voluntary or community activities	257	93.5	3.82	1.29
You are more able to manage money and adapt to changes in your financial situation	261	94.9	3.30	1.46
You feel more able to deal with any housing issues you may encounter	250	90.9	3.32	1.40
You now feel more informed about your health	261	94.9	3.64	1.34
You now feel more confident about using online tools to manage your health	264	96.0	3.55	1.34
You feel less lonely or isolated	261	94.9	3.42	1.45
You feel happier to have more social contact	270	98.2	3.76	1.31
You are a more confident and independent internet user	109	39.6	4.08	0.97
You have improved your digital skills	107	38.9	4.02	1.02
You are more motivated to be online	109	39.6	4.06	1.06

As shown in Table 4-17 above, the participants, in general, reported positively on the learning outcomes. The highest scores clustered around statements that described outcomes in feelings and attitudes such as "enthusiastic" (*M=4.24, SD=1.05*), "confident" (*M=4.11, SD=1.12*), "independent" (*M=4.08, SD=0.97*) and "motivated" (*M=4.06, SD=1.06*). In comparison, the lowest scores were the outcomes achieved in more specific and practical aspects, such as "financial management" (*M=3.30, SD=1.46*), "housing troubleshooting" (*M=3.32, SD=1.40*), "feeling of loneliness" (*M=3.42, SD=1.45*), and "managing health" (*M=3.55, SD=1.34*).

Moreover, the progression survey measured learning outcomes in terms of increased abilities to perform online activities. Participants were asked to state whether they had used the Internet from a list of online activities before the learning. If they had done so, they were asked whether they had learned how to better perform these activities and, if not, they were asked whether they had learned how to use the Internet in these ways. The frequency of responses is presented in Table 4-18.

Table 4-18 Comparison of respondents' online activities before and after learning
(The top-4 ranked activities are colour-coded for reader convenience. The colour used from higher ranking to lower-ranking are darker blue, lighter blue, darker grey and lighter grey)

Online activities	**Had experience before learning** (Valid number of cases N=218)			**Use for the first time** (Valid number of cases N=224)			**Gained better skills** (Valid number of cases N=196)		
	N Responses	% Responses	% Cases	N Responses	% Responses	% Cases	N Responses	% Responses	% Cases
Work									
Finding work	3	0.3	1.4	5	0.6	2.2	2	0.4	1.0
Work-related learning	5	0.5	2.3	4	0.5	1.8	4	0.7	2.0
Daily activities (general use)									
Learn for personal interest	149 Rank 2	16.2	68.3	98 Rank 4	11.1	43.8	124 Rank 1	21.7	63.3
Online entertainment	91	9.9	41.7	99 Rank 3	11.2	44.2	50	8.8	25.5
Keep in touch with friends and family	168 Rank 1	18.3	77.1	77	8.7	34.4	114 Rank 2	20	58.2
Online shopping	110 Rank 4	12.0	50.5	95	10.8	42.4	54 Rank 5	9.5	27.6
Financial									
Saving money	82	8.9	37.6	97 Rank 5	11.0	43.3	48	8.4	24.5
Online banking and budgeting	95 Rank 5	10.4	43.6	85	9.6	37.9	41	7.2	20.9
Health									
Finding health information online	111 Rank 3	12.1	50.9	119 Rank 1	13.5	53.1	74 Rank 3	13	37.8
Civic (services)									
Claiming benefits online	8	0.9	3.7	91	10.3	40.6	4	0.7	2.0
Using other government or council services online	95 Rank 5	10.4	43.6	112 Rank 2	12.7	50.0	56 Rank 4	9.8	28.6

As summarised in the table, most participants used the Internet to perform daily activities that revolve around communicating with family and friends (n=168, 77.1%), developing a personal interest (n=149, 68.3%), finding health information (n=111, 50.9%), doing online shopping (n=110, 50.5%), and using governmental services before learning (n=95, 43.6%). Among these, activities in finding health information, learning about things for personal interest, and using governmental online services also ranked as top online activities for both participants who learned these as new skills and those who had their skillset harnessed.

Furthermore, Pearson Chi-square tests were performed to test whether there were associations between the demographic variables (see Table 4-14) and the activities reported in Table 4-18. Results suggested a significant difference in “finding health information online”, (χ^2=9.992, p=0.002, df=1, n=164), with females being 3.56 times more likely to have started using the Internet for health information since learning.

4.6.2.5 Learning

In the progression survey, the learning status of the participants was assessed separately for learners at an offline centre (n=208) and learners at home (n=47).

Among those who learned at the centres, 85 participants (40.9%) were still learning about computers and the Internet when taking this survey. Although they stopped learning digital skills, some participants were still attending the centres for other learning (n=19, 9.1%) or services (n=35, 16.8%). Ninety-eight participants had stopped going to the learning site completely, comprising 47.1% of this group of participants. The reasons for stopping going to the centres were collected and coded as binary variables. The results are reported in Table 4-19.

Table 4-19 Breakdown of reasons for stopping attending the centres

Reasons for stopping going to the site of learning	**Count**	**%**
I had got all the help I needed	44	16.0
It did not seem to be useful to me	2	0.7
Couse ended/finished the course	11	4.0
Change of personal circumstances (i.e., bereavement, illness)	17	6.2
Waiting to start another course/would like to repeat the course	7	2.5
Too far away/no local centres	6	2.2
Centre shut down	2	0.7
Too busy/no time	7	2.5

The reasons for the learners stopping attending the centres varied. Most of the participants left because they had learned all the things they needed to know (n=44, 16.0%). Some participants stopped as the course ended (n=11, 4.0%). In comparison, a small number of participants wished to repeat the courses (n=7, 2.5%). Personal reasons such as change of circumstances (n=17, 6.2%) and lack of time resulting from a busy lifestyle (n =7, 2.5%) were also influential factors for some people. In addition, the provision of courses in terms of availability and location and the usefulness of course contents also mattered for some participants.

Likewise, the participants who learned at home on the LMW platform were also asked if they continued with the courses. Some participants were active LMW learners by the time of this survey (n=19, 40.4%), while others were still learning about computers and the Internet but no longer learning with the LMW (n=14, 29.8%). Fourteen participants (29.8%) had stopped learning about computers and the Internet completely. Among the 47 home learners, 12 started to attend an offline course at one of the centres. For those who stopped learning, “too complicated” (n=1), “no time” (n=3) and “I had learned everything I wanted” (n=5) were the reasons that were mentioned.

The length of learning was measured among both types of learners. A total of 123 participants (44.7%) learned for less than four weeks, compared to 142 participants (51.6%) who learned for more than four weeks.

Pearson Chi-square tests were used to test the associations between learning and using within different age groups. The results indicated significant associations between them for age groups 45-54, (χ^2=6.726, p=0.01, df=1, n=276), and over 65, (χ^2=4.546, p=0.033, df=1, n=269), respectively.

In summary, it can be concluded that the most common reason for having stopped learning was that the older learners felt that they had received all the help needed or have learned all things that they aimed for. As illustrated in Tables 4-4 and 4-5, the top two reasons older people brought to the courses were learning (better) how to stay in touch with family and friends and how to use the Internet for personal interest. This agrees with the data shown in Table 4-18 in the top-ranked activities the participants had experience with before the courses and bettered their skills after the courses. As opposed to younger age groups, learning how to use the Internet and the actual use were closely coupled for older people. However, although some participants were able to sustain their use of the Internet through learning, other participants risked being digitally excluded due to various factors, ranging from personal domain to organisational domain.

4.6.3 Sustained use and levels of the digital divide

Indicators of the traditional levels of the digital divide (i.e., first-, second-, and third-level digital divide) and an indicator of sustained use (i.e., a participant being active or discontinued Internet use) were tested for associations between them.

A set of Pearson Chi-square tests were performed for access, skills, and use. The results are reported in part 1 of Table 4-20. There were statistically significant differences between active users and discontinued users in access to a laptop (*p=0.001*), access to a tablet (*p=0.031*), skills in performing tasks of varying levels of complexities (*p<0.001*), self-rated ability as good (*p=0.029*) and poor (*p<0.001*). Discontinued users were 9.100 times more likely to consider their computer skills as "poor". In comparison, active users were 4.61 times more likely to regard their ability to go online as "good". Compared to discontinued users, they were also 5.56 times more likely to have access to laptop computers and 3.73 more likely to own tablet computers. This indicated that first-, and second- digital divides are compounded with the fourth digital divide (i.e., sustained Internet use).

Table 4-20 Results of Pearson Chi-square test between traditional indicators of the digital divide and an indicator of sustained Internet use

Part 1. **Indicators of the digital divide**	**Type of Internet user** (Active user of the Internet/discontinued user)			
	χ^2	df	Sig	OR
Access to devices (No/Yes)				
Desktop computers	Not significant			
Laptop computers	10.441	1	0.001**	0.180 95% CI (0.057,0.568)
Tablet computers	4.673	1	0.031*	0.268 95% CI (0.075,0.955)
None of the above	Not significant			
Access to training (No/Yes)				
Access through a centre	Not significant			
Access from home	Not significant			
Skills				
Complexity of tasks (One or two simple things/a few more	35.310	2	<0.001**	n.a.

complicated/none of these)				
Self-rated ability: Excellent (No/Yes)	Not significant			
Self-rated ability: Good (No/Yes)	4.768	1	0.029*	0.217 95% CI (0.048,0.968)
Self-rated ability: Fair (No/Yes)	Not significant			
Self-rated ability: Poor (No/Yes)	18.031	1	<0.001**	9.100 95% CI (3.096,26.751)
Self-rated ability: Bad (No/Yes)	Not significant			
Use				
Breadth of use (Visit same websites/one or two new websites/a lot of new websites	Not significant			

Part 2. **Indicators of the digital divide**	**Type of Internet user** (Active user of the Internet vs. discontinued user)			
	Mann-Whitney U			
	U	**Sig**	**Median[a] or *Mean rank[b]***	**IQR**
Outcome (5-point scale)				
More enthusiastic about learning	1501.000	0.025*	5.00 vs 4.00	(4.00, 5.00)
Improved general self-confidence	1198.500	0.001**	5.00 vs 3.00	(3.00, 5.00)
Able to help other people because of improved confidence	747.500	<0.001**	*132.36 / 55.22*	(3.00, 5.00)
More independent	985.000	<0.001**	*138.56 / 66.94*	(3.00, 5.00)
More voluntary or community activities	1200.000	0.028*	*128.42 / 88.00*	(3.00, 5.00)
More able to manage money and adapt to changes in financial situation	1329.500	0.014*	3.00 vs 3.00	(2.00, 5.00)
More able to deal with any housing issues	1204.500	0.007**	4.00 vs 3.00	(2.00, 5.00)
More informed about own health	1581.000	0.221	4.00 vs 3.00	(3.00, 5.00)
More confident about manage health online	1205.500	0.003**	4.00 vs 3.00	(3.00, 5.00)
Feel less lonely or isolated	1490.000	0.128	4.00 vs 3.00	(2.00, 5.00)
You feel happier to have more social contact	1247.000	0.009**	4.00 vs 3.00	(3.00, 5.00)
More confident and independent internet user	274.000	0.676	*54.29 / 49.17*	(3.00, 5.00)
Improved digital skills	252.500	0.219	*53.92 / 40.07*	(3.00, 5.00)
More motivated to be online	238.000	0.124	*55.64 / 38.00*	(3.00, 5.00)

*Significance level at 0.05
**Significance level at 0.01
a. According to the histogram, the shape of the outcome distribution of the two groups is basically the same; the median for each group is reported as the median for active users vs the median for the discontinued user.
b. According to the histogram, the outcome distributions of the two groups are inconsistent in shape; the mean rank for each group is reported as mean rank for active user/mean rank for the discontinued user.

As shown in part 2 of Table 4-20, further comparisons were conducted between subgroups of active users (n=252) and discontinued users (n=17). Tested variables were coded on a 5-point agreement scale from “strongly disagree” (assigned value “1”) to “strongly agree” (assigned value “5”). The variables included: *satisfaction on courses*, *enthusiasm for future learning*, *general self-confidence*, *confidence in helping others*, *increased independence*, *richer civic and voluntary life*, *better management of finance*, *better management of housing issues*, *more informed about health*, *better manage health online*, *less loneliness and isolation*, *happier from social contact*, and *digital skills outcomes* (3 items, including increased confidence and independence in using, improved digital skills, and more motivated to go online). According to the results from

Kolmogorov-Smirnov test for normality, the variables are not normally distributed. Thus, a non-parametric test (i.e., the Mann-Whitney U test) was performed on each outcome variable for two independent samples (i.e., active user and discontinued user groups). In the table, the Mann-Whitney U score, significance value, the inter-quartile range (IQR) were reported for each outcome variable. In addition, based on the uniformity of the distribution between the two groups, either the median (when their shapes of distribution from histograms agree) or the mean rank (when the distribution of outcome variables are inconsistent) for each group were reported.

The test results indicated that there was no significant difference between the two groups in terms of perceptions and attitudes towards becoming more able (*"improved digital skills", $p=0.219$*), confident *("a more confident and independent internet user", $p=0.676$*) and motivated Internet user *("more motivated to be online", $p=0.124$*). This was also supported by the small gaps in their mean rank between these two groups. In comparison, there were significant differences in their opinions about learning *("more enthusiastic about learning", $U=1501.000$, $p=0.025$*). Compared to discontinued users, active users gained a higher level of outcome from the LMW courses and were thus keener to keep learning. Despite the difference, both types of users reported positive attitudes on learning (Active users: median=5.00; discontinued users: median=4.00).

There were significant differences between these two groups in gaining beneficial outcomes offline, for example, being more confident about managing health online ($U=1205.500$, $p=0.003$), becoming more competent in dealing with housing issues ($U=1204.500$, $p=0.007$), becoming more able to manage money and adapt to financial situations ($U=1329.500$, $p=0.014$), having more social contact ($U=1247.000$, $p=0.009$), and being able to help other people ($U=747.500$, $p<0.001$) and engage in voluntary or community activities ($U=1200.000$, $p=0.028$). This difference may be related to the differences in their level of skills and general use pattern of the Internet that reported in Sections 4.6.2.2 and 4.6.2.3. Managing health, finance and housing-related issues or searching for relevant information online requires a certain level of digital skills. Discontinued users, who tended to have fewer skills and less confidence in using the Internet more extensively, were more likely not to perform online activities in such a wide range, hence gaining fewer outcomes from being online. Similarly, as more and more services and information are moved online, older people who are more active online, in particular on social networks, have more means to gain social contacts and to engage in community activities (e.g., volunteering, helping other people and socialising) that are published online.

It is worth noting that, despite the differences between these two groups in managing health online, active users and discontinued users did not vary from each other in whether or not they were more informed about their health (*p=0.221*). As older people living in their later life, this may be because they have become knowledgeable about their health, particularly the chronic health conditions, through day-to-day self-care. It may also be related to older people's preference towards and trust in medical professionals. As reported in a study conducted by Magsamen-Conrad et al. (2019), the Internet is a backup when medical professionals seem to struggle to confirm a diagnosis.

The results also suggested a significant difference between these two types of users in "improved general self-confidence" (*U=1198.500, p=0.001*) but not in feeling "less lonely or isolated" (*p=0.128*). As reported in Sections 4.5.2.3 and 4.6.2.2, discontinued users tended to be associated with a more negative self-rated ability to use the Internet. It may be more difficult for them to build self-confidence through the LMW courses. Loneliness and isolation are very common among older people (Age UK, 2021b). Although the Internet is expected to reduce the level of loneliness for older people who go online, there have been mixed results from previous studies on coping with loneliness with Internet adoption (Aarts, Peek, & Wouters, 2015; Morris et al., 2014). This agrees with the IQR reported for this measure of outcome (i.e., "feel less lonely or isolated"), with a range between 2.00 and 5.00, i.e., fifty per cent of the learners rated this outcome between a wide range of score of 2.00 and 5.00.

4.6.4 Who were being excluded and why?

In the previous subsections, a general socio-demographic profile for the older respondents was generated (Section 4.6.1) and existing digital divides at different levels were discussed (Sections 4.6.2 and 4.6.3). The reasons for abandoning learning or the use of the Internet were also presented. In this subsection, a closer look into each type of the participants and their sustained use of the Internet is taken. The aim is to understand better the profile of the participants who had used the Internet differently or had been excluded in different ways and to discuss the characteristics that may be related to or even lead to such digital exclusions.

As shown in Figures 4-20 and 4-21, different levels of digital exclusion existed across three types of learners who learned at home, with online centres or with other offline course providers. Three types of users were identified: active users (of the Internet), discontinued users, and non-users. The groups of active users and discontinued users signified a dynamic digital divide in sustained use of computers and the Internet.

Figure 4-20 An illustration of Internet-use status

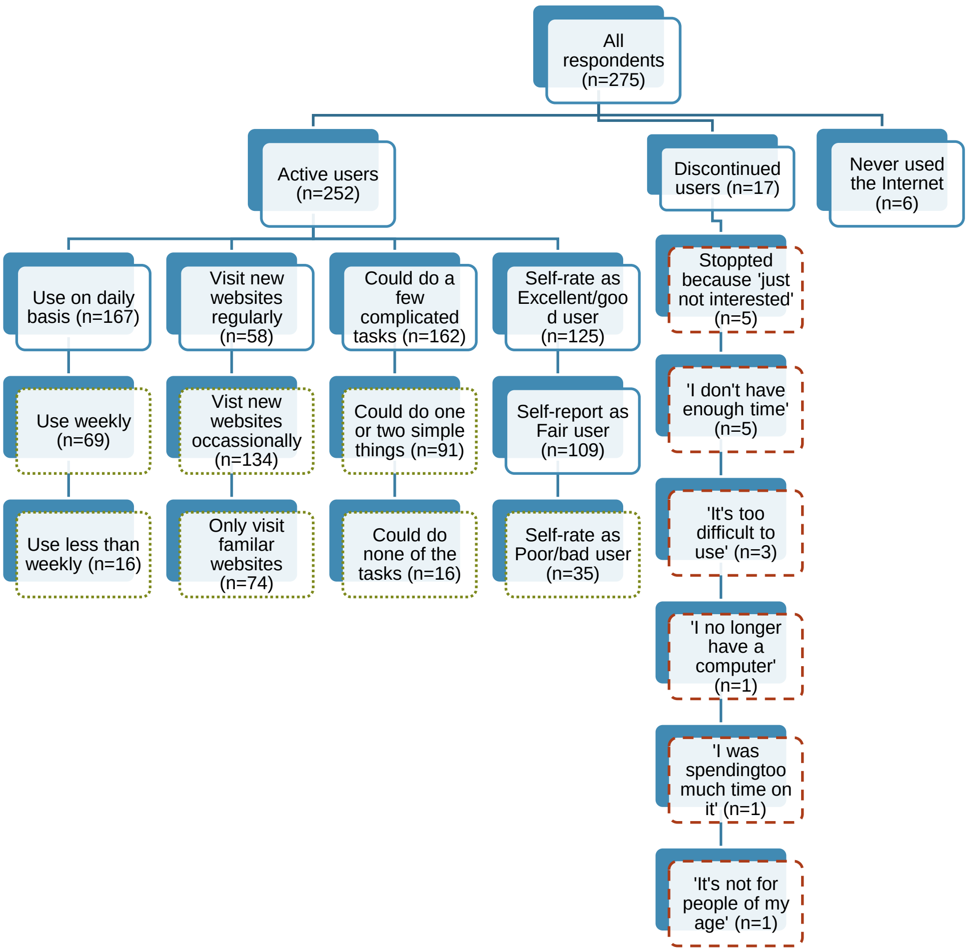
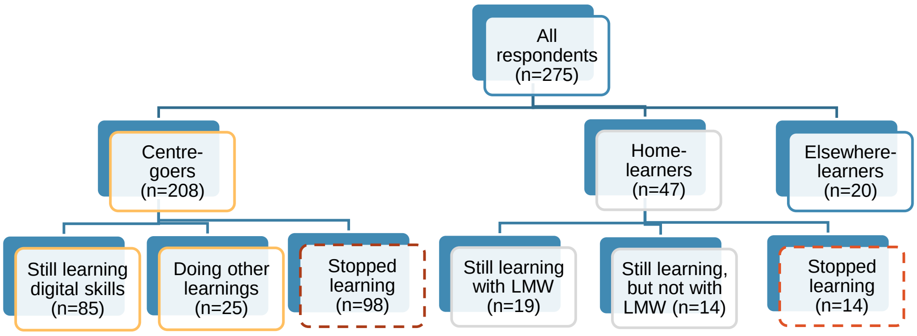


Figure 4-21 Illustration of changes in learning status by different learner types



The reasons why some of the previous Internet users discontinued this activity conform with those mentioned in published studies, for example, the so-called "choose-not-to" who stopped using the Internet due to a lack of interest (Norval, Arnott, & Hanson, 2014). The respondents who reported "no longer have a computer" were those previously digitally included but became excluded again due to a lack of support in technology maintenance (Gonzales, 2015).

Within the group of active users, different patterns of Internet use were detected even though they were still using the Internet actively. Some of them were "limited users" who had limited skills for performing online activities and limited Internet use in general. Some others were "pragmatic users" who visited familiar websites frequently. Two-step cluster analysis based on four variables (ownership of laptop, breadth of Internet use, complexity of Internet use, and self-rated ability) was conducted in SPSS version 24. Four clusters of active users emerged from the final model, with a Silhouette measure of cohesion and separation between 0.5 and 1.0, indicating a good cluster quality (Norusis, 2011). The four clusters had a ratio of sizes score 1.33, indicating an even distribution of cases by clusters (cluster 1, 26.7%; cluster 2, 26.7%; cluster 3, 20% and cluster 4, 26.7%). The distribution of each variable in the clusters was analysed, based on which the clusters were interpreted as follows:

- Cluster 1 (*The Pragmatic*) describes a type of user who could navigate through complicated online tasks but had no strong interest in exploring online spaces. In general, they felt good about their ability to go online.

- Cluster 2 (*The Limited*) describes a type of users who had limited skills to perform online tasks, occasionally explored new websites, used laptops, and had low confidence in their online skills.
- Cluster 3 (*The Goal-oriented*) describes a type of users who only visited the same few websites, could do some complicated online operation, but did not use laptops and had low confidence about their skills.
- Cluster 4 (*The Contented*) describes a type of users who had minimal skills, limited their use to the online spaces they already knew, and felt good about their ability to use the Internet.

Furthermore, binary logistic regression was first conducted to identify the factors that influenced the categorisation of a participant being an active Internet user or not. Following this, cases concerning the discontinued users were selected from the sample and further reviewed, resulting in a more in-depth categorisation within this type of Internet user from the sample.

4.6.4.1 Factors on sustained use

From a set of Pearson Chi-square tests on demographic variables and indicators of respondents' status, whether or not the respondents were still learning about computers and the Internet was related to their self-identification as active or discontinued users of the Internet. Binary logistic regression analysis was conducted to identify factors contributing to the categorisation of 'active' or 'discontinued' users. After screening based on results reported in Sections 4.5 and 4.6, the variables for other types of digital divides were included as predictors, including learning status (still learning/no), self-rated ability (excellent/good/fair/poor/bad), access to devices (desktop/laptop/tablet), breadth of use and complexity of use.

A set of assumptions defined in Section 4.4.5 were addressed:

1) The dependent variable was binary;
2) There was at least one independent variable;
3) Each observation was independent to each other. The classifications of categorical variables were mutually exclusive;

4) The sample size of older people was relatively small for obtaining reliable results from the binary logistic analysis. The EPV was less than 2. This violated the assumption of a minimum EPV value at 5. However, as Van Smeden et al. (2016) suggested, this can be addressed by increasing the total sample size. Therefore, the logistic regression was performed with the complete sample of the progression survey (n=1153) instead of the group of older people (n=275). The EPV was increased to 5 and met the assumption. In addition, the reliability of the test result was examined by observing the Wald value. According to Peduzzi et al. (Peduzzi et al., 1996), the main risk of logistic regression with small sample size or low EPV number were the situations of "complete separation" and "quasi-complete separation". This would mean that the regression coefficient B cannot be obtained or that the Wald χ^2 is too large, which would generate a very small p-value. Therefore, the Wald value was reviewed in the results reported in SPSS to mitigate these risks;
5) There were no continuous variables;
6) There was no multicollinearity between the independent variables (VIF<10, Tolerance>0.1);
7) There were no extreme outliers.

Due to a limitation in a small sample size for discontinued users, the result may be not robust enough. However, considering that the participants were recruited from the LMW training courses, which may affect the number of discontinued users represented, and the results have certain interpretability, they are still displayed in Table 4-21. The reliability of the result needs further research to confirm.

As shown in Table 4-21, nine variables were included in the test. The final logistic model containing all predictors was highly statistically significant (χ^2=130.417, p<0.001, df=18, n=982), indicating that the model could distinguish between active users or active discontinued users. The Hosmer-Lemeshow Test, a reliable test of 'goodness of fit' of the model, requires a greater p value than 0.05. In this model, the Hosmer-Lemeshow Test result showed that the modelling was successful (χ^2 =2.845, p=0.944, df=8, n=982). The Wald value, OR value, and confidence interval were relatively normal, suggesting a low risk of "complete separation" and "quasi-complete separation" on the regression model. The model can correctly classify 95.4% of the dependent variable. The sensitivity of the model was 15.6%, the specificity was 99.3%.

Table 4-21 Results from binary logistic regression (included in analysis n=982) with a dependent variable of user type (active user=0, discontinued user=1)

Variables in equation	B	Wald	Sig.	Exp(B)	95% C.I. for EXP(B) Lower	Upper
Learner type *Reference: learn at home* Learned at a centre	-1.513	7.565	.006**	.220	.075	.647
Self-rated ability *Reference: excellent*		17.467	.002**			
Bad	1.166	.683	.409	3.208	.202	50.964
Poor	2.510	5.050	.025*	12.310	1.378	109.939
Fair	1.284	1.404	.236	3.609	.432	30.158
Good	.043	0.001	.970	1.044	.107	10.145
Status of learning *Reference: No* Yes	-1.862	15.271	.000**	.155	.061	.395
The breadth of Internet use *Reference: regularly visit lots of new sites*		6.090	.048*			
Always visit the same few sites	1.878	5.550	.018**	6.540	1.371	31.197
Sometimes one or two new sites	1.372	2.837	.092	3.944	.799	19.475
Complexity of use *Reference: cannot do any online*		5.251	.072			
One or two simple things online	-1.071	3.748	.053	.343	.116	1.013
A few more complicated things	-1.411	5.066	.024*	.244	.071	.833
Ownership of desktop *Reference: yes* No	1.578	6.401	.011*	4.846	1.427	16.456
Ownership of laptop *Reference: yes* No	1.467	12.160	.000**	4.337	1.901	9.893
Ownership of tablet *Reference: yes* No	.892	3.973	.046*	2.439	1.015	5.862
Age group *Reference: 65+*		5.077	.407			
16-24	-17.004	.000	.998	.000	.000	.
25-34	-.383	.114	.735	.682	.074	6.260
35-44	-2.228	3.437	.064	.108	.010	1.136
45-54	-.474	.859	.354	.623	.229	1.696
55-64	.137	.104	.747	1.147	.498	2.643
Constant	-4.904	9.524	.002	.007		

Among the nine independent variables included in the model, learner type, self-rated ability, status of learning, breadth of use, the complexity of use, and ownership of devices were statistically significantly associated with whether the participant was an active or discontinued Internet user. With other variables controlled for, the age group was a statistically significant factor for sustained use (i.e., being active or discontinued user) in the equation. Moreover,

- Compared to learners at home, learners who learn at a centre were 78% less likely to become a discontinued user.
- Compared to learners who rated their digital abilities as excellent, those who rated their abilities as poor were 12.31 times more likely to be a discontinued user.
- Compared to those who stopped learning, those who continued with the digital training courses were 84.5% less likely to be a discontinued user.
- Compared to those who regularly visit new websites, those who always visited the same few websites were 6.54 times more likely to be a discontinued user.
- Compared to those who possessed no digital skills online, those who could complete a few more complicated activities online were less likely to be a discontinued user.
- Compared to those who had access to a desktop, laptop, or tablet computer, those who did not have one were 4.86, 4.34 and 2.44 times more likely, respectively, to be a discontinued user.

The results confirmed that those who risked inequalities in the first-, second-, and third-levels of the digital divide were more likely to be at risk from the fourth digital divide in sustained use. In addition to the findings presented previously in this section, this finding highlighted the interconnectedness of various digital divides. Technology maintenance, including maintaining access to devices and the maintenance of digital skills and use, is important to help keep older people online. Learning how to manage the devices and how to operate online is thus of strategic importance for achieving this goal.

4.6.4.2 Case studies on discontinued users

Previous analyses revealed that discontinued users (n=17) were often influenced by multiple factors other than a single factor. Whilst there were hurdles at different levels ranging from physical access, skills, to motivations and interests, data from this sample uncovered two main barriers to becoming or staying an active user: “lack of interest” (n=5) and “lack of time” (n=5). In addition to these, “too difficult to use” was also a frequently reported factor (n=3). More detailed comparisons thus were undertaken from a qualitative approach to identify the sub-categories and specific cases. For the “lack of interest” group, three types of users emerged:

- the “unwilling” users, who had higher education, good digital skills, and online activities but did not have access to any type of device at home. They thought they had spent too much time on the Internet;
- the “seed” users, who have had some previous experience with the Internet, and had either started learning digital skills to complete different online tasks or expressed an interest in taking up future learnings;
- the “disheartened” users, who had minimal prior-learning experience with the Internet. They gained somewhat limited skills from the training courses and had no interest in taking up any future learning courses. A negative attitude (i.e., “too difficult to use”) towards computers and the Internet was expressed by this type of discontinued user.

In addition, socio-demographic factors also had a contribution in profiling these three types of users. For example, the discontinued users who reported the reason “I no longer have a computer available” were categorised as socially excluded by income, whereas users who expressed “too difficult to use” were identified as socially excluded by education.

After going through the sample, five cases were extracted from the dataset for further analysis on discontinued users who indicated that they were “just not interested”. As shown in Table 4-21, four out of five were female and two out of five had no qualification and were socially excluded and disabled.

From Tables 4-21 and 4-22, it can be inferred that there existed differing contexts to the statement of “I am not interested” and therefore calls for different approaches to interpret them. Cases 43 (female) and 57 (male) had similar education and social backgrounds. Both of them had no access to the Internet at home, and they had the highest self-rated abilities. However, their Internet skills and learning experiences were entirely different.

Cases 49 and 55 can also be viewed as a pair: they had no educational qualifications and were disabled. Their previous engagement with the Internet was limited to searching health information, and their general activities online were limited. Both of them had access to the Internet at home but were not interested in learning or using the Internet because, as case 49 stated, it was “too difficult to use”.

Case 47 had a moderate educational background (i.e., Level 2 education) and had access to the Internet at home. She felt the Internet was “not for people for my age” and had minimal skills and experience in using the Internet. However, she showed a strong interest in learning new things despite her engagement with the LMW training was not fruitful. From dwelling deeper into these five cases, it emerged that the barriers to their digital exclusion vary:

- Case 43: Opted out from using the Internet due to access to rich resources offline. She had the digital skills and knowledge to go online. However, using the Internet did not add value to her life. Learners of this type should not be targeted for involvement in further training sessions on skills.
- Case 47: Discontinued user due to a lack of skill and knowledge and a negative attitude towards the Internet concerning her perception of age-appropriate behaviours. However, although she was not interested in the Internet, she showed strong interest in learning for the time being. Learners of this type should be prioritised for further digital skills training opportunities.
- Cases 49 and 55: The main barrier to their continued Internet use appeared to be a lack of literacy and skills. Their digital behaviours were closely linked to their health conditions. Interventions towards them should be tailored to their specific health needs. The learning contents should be adapted, made more relevant and more accessible for them to understand.
- Case 57: The main barrier to his digital inclusion was attitudinal. His digital behaviour and purposes of learning were very pragmatic. Interventions could start from communicating the benefits and convenience of going online, but more should be learned from this type of discontinued user in the following stage of the study.

Table 4-22 Socio-demographic information of the selected cases
(Disability 1 refers to whether a person is disabled or not. Disability 2 measures whether a disability has an adverse effect on day-to-day life)

Case number	Gender	Education	Disability 1	Disability 2	Social exclusion: overall	Social exclusion: education	Social exclusion: income	Social exclusion: benefits	Social exclusion: housing
43	Female	Level 4	Not disabled	Not disabled or no adverse effect	Not	Not	Not	Not	Not
47	Female	Level 2	Not disabled	Not disabled or no adverse effect	Not	Not	Not	Not	Not
49	Female	No qualifications	Disabled	Not disabled or no adverse effect	Social Exclusion	Education	Not	Not	Not
55	Female	No qualifications	Disabled	Not disabled or no adverse effect	Social Exclusion	Education	Not	Benefits	Housing
57	Male	Level 4	Not disabled	Not disabled or no adverse effect	Not	Not	Not	Not	Not

Table 4-23 Internet skills and learning before and after intervention among the selected cases

Case number	Access to the Internet	Online skills	Self-rated ability	The breadth of Internet use	Previous experience with the Internet	Q: Have you learned new skills?	Q: Have you improved your skills through learning?	Willingness to continue learning the lessons missed	More reasons given for discontinuing with the Internet
43	No access	Can do a few more complicated things	Excellent	Sometimes visit one or two new websites	Good previous experience	No	No	Not interested	"I was spending too much time on it"
47	Desktop/ laptop	One or two simple things	Poor	Same websites	Some previous experience	No	No	Strong interest	"Not for people for my age"
49	Desktop/ laptop	One or two simple things	Poor	Same websites	Only searched for health info	Learned one (personal interest)	Better	Not interested	"Too difficult to use"
55	Tablet	One or two simple things	Fair	Sometimes visit one or two new websites	Only searched for health info	Learned most (except for how to find best deal)	Better	Not interested	n.a.
57	No access	None of these skills	Good	Same websites	Only for personal interest	Learned a few (but entertainment, communication, shopping)	Better	Not interested	n.a.

4.7 DISCUSSION

This study investigated how the digital divide was manifested amongst the older digital skills learners on the LMW course across the UK. The widely adopted indicators of the digital divide (i.e., motivation, skills, use, and outcome) (Helsper, 2012; Van Deursen & Helsper, 2015b; Van Dijk, 2005) were used to examine the digital divide at varying levels. The fourth digital divide in disengagement, coined by Olphert and Damodaran (2013) from a dynamic perspective, was investigated by distinguishing the survey participants between ‘active’ and ‘discontinued’ Internet users. Two surveys, with one taken online while the participants were taking the course (i.e., the learner survey) and the other taken over the phone three months after the course (i.e., the progression survey), were used to ‘capture’ the digital divide among the participants during and after learning with the LMW courses.

To address the first research question, “*What were the profiles of the older digital skills learners of the LMW courses? Why did they start learning on the LMW platform?*”, the sample characteristics of older people from both surveys were taken, and the motivational factors from the learner survey were analysed. The data revealed that the vast majority of the learners were retired, native English speakers and from a white ethnic background. The age band for older people in both surveys was set as aged 65 and over, a commonly used age threshold for retirement (Matthews & Nazroo, 2015; Tsatsou, 2021; Wilson, 2018). The LMW courses were only available in English. This may have limited the learner cohort to those who were competent in reading and understanding English. The impact of English proficiency on access to various online content (e.g., the LMW) was noticed by Tan and Chen (Tan & Chan, 2018) in Singapore, where English is also the *lingua franca* of the Internet. It was highlighted in Van Deursen and Helsper’s (2015a) study that traditional literacy, such as the ability to read and understand texts are influential on the adoption and use of ICTs and the Internet. Adding to their findings, this study revealed that a lack of English literacy might exacerbate the digital inequalities experienced by those already struggling with going online by further limiting their learning opportunities. For older people who face language barriers and are digitally excluded simultaneously, being able to access digital skills learning opportunities with language support is crucial. This is because older people often rely on face-to-face support (Damodaran et al., 2013; Morris et al., 2007) for digital skills learning. While arguably that the language barrier can be addressed once they are online, considering that the Internet-based devices nowadays offer a variety of language options, so as many of the online information and services, it is less possible for them to bypass this barrier in learning because the offline courses they require are geographically bounded. Given the fact that the LMW courses were not only accessible online but also used as teaching resources in thousands of online centres across the UK (Bradbrook & Fisher, 2004), the scale of unequal distribution of learning opportunities might be universal rather than regional.

The older LMW learners were also mainly from a white ethnic background, as evidenced in both surveys. Previous research revealed that ethnicity is significantly associated with discontinued Internet use. Older people from black and Hispanic ethnicities are at least two times more likely than whites to have stopped using the Internet at some point in their later life (Choi & Dinitto, 2013b). According to Age UK (2019), at least 8% of the older population are BME (i.e., Black and Minority Ethnic), and the general BME populations are ageing progressively with the white ethnic group. As the older ethnic minorities are more likely to face offline inequalities (Tinker & Ginn, 2015), it is vital to help them sustain their digital engagement and enhance their inclusivity in both online and offline worlds. The results from this study call for further research to understand if a low attendance on the LMW courses from the BAME groups was simply mirroring their proportion in the overall UK population.

The older survey participants had a more balanced profile in other socio-demographic indicators such as gender, level of education and residency. There were slightly more of them who lived with others than lived alone, and not disabled than having a form of disability that either affect the activities of daily living or not. In general, there were no statistically significant associations found between these variables and the status of an Internet user being active or discontinued (Table 4-13). This is at odds with research that identified male, better educated, those living with partners, and not disabled are more likely to be users than non-users of the Internet (Helsper & Reisdorf, 2017). This is probably because the participants were sampled from the LMW learners rather than the general population. It may also relate to the method used for classifying user types. In this study, the users were identified as active-, discontinued-, or non-user of the Internet, focusing on the former two types of participants. The discontinued users can be seen as a subset of Helsper and Reisdorf's (2017) definition of 'non-user', suggesting that there may be a difference associated with the socio-demographics between older active Internet users and those who were never online. The findings agree with the studies that argued for looking beyond simple classification of 'use' or 'non-use' among older people as if they are all the same within each of these two types (Lutz & Hoffmann, 2017; Olsson & Viscovi, 2020; Tsatsou, 2021). Van Boekel et al. (2017) identified four clusters of users based on their online activities, as explained in their cluster names: the "practical users", the "minimisers", the "maximisers", and the "social users". Unlike their approach, this study distinguished between the active users and the discontinued users of the Internet from the survey. Based on this, four clusters ("the pragmatic", "the limited", "the goal-oriented", and the "contended") and three clusters ("the unwilling", "the seed", and "the disheartened") were identified for the group of active users and discontinued users, respectively. Compared with Van Boekel et al.'s (2017) clusters, the "pragmatic" and the "limited" resembles their cluster of "practical users", while the "limited" is akin to their "minimisers" user type. "Social users" were not identified from the sample in this study, primarily because of a lack of measure on the use of social and leisure activities. This study further identified user typologies within the group of discontinued users, namely the "unwilling" users (e.g., lack of interest), the "seed" users (e.g., lack of skills due to a lack of training) and the "disheartened" users (e.g., negative learning experience or frustrations on Internet use that built overtime).

Overall, it can be concluded from the above discussions that the survey sample included a wide variety of older people from different demographics except for lack of language and ethnic diversity. The learner profiles also confirmed that regardless of gender, education, household composition, health and residency differences, older people needed to learn how to (better) get online and stay online. The older LMW learners constitute a heterogeneous group concerning their adoption and use of the Internet. However, when viewed as a group, there was a clear grey digital divide when comparing their levels of digital engagement with their younger counterparts.

Concerning the motivations for learning, the reasons that prompted older people to take the LMW courses were rather diverse. Meanwhile, many older people were driven by more than one motivation to engage with the learning. There is an interesting similarity between this study and Helsper and Reisdor's (2013) study. They discovered that the reasons for non-use and discontinued use were multifaceted, with each of them representing one dimension of social disadvantages. They argued that, while it is tempting to ask for *the* most important reason, all reasons should be examined as an organic whole. Likewise, although "to do some informal learning" was identified as *the* main reason for learning with the LMW, many other reasons should be taken altogether to better understand why older people start learning with informal courses like the LMW. Other highly cited reasons were meeting other people and being social, following family and friends' recommendations, and losing a proxy user who used to go online on their behalf. According to Gatto and Tak (2008), older people find that doing some learning can help them keep their minds active. Keeping social contact and social participation is also important for older people to remain active and age well (Kania-Lundholm, 2019). Indeed, in this study, reasons for doing some informal learning and being social were related.

Moreover, as older people age, living an independent life, either voluntarily or forced by a change of individual circumstances, is of significant importance to their general health and wellbeing (Favela & Castro, 2015). Correspondingly, reasons due to loss of proxy user and family influence were found to be statistically associated in this study. Therefore, older people seem to have attended the LMW courses not solely because of what they can learn or gain, but also for *the experience* of joining a social event (only this one involves digital skills learning) to counter the ageing-related changes in their cognitive abilities and social relationships.

Regarding the second research question, "*To what extent were they digitally included or excluded before and after undertaking digital skills training?*", the results revealed a co-existence of a multi-dimensional digital divide among the older participants before and after the training, that is, there was evidence of a digital divide existing in access, skill, use and outcome levels. This, together with findings from recent research such as that of Van Deursen and Van Dijk's (2019) and Hilbert's (2016), contrasts with other literature that found the lower level of the digital divide (e.g., access) was diminishing (Heart & Kalderon, 2013). Again, not all older people were on the disadvantaged side; the overall results revealed more heterogeneity in the group of older participants concerning their motivations, ownership of devices, levels of skills, use patterns and gained outcomes. Evident in both surveys, the traditional levels of the digital divide were closely coupled with the fourth digital divide in sustained use. Those who started learning because of the learning *experience* (i.e., for informal learning and socialising) or change of personal circumstances (i.e., loss of proxy user), did not own a laptop or had no access to any device, had lesser skills and poorer self-efficacy, made limited use of the Internet, and gained lesser benefits were more likely to be identified as discontinued users. This finding contributes to the strand of digital divide research on understanding the inter-relationships among different dimensions of the digital divide (e.g., Van Deursen et al., 2017) by adding a dimension of sustainability.

This study did not identify whether the extent of the digital divide increased or decreased after the participants completed their LMW courses due to limitations in the survey. Future studies should address this by tracking the participants' learning progress from the same sample. Nevertheless, this study showed that the digital divide among older people tends to be fluid, persistent and sometimes emergent. After all, the results suggested that even some active users were not using the Internet frequently and extensively, which were the leading indicators for the discontinued users. In the meanwhile, despite the training, some older LMW learners still discontinued their use of the Internet due to various reasons such as lack of interest, lack of time, they found it too difficult to use, they experienced a loss of access to computers, addiction, and some considered it as not age-appropriate. These barriers to sustained use were consistent with those found in studies such as Morris et al. (2007), Helsper and Reisdorf (2013), and Kania-Lundholm (2019). However, compared to these studies, the barriers identified in this study emerged in a different context where informal learning was involved. The results suggested that the dynamic and multi-faceted digital divide among older people cannot be fixed by only one training episode. Rather, it requires continuous support on learning and engagement (Damodaran & Olphert, 2010; Klímova, Poulova, Prazak, & Simonova, 2018; Martinez-Pecino et al., 2013; Shapira, Barak, & Gal, 2007).

The results revealed that older people's learning was primarily community-based and interest-, activity-oriented. Most of the older people first heard about the learning opportunities through their social network (e.g., through word of mouth) or local community (e.g., from the local library or poster). The majority of older people attended a face-to-face session at a local online centre. They also used other support available, such as non-digital related informal learning, social events, and training on volunteering. Older people seemed only to stay on the course as long as they felt something to learn was relevant to their life and personal needs. This can be explained by a notion identified among older people that time is a valuable resource in later life and should be spent on 'real' and important things other than wasting it on those irrelevant (Kania-Lundholm & Torres, 2015). Older people then tend to be very selective of the activities (Tsatsou, 2021). Using the training courses to add value to day-to-day life was thus a very personal judgement that varied among the participants. Evident in the data was the varying length of learning, with some learned for less than four weeks, while some stayed much longer and wanted to repeat the courses. The results suggested that older people used the learning to mainly enhance their ability to perform daily activities such as communication and those of personal interest, health information, and civic services. It thus suggested that, in addition to 'social' (e.g., communication), 'instrumental' (e.g., civic services), and 'informational' sectors (e.g., health information) (Szabo, Allen, Stephens, & Alpass, 2019), older people also learned how to maintain 'hedonic' (Gatto & Tak, 2008; Venkatesh et al., 2012), or interest-oriented activities online. Online shopping and online financial management were two areas that older people paid much less attention to in their learning. This agrees with research that found that older people value less online shopping (Morris et al., 2007). The learning older people undertook in the above domains of daily life was transferred into offline outcomes within the same domains; for example, learning how to find health information online enabled the participants to manage health online more confidently. However, how well they benefited from the learning varied between active and discontinued users of the Internet. Overall, the above discussions addressed the third research question, "*In what ways did they use the training courses to manage their daily life and maintain online participation?*".

The final research question, "*What were the factors that influenced the level of their digital inclusion and learning?*" were already partially addressed in the discussions above. For example, one factor that influenced both their level of digital inclusion and their learning was ageing-related personal changes (e.g., physical, psychological, and social). The study conducted by Olsson and Viscovi (2020) took a closer look into the group of 'silver surfers', a privileged group of older Internet users who are more confident and more competent in surfing online. According to their study, psychological factors such as interest and self-efficacy distinguish the silver surfers from others better than gender or education. Similarly, Siren and Knudsen (2016) found that demographic profiles, such as age and gender, are secondary to attitudes and experiences. In the existing literature, the physical and psychological factors have gathered the most scholarly attention, leaving the social factors underexplored (Tsatsou, 2021). The technological factor was also found to have influenced older people's learning and use of the Internet (e.g., the small smartphone screen). However, in addition, the overall effect of these factors was identified in this study, there lacked an in-depth investigation within each category. This is considered as a limitation of using secondary data. Nevertheless, this study addressed a gap in the existing literature. It investigated the factors that influenced the sustained use of the Internet among older people by considering the factor of informal learning. The results suggested that learning at a centre, continuous engagement in learning, more extensive use of the Internet, better skills, and maintaining access to an Internet-enabled device helped the participants sustain their digital inclusion.

4.8 LIMITATIONS OF THE STUDY

There were some limitations in the study. First, the group of older people was simply classified as those aged 65 and over. While previous research highlighted the differences between younger seniors (e.g., less than 75 years old) and older seniors (e.g., aged 75 and over) in levels of engagement, attitudes towards technology and perceptions about themselves (Van Deursen & Helsper, 2015a), it was not possible to investigate this dimension due to a lack of data. Second, although the two surveys were meant to examine different aspects by design, with the learner survey capturing a pre-learning landscape of the digital divide and the progression survey capturing a post-learning state of digital inclusion, there were discrepancies in some of the questions. For example, the use of smartphones was examined in the learner survey but not the progression survey. In addition, not being able to establish a link between the surveys by participants limited the investigation on the influence of learning. However, this was addressed by conceptualising them as two independent surveys that captured different states of older people's overall digital learning and maintenance in their daily lives. Third, the sample size for the group of older people was small. This was particularly the case for discontinued users. Increasing the sample size required the researcher to combine the monthly/quarterly data over a more extensive sampling period. It would have compromised the data quality in two ways: 1) view the LMW learners registered over more than two years periods of time as the circumstances were the same; 2) lose some dimensions of measure due to the rising need to reconcile differences between different versions of the survey developed over the years. Other large-scale data, such as the UK annual survey on Internet use conducted by Office for Statistics (2021), has a large sample size but lacked other important information, especially those concerning older people's learning. Overall, the LMW survey data eventually used was the most relevant data for this study.

4.9 CONCLUSION

Although it has been widely reported that digital inequality in modern society has progressed from lower-level hurdles in access, use and skills to higher-level barriers, such as meaningful engagement and beneficial outcomes, evidence emerged from the survey data revealed that these levels of the digital divide co-existed within the older digital skills learners. They were also overlapped with the divide in sustained use, thus further complicating the landscape of the digital divide among older people. Engagement in informal learning, such as learning the LMW courses, was helpful in keeping older people online, enhancing their digital skills and gaining benefits on their day-to-day living from being online.

Although the landscape of the digital divide among older digital skills learners was delineated, there is a lack of richness in understanding why different levels of the digital divide take place, how older people manage and sustain their digital use through informal learning, why do some of them discontinue or change their use of the Internet, and last but not least, does going online help them to better manage their daily life and age well? If so, how? If not, why is that? Therefore, the second phase of this study involved a more in-depth qualitative study. A set of semi-structured interviews was conducted to gain a more in-depth understanding of how the digital divide, informal learning, and the needs for ageing well are interplayed in older people's daily life. The next chapter presents reports on this study and presents findings from this qualitative approach.

CHAPTER 5 THE QUALITATIVE STUDY

5.1 INTRODUCTION

Findings from the previous quantitative study (in Chapter 4) provided an overview (*'the landscape'*) of the characteristics of older people who had attended digital skills classes and how they had been utilising the learning opportunities and enhancing their skills to go online. The status of a participant being an active or inactive Internet user (*'the change'*) was found to be fluid rather than fixed: on one hand, the 'offline' participants became digitally engaged through informal learning (see Section 4.5 for the Learner Survey). On the other hand, some of those who managed to get online didn't automatically become an active Internet user for the lifetime (as if it's the 'happily ever after') but discontinued for different reasons (see Section 4.6 for the Progression Survey). This 'fluid' process of becoming/maintaining digitally included is similar to Lloyd's (2017) description of an iterative and recursive process of transition as the leaners "move between novice-expert-novice positions" (p. 97). According to the survey results, *access* to devices was associated with a participant continuing to be active on the Internet or not; this was also influenced by 'status of learning' and 'self-efficacy'/confidence.

Yet, it remained unclear from the survey how and why these changes in digital inclusion took form under the influence of complex factors in the context of daily life. It thus calls for an approach that is suitable for probing the in-depth 'how' and 'why' questions with a theoretical lens that better accounts for the *social context*, which was overly simplified in the behaviour-oriented technology use and adoption models (Tan & Chan, 2018), such as the UTAUT2. In addition, in light of the fluid nature of the changes in Internet use, although a layered conceptualisation of the digital divide has been an insightful tool in delineating the landscape of the social phenomenon under study (see Chapter 4), there is a need to change the perspective by taking a holistic view of the *digital divide* (Goraya & Light, 2011) for an in-depth and more nuanced understanding. This is because the so-called layers/gaps of the digital divide do not exist in isolation from each other but are interrelated. It is in vain to address them one by one, starting from closing the first gap in *access*, as the survey results already show that the issues surrounding *access* could re-emerge even after crossing the initial gaps of *skill* and *use*. In comparison, the challenges associated with *access*, *skill*, and *use* are taken as different aspects of the same contest when facilitating older people's day-to-day digital engagement (i.e., the social context) from a holistic view. Under the guide of this new perspective, these different aspects are to be understood and dealt with together in a comprehensive and dynamic manner in context.

Following the methodological design set out in Chapter 3, a second study adopted a qualitative approach to complement and enrich the quantitative counterpart. This chapter presents findings from the qualitative study. Data were collected through semi-structured interviews conducted with older people from the North of England [14] in the UK. In particular, social theories of practice, particularly the concepts developed by contemporary theorists (see Chapter 2), were used as a theoretical framework in response to the need to include and study the *context* and *changes* of Internet use. Using the Internet can be viewed as a *practice* that is consisted of organised sets of sayings and doings (Maller, 2015; Shove et al., 2012) that fulfil a particular need. Both studies are further discussed and triangulated in Chapter 6.

This chapter starts by articulating the aim and research questions for this study concerning the overall research in Section 5.2. It then gives a detailed account of the methods used for data collection and preparation in Section 5.3. In Section 5.4, the approach to data analysis is explained. Results of the study are reported in Section 5.5 and 5.6, respectively; the former introduces the sample in terms of the demographic details and interviewee characteristics that are of interest to the analysis, while the latter reports the qualitative findings under the structure of hierarchical themes and sub-themes that emerged from template analysis on the data. Discussion on the findings from this study is provided in Section 5.7, developing a more in-depth and nuanced understanding of the dynamics of informal learning and digital engagement in the participants' daily life. This chapter concludes in Section 5.8.

[14] The interviews were conducted with participants from Yorkshire, Greater Manchester, and Merseyside.

5.2 AIM AND RESEARCH QUESTIONS

As part of a more extensive mixed methodology research, the aim of this study and the research questions were set to bound with the quantitative study and serve to support the overall research aim stated in Chapter 1. This intrinsic relationship between different parts of the research called for integration between studies by research questions.

The consideration was two-fold: first, although different types of older learners were identified, and the influencing factors of their use of the Internet and the ICTs were studied in the quantitative study, the insights gained were limited to the scope of survey questions and sampling method. They needed to be compared, confirmed, explained, and further expanded by richer qualitative data from a more inclusive sample. For instance, to include older people engaged in other types of learning, or who learned about the Internet more casually from their social network, and if possible, non-users of the Internet; second, the expected findings from this study need to be applicable to triangulate with those from the quantitative study, thereby enabling a ‘third effort’ of analysis on the whole (Morgan, 1998), other than parts, to ‘yield’ more useful insights (O’Cathain, Murphy, & Nicholl, 2007).

Thus, this qualitative study aimed to gain a more holistic view of the daily social practices that involve the use of the Internet (and ICTs) and other practices that are highly relevant (e.g., the practice of learning). By probing into the social phenomenon under study through the theoretical lens of social practice theory, the behaviours of older people’s Internet use discussed in Chapter 4 are placed in a day-to-day context and studied as the reflection of broader social phenomenon other than that of individual attitudes and choices, based on which deeper understanding on how and why certain forms of ICT integration in life are established, maintained, discontinued, or expanded. It is also within the scope of this study to reflect on the role that digital plays in facilitating an active and healthy ageing process.

The research question set out in Chapter 1 was further broken into the following research questions:

RQ2: How does the informal learning of digital skills address the digital divide among older people?

1. What factors influence, shape, and change the digital divide among older people?
2. How do older people manage and sustain their day-to-day use of ICTs and the Internet through informal learning?

RQ3: Does sustaining digital inclusion contribute to active and healthy ageing for older people? If yes, how? If not, why?

These research questions are addressed through a set of semi-structured interviews and discussed within a theoretical framework of practice theory.

5.3 RESEARCH METHODS

5.3.1 Study design

Semi-structured interviews were adopted as the research method for data collection. They enabled the researcher to retain control over the scope of the conversation while still leaving room for flexibility in gaining a more in-depth understanding of the rationale behind the dynamics in Internet use, learning and maintenance in older people's day-to-day life (Bobillier Chaumon, Michel, Tarpin Bernard, & Croisile, 2014; Peek et al., 2017; Zaidman & Tinker, 2016a). As illustrated in Figure 5-1, different streams of preparation work were carried out in parallel before the actual data collection started:

1) apply to the University Research Ethics Committee for approval on this study;

2) design interview questions and interview guide;

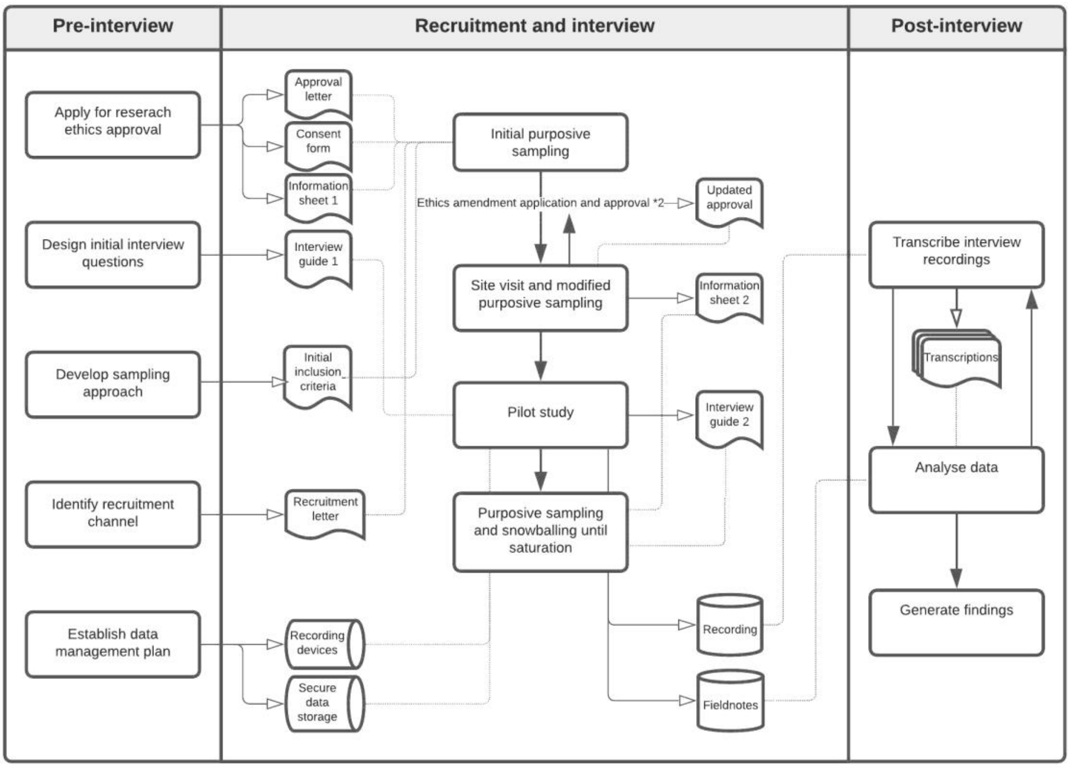
3) develop the sampling and recruitment process;

4) identify potential recruitment channel, participants, and procedures;

5) establish data management plan and protocol.

After being given ethics approval from the University (see Appendices 3 and 4), the recruitment process commenced through pre-identified channels (see Section 3.4 in Chapter 3). The sampling and recruitment processes are detailed in subsection 5.3.3, followed by two sections dedicated to accounts on the pilot study and data collection. When data saturation was reached, recorded interviews were transcribed anonymously (see subsections 5.3.6 and 5.3.7).

Figure 5-1 Qualitative study design organised by stages



A total of 24 interviews were conducted with 27 participants, including two interviews with a married couple and one interview with a pair of friends. The interviews were taken at various locations, based on the participants' preference, such as the venues where they attended learning sessions, cafés, their own homes, or the iLab[15]. The recruitment process started in early February 2019, and interviews were carried out between April and June

[15] It is a multi-media research laboratory located in the Information School, University of Sheffield. Although the lab is equipped with wall-mounted cameras, only audio recording data were collected as per the ethics approval.

2019. Audio recordings were taken for all the interviews with written consent given by the participants before each interview started (see Appendix 5 for Information Sheet and Consent Form). The average length of the interviews was 93 minutes, with the shortest lasting 43 minutes and the longest lasting 160 minutes[16]. Five out of the 24 interviews were transcribed by the researcher (468 minutes), while the rest were transcribed by a contracted professional agency (see Appendix 7). Consistency between the transcriptions was ensured by sharing a detailed transcription guide (see Appendix 8). The researcher reviewed all contracted transcriptions for quality control (see subsection 5.3.7 for more details).

5.3.2 Research setting

Unlike studies on the adoption of assistive or health technologies, such as sensor-based activity/ fall monitors that are based on controlled settings for pre-defined purposes (Peek et al., 2014), research on the acceptance and use of the Internet and the enabling ICTs looks at discursive, complex, emergent, and often messy practices and routines that are meshed in the web of everyday life.

Placed in the context of daily life, this study was situated in natural settings, such as their own homes and social amenities, where older people usually approach, learn, and use the Internet. As introduced in Chapter 4, the Online Centres Network offers varying types of digital skills training classes and consists of more than 5000 organisations, such as libraries, community centres, leisure centres, and social venues, as well as some unconventional teaching and learning environments, such as pubs and cafés. This makes the Network a confluence of natural settings for socialising among older people where the practice of learning and maintaining access to the Internet may be involved. The Network was thus a primary channel for diverse participant recruitment on the one hand and a field itself in which the practices of learning and using were enacted, on the other hand,

[16] The participant moved to her desktop computer during the interview to show the setting and explain how she normally used it. Similarly, the participants from another 8 interviews also illustrated their accounts with the ICT devices at hand or nearby. This was an interesting finding emerged from the interviews that signifies the role of materials and settings in influencing practices and daily routines, by which embodied knowledge was gained (see more discussions on this in Section 5.7). These recordings lasted relatively longer and ranged between 90 and 160 minutes. In addition, rich information on their interactions with the ICTs were kept in fieldnotes during and after the interviews.

bringing the need to understand the physical arrangements and dynamics of the learning environment to the foreground.

Based on the site visits conducted during sampling and recruitment (discussed in the next section), two types of venues were summarised. Figure 5-2 illustrates a common closed learning environment compared to a more open environment in Figure 5-3. A closed learning environment is more common in libraries and community centres but can also be found in some local cafés. Likewise, an open learning setting is more likely to be found in cafés and pubs, but it is also accessible in some libraries and community hubs. Some organisations can accommodate both modes within their sites.

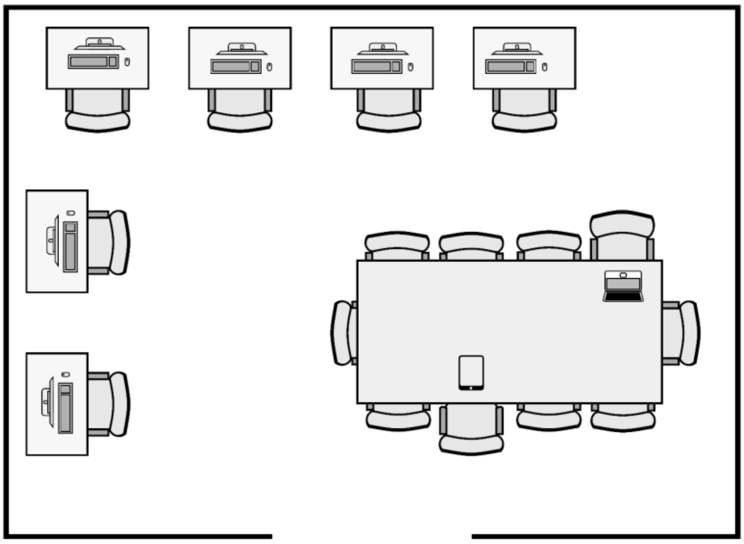


Figure 5-2 Illustration of a more closed learning environment in places such as libraries and community centres

The major distinctions between a closed and an open setting are space, digital equipment, course delivery model and time. The former has a more confined space but receives less disruption from the surroundings. It is usually a conventional PC room with desktop computers set up and connected to the Internet. This benefits learner who do not have portable devices or any device at home. Within this closed environment, the tutors and volunteers have the flexibility to run either drop-in sessions to provide casual but tailored support to each learner or more structured sessions targeted at larger groups of learners with fixed teaching contents. A hybrid session is also achievable within this space, as depicted in Figure 5-2, where learners sitting around the table can use their own devices like at home and ask questions when in need. In contrast, others on the desktop computers can take structured online courses from websites such as Learn My Way (discussed in Chapter 4). A session is usually limited to two hours, after which the room will be used for other events. Even if the room is still available after the sessions, it is less likely that older people would stay, use computers, and socialise while the tutors are absent.

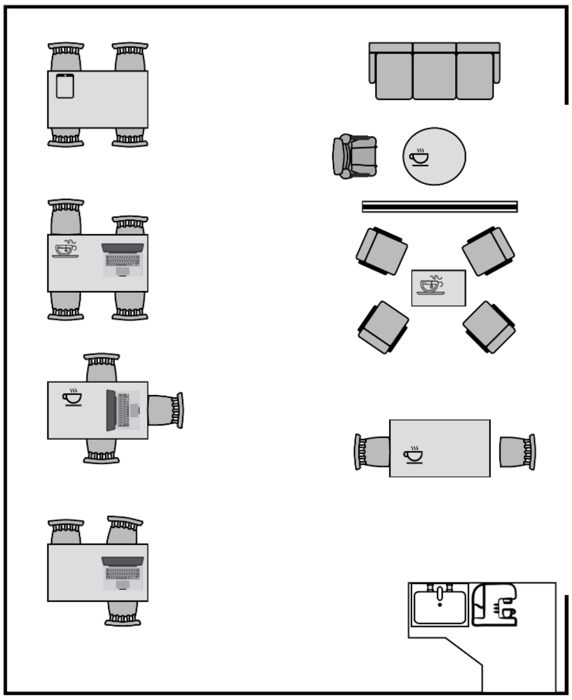


Figure 5-3 Illustration of a more open learning environment commonly seen in cafés

In comparison, an open environment, in the first place, is situated in a venue for social purposes. The environment continues to facilitate casual chats and discussions among the learners even if the session ends. Digital skills training sessions in this context are more informal, learner-directed, and more often run as drop-in sessions with a focus on portable devices only, such as laptops, tablets, and smartphones. As the learning space is open and joins other functional zones (see Figure 5-3), it can be noisy and distracting for some learners, while rather relaxing for others.

Overall, it is a natural, complex, and evolving landscape in which older people develop their digital skills and use the devices for varying purposes. The participants of this study were recruited and interviewed in natural settings (e.g., the organisations mentioned above, other public amenities, and participants' own homes) with their informed consent.

5.3.3 Sampling and recruitment

A purposive, non-random sampling strategy was employed to generate both narrative and numeric data, with the former being the primary focus. Purposive sampling is a commonly used tool in a qualitative study. It entails a selection process based on a set of characteristics that the desired participants possess (Creswell & Plano Clark, 2009). The sampling approach was sequential to enable a gradual identification and selection of research participants, for which multiple purposeful techniques were used: theory-based, maximum variation and snowball sampling (Teddlie & Tashakkori, 2009). The sampling process was inductive, repetitive and reflective, with the initial sampling frame refined as the recruitment process rolled out (Kleiman et al., 1997). The initial inclusion criteria were:

1. **People aged 65 and over**. Although there are different markers for older adults' starting age (lowest at 45, highest at 65) in the literature on Internet use among older people (Hunsaker & Hargittai, 2018), this study adopted the most commonly used cut-off age of 65. This was because the age of 65 was previously known as the 'default retirement age' in the UK. Despite the removal of the fixed retirement age in 2011, regarding the population aged 65 and over as the group of older people is still a traditional approach in the industry (e.g., charitable organisations like Age UK), and also the most widely used concept in ageing and technology studies literature (Bath & Gardiner, 2005; Levy & Simonovsky, 2016; Niehaves & Plattfaut, 2014; Van Deursen & Van Dijk, 2015). Keeping the same standard helps maintain consistency within this research project (e.g., the same definition in the surveys used in Chapter 4) while retaining the possibility of comparing with and drawing upon findings from other studies.

2. **English-speaking and community-dwelling in the UK**. These two criteria were set to refine the scope of the research. Although it was tempting to also include vulnerable groups of older people with compound inequalities, such as older

migrants who also faced language barriers (Tan & Chan, 2018) or older people who required assisted living or extra-care in daily life (Munoz, Gutierrez, & Ochoa, 2015; Weegh & Kampel, 2015; Wittland, Brauner, & Ziefle, 2015), it was not practical to follow these threads within the research timeframe. Moreover, this study was grounded in the normal settings of daily life to reflect the day-to-day experience that older people have with or without the Internet. Thus, the sample characteristics were set to target the most ordinary older people who were able to read online content, lived independently and had a certain level of social interaction. Since the researcher was Sheffield-based, potential participants residing in South Yorkshire and Greater Manchester were targeted first for the convenience of travelling.

3. **Have the capacity to consent**. Due to ethical considerations, older people participating in this study should have the capacity to give informed consent. An information sheet that contains an introduction to, and an explanation of, this study was circulated during the recruitment phase to potential participants. The information sheet was made available to the informants in a clear way throughout the study. A consent form was used to obtain informed consent from each participant before each interview commenced.
4. **Experience in digital skills training courses at an online centre**. Previous and current digital skills learners from their local online centres (for example, libraries and community learning centres) were invited to the study.

The theory-based sampling strategy was applied first to put the theories of the digital divide into practice. It helped the researcher to recognise and classify the potential interviewees by user/learner typology. This informed the scope for sampling (Palinkas et al., 2015). In the corresponding recruitment process, the researcher first approached the Network to recruit past or active learners of the Learn My Way platform. A recruitment message was published in an internal newsletter circulated amongst all the tutors and volunteers (e.g., library staff, community learning centre staff). A link to an online form was embedded in the message for the tutors to fill in if they were interested in referring potential participants who meet the inclusion criteria to the interview. With no response in the following seven days, the first attempt of recruitment was deemed unsuccessful. A consultation with the staff from the Network revealed low newsletter open rates, for which an amendment on ethics approval concerning altering the recruitment channel and process was sought after (see Appendix 4). This new recruitment process derived extensive site visits and remained largely theory-based in seeking different types of digital skills learners and Internet users. A few organisations outside the Network were discovered and visited.

The information sheet and recruitment poster were disseminated in the sites visited. Observations and conversations with tutors and potential participants also took place, from which new insights were gained gradually with theoretical understandings contextualised, examined, and elaborated. The delivery models of digital skills learning classes were diverse, adaptative, interactive, and casual. Attendance in libraries was much lower than in community learning centres and local cafés or other social facilities. This was because the libraries were less of a social hub comparing to the latter ones. Moreover, the use of structured content such as the LMW platform (see Chapter 4) was less significant; the classes were more ad-hoc and question-oriented to address the problems that older people encountered before or during the session they attended. Furthermore, some older people acted as tutors/volunteers other than learners. Maximum variation sampling was thus applied to capture maximum diversity in venue, learning type, location, and identity. The snowballing sampling technique was also used to include older people who relied on other types of support and resources, for example, who learned from their family and friends and those who discontinued for various reasons (Berg, 2001). Particularly worth mentioning was the recruitment of deviant cases (i.e., the self-claimed 'non-users')[17] to ensure the inclusivity of different perspectives. Tutors and recruited participants were the key informants in this process. The fourth inclusion criterion was modified to reflect the development of the sampling strategy:

a) Experience of any form of learning or attending troubleshooting sessions on computers and the Internet
b) Do not use or not interested in computers and the Internet

The recruitment attracted interest from more than 60 older people who met the inclusion criteria, amongst which 27 were invited to the interviews based on the maximum variation sampling principle. Twenty-one participants were recruited from purposive

[17] They were the actual users of the Internet who claimed to be 'non-users' during the recruitment. One participant revealed in the interview that it was a protest against the push of digitalisation from the society. It is again mentioned in Section 5.5.3 and further discussed in Section 5.6.7.

sampling in various learning venues (77.8%), while six were reached via snowball sampling (22.2%). In terms of geographical variety, 17 were from the Greater Manchester area (63%), compared to nine from Yorkshire (33.3%) and one from Merseyside (3.7%). All participants were volunteers, and no incentives were used throughout the recruitment. More characteristics of the sample are reported in Section 5.5.

5.3.4 Pilot study

Due to the discursive nature of ICT use in daily life, coupling with a dazzling array of approaches older people adopted to learn and maintain access to the Internet; it was challenging yet of significance to keep the conversation focused on the research questions and avoid drifting with the daily grind. A pilot study was used to test the practicality of research instruments (e.g., demographic survey, interview schedule), gain operational and experiential knowledge, and review the feasibility of interview questions at a small scale (Teherani, Martimianakis, Stenfors-Hayes, Wadhwa, & Varpio, 2015). The sample size for this preliminary study was set to three, including two learners from a library and one from a local café. Minor changes were made to the interview guide based on the test-run, including refining living arrangement options, level of education and employment from the demographic survey, and the sequence of interview questions. Despite the changes, the interviews were successful and contributed to a better understanding of how they used the Internet and how this way of digital engagement formed and developed. Therefore, the data collected from this pilot study were deemed valuable and later included in the full-scale study.

5.3.5 Data collection

There were three types of data collected before and during the semi-structured interviews: fieldnotes, demographic survey data, and narrative data. Fieldnotes document contextual data through observation and reflection during the recruitment and interview processes (B. D. Johnson, Dunlap, & Benoit, 2010). It added further explanation or corroboration to the conversation, enabling an understanding of what the participant meant. For example, in an interview, the participant mentioned that sometimes computers did not work as intended. Fieldnote illustrated the extent of frustration: *"He wielded his arms in the air several times to act like smashing the computer" (observation during interview, April 9, 2019).*

A short demographic survey was taken at the beginning of each interview. It consisted of eight questions: name, age, gender, area of living, living arrangement, marital status, level of education, and employment/or voluntary work. Further details of the survey data are reported in Section 5.5. The complete interview guide, including the survey, is reported in Appendix 6.

The main form of data collected was narrative data from the semi-structured interviews. The interviews were intended to investigate how their daily practices influence older people's use of the Internet or not and how this, in turn, shapes their ways of living. Unlike other household appliances, the Internet-enabling ICTs and the online contents update themselves at a swift pace (Gonzales, 2015). This requires the users to engage in continuous learning to maintain their level of digital inclusion. As discussed in Sections 4.3.1 and 5.3.2, informal learning can be carried out in different contexts, such as at a training centre or home. Two sets of interview guides were thus used to collect data from different types of interview participants. A *learner version* was used to collect narrative data from the learners recruited through the Network. It started with warming-up questions concerning the sessions the participants were taking and their learning experience. A *non-learner version* was tailored for participants recruited from snowball samplings, such as self-claimed 'non-users' of the Internet, or home/casual learners. It began with questions of their understanding of computers and the Internet. Since the interviews were semi-structured, the questions were thus not formalised or asked in a strict order but were led by the conversation (Bryman, 2006). The following key topics were covered: access to devices and the Internet, learning experience and opportunity, day-to-day use of the devices and the Internet, use of the Internet to keep healthy and active, changes in use over time, experience of maintaining, and perceptions and attitudes towards an Internet-enabled independent later life.

5.3.6 Data saturation

Data saturation refers to the point at which no new themes emerge from the interviews. It is often used in purposive sampling to help determine the sample composition and final sample size based on data adequacy (Palinkas et al., 2015), making it an important aspect to consider for research quality and trustworthiness (Vasileiou, Barnett, Thorpe, & Young, 2018). As a tool for collecting rich and in-depth information and data, the sample size in qualitative studies tends to be small. In the initial sampling stage, the researcher estimated a sample size between 25 and 30, which was among the ranges of optimal sample size between 15-30 found in qualitative information systems research (Creswell, 2007a; Marshall, Cardon, Poddar, & Fontenot, 2013). In the pilot study, three participants were interviewed, and there emerged a wide variety in how they use and learn about the Internet and their relationships with tutors. Initial analysis of the data (audio recording and fieldnotes) generated a list of themes. As the recruitment proceeded, more themes and individual stories emerged (e.g., loss of family member who was their proxy to the Internet, learn to use to prove that their family were wrong, and claim as a non-user just to defy the 'digital by default' changes, using the Internet while suffering from learning disorder). The overall patterns of the themes started to settle by the 26th interview. The researcher carried on with the 27th interview to be sure that the data saturation was reached. At this last interview, no new patterns emerged. Thus, data saturation was confirmed, and the recruitment process was ceased.

5.3.7 Transcription and anonymisation

Interviews were audio-recorded with written consent obtained from each of the participants. The recordings were transcribed by the researcher (n=5) and a professional transcription agency (n=19). Confidentiality and GDPR agreement was signed between the two parties before sharing of data. Demographic survey information at the beginning of each recording was removed. The remaining length of the recordings was encrypted and sent to the agency via a password-protected file transfer facility. Similarly, the completed transcripts returned from the agency by email were also encrypted, with passwords sent separately to the researcher's phone.

For quality control and consistency, the researcher developed a transcription notation system. It was used as a shared standard for all transcriptions. For example, clean verbatim was used other than full verbatim, where things like *laughs*, *sighs*, or *pauses* were included but not every *erm* or stutter unless found to be relevant to the conversation (Halcomb & Davidson, 2006). The anonymity of the participants was another significant agreement in the notation system. All identifiable information of the interviewees were removed when transcribing the audio recordings under the guidance of GDPR, including 1) names of the interviewees; 2) other names mentioned were replaced with their relationship with the participant, such as tutor or son; 3) geographical or other identifiable information such as street names.

Quality of transcriptions was ensured through a set of checking mechanisms. The first transcription completed by the agency was examined against the recording as well as the notation system. Disagreement was discussed and resolved before continuing with the rest. All transcriptions were reviewed against the recordings for data accuracy and completeness.

5.4 FRAMEWORK FOR DATA ANALYSIS

5.4.1 Data familiarisation

Familiarisation with data is constitutive of qualitative data analysis and builds foundation for coding and identification of themes. It was achieved through listening, reading and re-reading the full set of interview data (Lacey & Luff, 2007). After each interview, the recording was replayed as a first attempt to familiarise with raw data. While immersing in the conversation and reliving the experience, reflective field notes were taken to register relevant contextual information for later use. After completing transcription, the transcripts and field notes were filed in the software package Nvivo 12 and read multiple times. Non-verbal elements, such as gestures (e.g., tapping of the table) and emotions (e.g., change of tone), were added to the transcripts. Initial codes were generated and refined, through which data sets were further familiarised for the exploration of patterns and emerging themes.

5.4.2 Template analysis

Template analysis was used as a method for data analysis. As a form of the broad thematic approach, it provided guidance for organising and analysing the data through the stages of coding, identifying patterns and themes, and developing and refining a coding template (Brooks & King, 2014). After the familiarisation of data, preliminary coding was first conducted on a subset of the textual data (i.e., five selected interview transcripts from various accounts[18]). An initial version of the template (a hierarchical coding structure) was developed, including a set of *a priori* themes (the themes that were identified tentatively based on both the focus of study and extant literature in advance of coding, for example, '*how digital is viewed, managed and maintained'*, '*motivation'*, '*social network', 'computer literacy and skills'*) and themes, such as '*search online then move offline*', '*society full of (social) bubbles*', and '*computer updates and changes*' that emerged from data that added value to the understanding of research questions. Coding levels also formed in certain themes from the template, for instance, under the broad theme '*purposes for digital learning*', there nested several narrower themes: '*to practice*', '*to learn about new things*', '*pushed by changes*', '*for problem-solving*', '*just for social*', and '*just to get out of the house*'.

This initial template was then applied in subsequent coding on the new data sets (i.e., the remaining transcripts) and was modified when it did not fit by adding, removing, or altering the themes and/or the structure. This modification process was repeated as necessary until the initial coding was completed, from which successive versions of the template were created. The last version of the template was reviewed against the transcripts and field notes, allowing for refinement as necessary to present a comprehensive interpretation of the data. When no textual data was deemed relevant to the study left uncoded, and no more revisions were required, the coding was discontinued. A final version of the template was thereby developed (shown in Section 5.6)

5.4.3 Interpreting the quotations

Direct quotations from the interviewees are used in this chapter to help illustrate the themes and interpretations. This subsection describes the notation system of the quotations.

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[18] It was a trade-off decision made to account for a good cross-section of the overall digital experience in data, while at a manageable size for generating an initial template. Analysing at a small-scale first, five in this case, was also endorsed by Brooks and King (2014) to avoid two extreme scenarios: 1) generating an initial template too early with just one transcript may hinder the researcher from interpreting the rest of the data set with an open mind; 2) doing it too late may complicate the coding with excessive codes, many of which are redundant or repetitive. This will inevitably be time-consuming and potentially adverse to theme generation.

Non-verbal elements, such as tone and pitch of voice, speed and volume, pause, silence, body movement, and vocal act like laughter, were represented in the transcripts and are largely retained in the quotations presented in this chapter. This is to add context to the conversation presented and capture the intangible sentiments to better understand their perspectives and attitudes. These elements are represented by different punctuation marks, such as brackets and underlining in between the sentences, for example:

> *…we don't know* <u>how</u> *to fix it. If it goes wrong [pause], we don't know what we've done [lowering voice]. Turn it on and off [laughs].* (Valerie, aged 75)

In this instance, the addition of non-verbal annotations facilitates a more accurate interpretation of the conversation with the transmission of unsaid messages from the interviewees: the use of digital devices in daily life was not trouble-free, nor was it guaranteed to be beneficial (c.f. in Chapter 2: the development and shifted focus on the digital divide from 'access', to 'use and engagement', to 'beneficial outcomes' and the concept of 'maintenance'); it can also cause confusions and frustrations. However, rather than being annoyed and deeply troubled by the problems encountered and the lack of resources to address these issues, the frustrations seemed to have only been short-lived, and they were settled with makeshift solutions, although such a compromise may be volatile and, hence, the sustainability of this practice questionable. This interpretation not only adds value to a better understanding of the context on its own merit (i.e. the revelation of the delicate balance) but also brings insight into the latent interrelations between the circumstantial factors (e.g. material, infrastructural, and social network) that was inflicted on them, the personal factors (e.g. emotions, capabilities, personality, cognitive ability), and whether these interactions between the dynamic forces may continue to offset or instead, or trigger changes (e.g. discontinue, gain knowledge and skills through learning, or resort to proxy).

As explained in subsection 5.3.7, all interview participants were anonymised during the transcription process. In this chapter, names following the quotations are all pseudonyms. Thus, the name Valerie used in the example above was not the participant's actual name. Each participant's exact age is added, and the pseudonyms to further contextualise the participants' accounts.

5.4.4 Reliability and validity

Reliability and validity are two conventional positivism-oriented benchmarks commonly used in the quantitative study to assess the quality of research under examination (Golafshani, 2003). Originated from the other end of the spectrum of research paradigm, qualitative studies have been evaluated with a different set of criteria. Lincoln and Guba (1986) noted the move to adopt rigorous criteria including *trustworthiness* and *authenticity* that better suit the underpinning philosophical assumptions in the qualitative approach. *Trustworthiness* was further managed through four dimensions: credibility, dependability, confirmability, and transferability. The corresponding protocols operationalised by Forero et al. (2018) were adopted in this study and explained in Table 5-1.

Table 5-1 Strategies used in this study for trustworthiness in four dimensions [adopted from (Forero et al., 2018)]

Dimensions	Definition	Protocols	Actions taken
Credibility	Data collected from the participants are believable and an accountable reflection of what is true in life.	• Longer engagement with research settings • Interview design and techniques • Expert knowledge in this field • Additional source and data collection	• The researcher visited the sites in person multiple times before participants were recruited. Prolonged stays in the settings were observed as 1) the researcher needed to stay until a learning session was finished to talk to potential participants; 2) the researcher walked around the libraries to establish a better understanding of how the places were accessed and used; 3) at the more sociable venues, such as café, the researcher had more engagement with the settings. • The interview guide was tested in the pilot study and refined accordingly. The researcher practised interview techniques with experienced qualitative researchers. • The researcher had been communicating with practitioners from the industry for two years prior to the study. Knowledge and experience were also gained

			from the precedent quantitative study. • Fieldnotes were kept before and after the recruitment and interview processes. Conversations with tutors and practitioners were also used as an additional source for judgement.
Dependability	The results from this study are repeatable when the context and conditions are controlled for.	• A detailed description of research design and methods • Secure and detailed track record of the research process	• The researcher established clear working protocols and research design (e.g., subsection 5.3.1) and kept a complete set of documents used in each step of the study, including interview planning, interview guide, information sheet, consent form, transcription guide, etc. • A detailed track record of the research process and the methods was documented (e.g., subsection 5.3.3 to 5.3.5).
Confirmability	The findings can be confirmed or validated by other studies.	• Researcher reflexivity • Triangulation	• The researcher was aware of the individual and subjective lens through which this qualitative study was undertaken and was reflexive of the interaction and reactions (e.g., footnotes were used as necessary to clarify the issues encountered in the study) with the participants (Dodgson, 2019). This was reflected in the philosophical position adopted in the study (see Chapter 3) and addressed by the methods and approaches that gradually developed (e.g., purposive sampling, semi-structured interview, social theories of practice). • Different triangulation techniques were used in the study (e.g., data source, methodological approach, theoretical framework).
Transferability	The results can be generalised under different conditions and circumstances.	• Purposive sampling with clearly defined characteristics of the target sample • Data saturation	• A combination of three purposive sampling tools was used and explained in subsection 5.3.3. The broad sampling criteria were also introduced and clarified.

			• Data saturation was guided by both theoretical data sufficiency and operational practicality.

In Lincoln and Guba's (1986) view, *Authenticity* is subsumed under the process of achieving *trustworthiness*, concerning wider research implications in relation to the wider society. It encompasses five dimensions during the inquiry process, including "*fairness*, *ontological authenticity*, *educative authenticity*, *catalytic authenticity*, and *tactic authenticity*" (p.78-82). Much of their operationalisation strategies summarised by Shannon and Hambacher (2014) were akin to those detailed in Table 5.1, such as keeping field notes, reflexive and methods journaling. In addition, the strategies for post-study examination on authenticity retrospectively were included and described in Chapter 7, including stakeholder consultant and reflexive journaling during the dissemination of research findings.

Moreover, research ethics guidelines (e.g., from GDPR, and University Ethics Committee) were followed throughout the study for methods appropriateness (Noble & Smith, 2015) and research integrity (Whittemore, Chase, & Mandle, 2001).

5.5 STUDY RESULTS – DESCRIPTION OF SAMPLE

5.5.1 Recruitment rate

The recruitment rate was assessed by two measurements: response rate and interview rate. A response rate is a conventional tool used in survey studies to reflect sampling inclusivity and potential bias. However, there is no unified definition of how this rate is precisely calculated (Kiezebrink et al., 2009).

In this qualitative study, the response rate was defined as the total number of participants agreed to interview divided by the total number of potential participants that the research was able to approach (Morton, Bandara, Robinson, & Carr, 2012). The initial recruitment approach by contacting gatekeepers through an internal newsletter was unsuccessful and attracted no response. An alternative approach was developed to enhance recruitment by visiting the sites[19], speak to the tutors, elderly learners, and other older people in person from these settings. A total of 65 older people tentatively agreed to be interviewed during the visits and gave the researcher their contact information. Five of them turned down the interview invitation for various reasons (e.g., travelling, health issues) in a follow-up phone call. The total response rate was 92%. It is worth noting that two factors were not reflected in this rate. One was that during the recruitment, it was very difficult to find a site that either was still running any session or had any older people attending at that time. Often there were none or only a handful of learners aged 65 and over found. This was particularly the case for library visits. Another was that recruitment materials, including a flyer and an information sheet, were left with the tutors at venues and handed out after the sessions (it was impossible to talk to all the learners in person). It was not calculated how many copies were handed out.

Interview rate was defined as the overall number of semi-structured interviews taken divided by all possible interviews. Due to practicality issues (e.g., availability) and data saturation, a total number of 27 older people were interviewed. Therefore, the interview rate was 45%.

5.5.2 Sociodemographic details

The sociodemographic details of the sample are represented in Table 5-2.

The mean age of the interview participants was 73 years (SD 5.4; median 73; range: 65-84). Among them, two-thirds were female (18/27, 67%), most were community dwellers in towns and suburbs (22/27, 81%), and nearly all were retired (25/27, 92%). Married participants (15/27, 56%) were living with their partners, and most participants who self-identified as single or widowed (n=12) were living on their own (11/27, 41%). Their level of education ranged from no schooling completed (n=1) to an Undergraduate degree or higher (n=3), with the largest proportion having received a vocational qualification (n=9, 33%). Although mostly retired, some were still engaging in voluntary work (n=7, 26%).

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[19] Although the sites such as libraries and cafés are public spaces, the researcher approached the tutors and volunteers who organised the learning events first and gained their support before reaching out to older people who attended the sessions.

Table 5-2 The sociodemographic characteristics of the interview participants (N=27).

Sociodemographic characteristics	Values
Age (Years)	
Mean (SD)	73 (5.4)
Range	65-84
Sex, n (%)	
Male	9 (33)
Female	18 (67)
Area of living, n (%)	
City	4 (15)
Towns and suburbs	22 (81)
Village	1 (4)
Living arrangement, n (%)	
Living alone	11 (41)
Living with family	16 (59)
Marital status, n (%)	
Single	9 (33)
Married	15 (56)
Widowed	3 (11)
Level of education, n (%)	
None completed	1 (4)
Primary education	1 (4)
Secondary education	6 (22)
Post-secondary education	7 (26)
Undergraduate degree or higher	3 (11)
Vocational qualification	9 (33)
Occupation/active status, n (%)	
Retired	25 (92)
Part-time	1 (4)
N/A for health reasons	1 (4)
Voluntary work	7 (26)

5.5.3 Characteristic attributes

While the data above have shed light on the general socio-demographic composition of the participants, additional information on specific attributes in relation to their learning and use of the digital devices and the Internet are also of great value in delineating the settings where this study was conducted and situated. Hence, the participants were organised into groups according to these attributes in Table 5-3.

A person’s use and learning of the internet are often overlapped and interwoven into the fabrics of their interactions with the digital front of daily life. Therefore, any participant may have more than one identity; for example, an older person who facilitates tutorial sessions at a learning centre can be identified as a *tutor* for the sake of the teaching involved, meanwhile, he/she can be identified as a *user* of the Internet, and a *learner* when engagement in continuous/regular learning at a venue is considered. On this basis, the types of *identity* reported in Table 5-3 are not mutually exclusive.

Table 5-3 The groups of interview participants by varying attribute (N=27).

Groups of participants by attribute	N (%)
Identity[20]	
User	27 (100)
'Non-user'	2 (7)
Learner	20 (75)
Volunteer/Tutor	2 (7)
Main site of digital-related practice	
Home	6 (22)
Library (drop-in session)	4 (15)
Café (drop-in session)	9 (33)
Community learning centre	1 (4)
Community social venue	7 (26)
Use of Internet-enabled device	
Desktop computer	6 (22)
Laptop computer	21 (78)
Tablet/iPad/Kindle	20 (75)
Smartphone	16 (59)
Ownership of devices	
None[21]	1 (4)
1 type of device	2 (7)
2 types of devices	13 (48)
3 types of devices	9 (33)
4 types of devices	2 (7)

Learner (n=20) in this case represents the participants who were actively involved in any form of learning (e.g., attending drop-in sessions, informal or structured lessons) at one of the sites visited. *Non-user* refers to the two participants who claimed that they do not use computers or the Internet during recruitment (through snowball sampling). It later emerged from the conversations that they were using the Internet to some extent. One of them deliberately did so for a protest, while the other did not understand the terminology

[20] Some of the participants were recruited as they claimed to be a non-user of the Internet. However, it emerged from the interviews that all participants use Internet-enabled devices to a certain degree. This turned out to be a valuable finding, which provides an interesting lens into the interpretation of their perceptions and attitudes towards the ICTs and their use of the Internet.
[21] This participant had a device borrowed from the local library.

of the Internet and that she was online. Because of this, they were categorised as non-users that are distinguished from the others.

Although there were other types of Internet-enabled digital devices mentioned by some participants, such as smart TVs, there was a lack of pervasiveness in the interview data. Four types of mainstream digital devices, namely desktop computer, laptop computer, tablet (including iPad and Kindle) and smartphone, were primarily adopted by the participants and accounted for a substantial part of the varying digital learning sessions. The laptop (n=21) was the most common digital device owned by the interviewees, and there tended to be more than one device in use in their households, with more than 80% of them possessing two to three different types of devices. This echoes the findings from the survey data in Chapter 4 and is further discussed in Chapter 6, where the findings from different phases of the study are triangulated and reflected upon.

5.6 STUDY RESULTS – INTERVIEW FINDINGS

The analysis of interviews is presented in this section, with a hierarchical structure of themes used as a guide to elucidate the experience of how digital is managed by older people in the context of daily life (Brooks & King, 2014).

The subsections and constitutive dimensions are organised by cascading themes and lower-level factors. An integrative theme, which is recognised as a theme that permeates all the other themes, is also described. This highlights that the relationships between the themes were not mutually exclusive but rather closely connected and interacted. The observed online or offline behaviours and changes enacted by older people were formed and contextualised. It provides a new perspective on the study of the digital divide/digital inclusion phenomenon among older people, that is, rather than attributing the adoption and use of the Internet to older people's personal *attitude*, *behaviour,* and *choice* through the dominant school of thought from behavioural and cognitive science (i.e., the human 'agency') (Shove, 2010), or ascribing the challenges older people faced in going online and staying online to the surrounding environment (i.e., the 'structure'), a comprehensive view on this matter is needed to look beyond the dichotomy of agency and structure, and to focus on the *performances* of Internet-related *practices*. Older people, in this sense, are the performers or carriers of their daily practices. The question of low or limited Internet use is converted into an inquiry on driving older people to these practices.

Then, how were the practices formed, changed, and evolved? How were they unfolded in older people's daily life? Why did such changes happen? What challenges lie in the future? To address these questions that are pertinent to the research questions in the first place, contemporary development in the theorisation of *practice* made by Shove et al. (2012) is used. Either envisaged as digging down the tip of an iceberg or looking through an optical prism, the *practice* is conceived as an *entity* with three elements - *materials, meanings,* and *competences.* This conceptualisation of practice in layers of *performance* and *entity* echoes a stratified worldview from critical realism explained in Chapter 3.

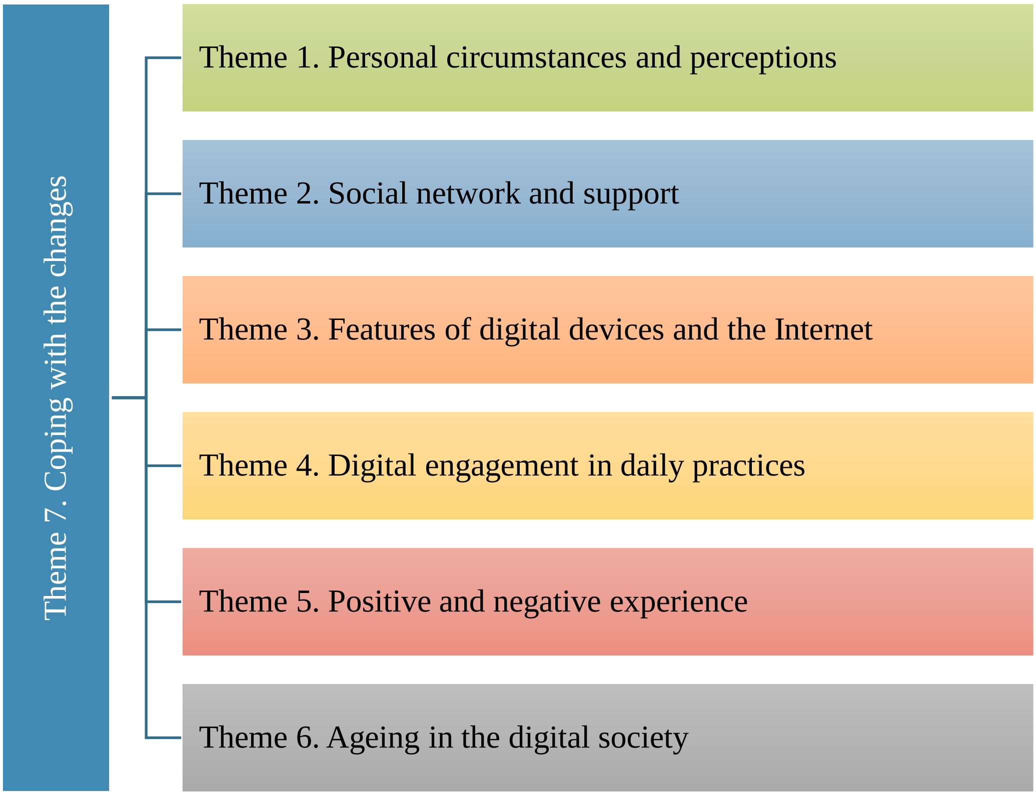
Thus, the *performance* of practice (i.e., the observed set of actions/ doings and sayings performed by older people) is the top of the iceberg above the water, or a beam of light passes through the prism. In contrast, the *entity* of practice is the hidden foundation and is refracted by the conceptual prism and separated into its component elements. Older people as human agents, ICTs and other non-human objects and artefacts, and social rules and conventions, are embodied forms of elements. The moments when all three types of elements integrate bring forth the performances of commonly recognised practices as behaviours (Blue et al., 2016; Maller, 2015). *Changes* in behaviours (e.g., stopped online shopping) thus can be investigated from changes in the constitutional elements or the forming and breaking of links between elements of practice (Shove et al., 2012). Through the identification of these elements and the understanding of their movements, a profound view of digital inclusion is established.

Therefore, the following subsections first present the constitutive *elements*, traces of their *movements* (e.g., through historical development from lived experience or travelling across spaces) and relevant *practices* (Maller, 2015) in the structure of cascading themes. The highest level of themes (see Figure 5-4) is explained in Section 5.6.1. The lower levels of themes (see Figures 5-5 to 5-11) are discussed from Section 5.6.2 to 5.6.8. Building on which it then moves on to show the *changes* in practices with illustrative models in Section 5.7.

5.6.1 Overview of the primary themes

Emerged from the interview data, seven primary themes are shown in Figure 5-4 below. Among them, theme 7 was an integrative theme that pervades themes 1 to 6.

Figure 5-4 Main themes (first level) emerged from the qualitative data that account for digital inclusion among older people

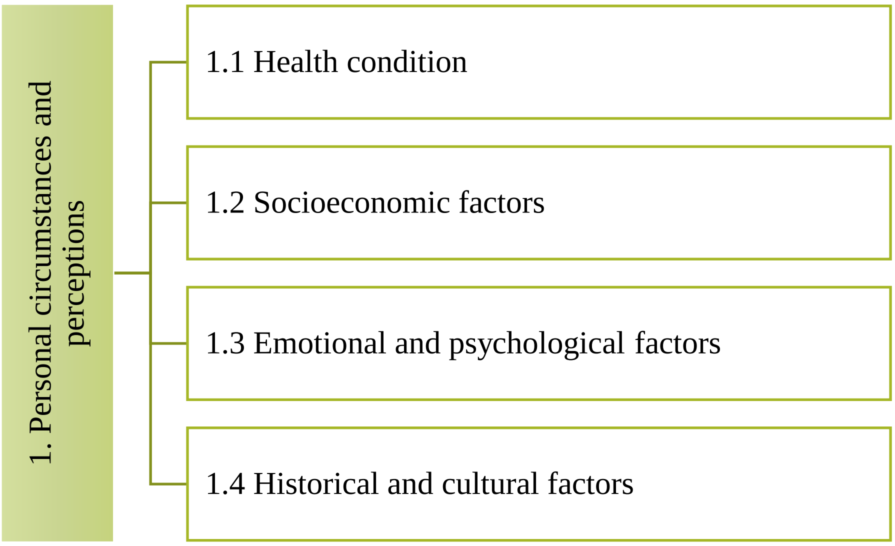


The numbering of the themes does not indicate the level of importance. Rather, it illustrates a conceptual map of the constellations of elements in older people's lives that compose the complex bundles of digital and non-digital related daily practices. Themes 1 to 3 comprise elements from personal, social, and technological domains, respectively. Theme 4 reveals the patterns of digital-related practices concerning how daily life was laid out both in time (e.g., routines as in bundles of activities) and in space (e.g., accessibility of ICTs in different rooms). Theme 5 presents the historical and experiential accounts of their use and learning of the Internet, explaining how the past and vital lessons influence how the practices were performed. Theme 6 reflects the meaning (e.g., social convention and expectation) of getting old actively, independently, healthy and included in an increasingly digitalised society. The integrative theme illustrates the dynamic nature of daily digital-related practices. Further, it explains how changes in elements were responded to and how changes in behaviours were activated, through which practices were formed and sustained. Each of the themes is further unfolded, discussed, and exemplified in the following subsections.

5.6.2 Personal circumstances and perceptions

The participants' personal circumstances and perceptions of Internet use and digital engagement constituted a recurring theme from the data. Four subthemes were recognised under this theme and are shown in Figure 5-5.

Figure 5-5 Sub-themes (second level) under Theme 1 *Personal circumstances and perceptions*



They are detailed and exemplified in the following divisions of this subsection.

5.6.2.1 Health conditions

According to the sample, declining mobility, particularly impaired hand dexterity, had a gradual influence on the adoption of ICT devices (Hawthorn, Barham, Alloway, Henderson, & Jackson, 2008) through the built-up negative experience. A participant who was a tutor with more than seven years of experience in helping other older people to get online gave an example:

> *…they hold the mouse like that* [demonstrates stiff fingers]. *So when they press the button it's touching the wrong place…and then they get frustrated-, if they're at home struggling they might lose their patience and give up.* (Julia, aged 73)

The physical conditions of the participants varied from person to person, which had diverse effects on their preferences towards ICTs. This was evidenced in the sample as some participants found a mouse was more user-friendly in comparison to a touchscreen:

> *…these touchscreens are causing me problems, because if I get my finger near it, things disappear on the screen. That's why I've got a mouse, you just click that and it's a lot more precise.* (Patricia, aged 84)

The type of devices the participants settled with according to their own physical capacity also inevitably shaped the activities they performed online. Devices with a touchscreen have gained popularity in the last decade with an intuitive interaction design, which was believed to be beneficial for the older generation who had less opportunity to learn and use traditional computers (Vroman, Arthanat, & Lysack, 2015). At local learning centres, tutors and volunteers "*used to deal quite a lot with the laptops more so than the tablets. It's the other way round now*" (Julia, aged 73). Limited use of smartphones that related to declining dexterity was brought to the fore by the participants:

> [It is] *a bit fiddly, ain't it, it's a bit fiddly. Sometimes when I've been on bus if I go on me own sometimes, I might just put radio on and stuff like that on me phone.* (Harold, aged 71)

Engaged use of smartphones requires nimble fingers to touch, stroke, press, swipe, and type on the screen repeatedly with precision. Using apps such as radio only needs a simple set of strokes. In comparison, for more sophisticated online activities such as using email, performing more complicated sets of on-screen interaction techniques such as sliding and dragging are essential. This lack of finger mobility and flexibility to carry out specific, precise movements on the devices, alongside many other factors such as sight that will be introduced later in this section, explained the continuing but confined application of smartphones and the Internet in a variety of situations of daily life for older people like Harold.

Other ageing-related physiological declines were also frequently voiced in the interviews, showing an impact on where and when the participants went online:

> *…, I doubt it-, I doubt very much as I can't carry it* [iPad] *cause it's so heavy. I mean my handbag's heavy for start, to carry this as well – [laughs], just too heavy for me.* (Clara, aged 83)

For older people like Clara, it was physically challenging to take the tablets such as iPad out and about or hold them for a long time. Consequently, they were excluded from a wide range of use scenarios in life that would require them to do so on the go.

A focus group study conducted by Vaportzis, Clausen and Gow (Vaportzis et al., 2017) also reported similar concerns on the heaviness of devices from older people aged between 65 and 76. It was complained even more by those aged 80 and over, who found it hindering the use of some functions, such as holding it up to take a photo (Barbara Barbosa Neves et al., 2015a). Admittedly, muscle strength gradually decreases as people age, and the rate of change accelerates since the age of 60 (Mayer et al., 2011).

Apart from the progressive decline in physical status due to ageing, older people are also prone to falls and accidents that are less easy to recover from (Age UK, 2019). Participants talked about how their ability to learn and use the Internet was damaged as such. When asked of the challenges they encountered in daily use of ICTs, one participant noted:

> *With me it's continuity because, I've got a bit of epilepsy, so I find my memory is affected, erm, it slows down a bit-, and it just knocked me, I couldn't walk, I was so ill, can't remember anything, I'm falling over, just couldn't-, I was just a mess.* (Eileen, aged 66)

Although affected differently, similar experiences were not uncommon in the sample. This dimension will be further discussed in the integrative theme from the perspective of coping with life changes.

Reduced cognitive abilities also have adverse implications on older people's ICT learning, application, and maintenance (Ramondt et al., 2013). This was frequently spoken of by the participants as the main barrier to progress:

> *...the older you get the more difficult it is to take in a lot of information and to remember it all, so I just look for things as I need them.* (George, aged 81)
>
> *I don't think you soak up the information as much when you're older. I think there's too much in there already and there's not enough room left.* (Harriet, aged 68)

The metaphor Harriet used was an illustration of discerned brain changes as she got older. A lack of storage capacity was implied. Although it sounded compelling and intuitive from common sense, the psychologists rejected this theory: "the brain is not an overloaded hard drive" (American Psychological Association, 2006). Friedman, Nessler and Johnson (2007) pointed out the reasons behind such problems lie with a worsening ability to encode and retrieve information, which is generally associated with normal cognitive ageing.

The cognitive domains reflected in the interview data include attention, memory, and processing speed. Attention refers to the mental processes that selectively receive and respond to relevant stimuli (Harada, Natelson Love, & Triebel, 2013). In the context of ICT use, it was manifested in participants' abilities to concentrate on the tasks they intended to perform while also staying responsive to a range of interactive features, such as pop-up messages or screen lock. The following example from the interviews illustrated an issue of interruption/or distraction:

> *…a screensaver comes up, so you're always trying to-, fighting to-, you know-. It's quite difficult to get a continuous-, try to concentrate on something on the phone.* (Carole, aged 74)

For those affected, deterioration in attention hampered their brain to receive, prioritise and encode new information effectively. As a result, some participants found themselves in a position where great perseverance was essential for acquiring new skills. Anne gave an example from her experience:

> *…learning how to-, it was a case of: "There's that one, there's that one, and there's that one." Quite slow. Whereas perseverance and remembering where the things are, it came a little bit. The more you use it, the more you got into it.* (Anne, aged 67)

Indeed, to compensate for reduced cognition, participants like Anne stressed the importance of repetition and practice for building competence, for which patience is fundamental to eventual success. The process of making sense of the digital devices thus appeared to be a lengthy one for most of the participants:

> *I think it's just kind of slowly developed really. It kind of dawned on-, it dawned in a slow way.* (Elaine, aged 70)

While not working for everyone, many explicitly expressed their acceptance of this prolonged learning curve, comparing their cognitive capacities with that of the younger ones. For example:

> *When I got me iPad-, me iPhone, I found it very very hard…it's different to us-, when you're young you learn so much quicker, but when you're older, everything's harder. You're in a learning curve…you have to acknowledge as you get older, it takes longer to go in.* (Sylvia, aged 78)

Closely coupled with attention, forgetfulness was another indicator of ageing, and it was commonly mentioned in the interviews. The degree of the memory decline varied in the sample; nonetheless, even the least affected ones, usually the younger participants, complained about the extra challenges it cast on their daily learning and interaction with the ICTs:

> *I have had moments, when I am trying to do it at home and I think, oh how did we do that earlier* [at the learning centre]*…, so I've had moments of frustration with my phone and certain things on my iPad.* (Beatrix, aged 65)

Participants often struggled with a short-term memory deficiency, whereas experiencing fewer troubles with retaining long-term memory:

When you get older, your memory, you know what I mean? Your short-term memory is not as good as your long-term memory. (Harold, aged 71)

…as time go on my short-term memory's horr-, it's terrible. I can remember something from when I was four, but I'll be talking to you now and I'll forget what I'm on about, or-, I can't remember what happened yesterday. (Eileen, aged 66)

Like impaired attention, a poor short-term/active memory made it difficult for the participants to efficiently learn about digital devices and the Internet to remember a coherent sequence of actions required for corresponding tasks. For instance, writing an email entails logging in to the account, clicking on the 'compose' button, entering a recipient email address, writing the title and content, and clicking on the 'send' button in the least. Countermeasures like perseverance and practice retained their charm in helping address memory-related learning difficulty, as commented below:

As you get older you need repetition in order to remember it. (Julia, aged 73)

I suppose if you do it and do it and do it and do it and do it, eventually it comes to you. But you've got to do it a lot of times. (Frank, aged 75)

Moreover, a good habit of documentation, such as note-taking was widely pursued by the participants as a strategy to facilitate information encoding and retrieval (i.e., help with remembering). This is exemplified below:

I get frustrated when I can't remember. That's why I've got me book here. If I went home, I'd get me book out and I'd do it first and third and when I got to fourth, I wouldn't need me book, I'd be able to do it. But then, if I didn't do any more for say three weeks, I'd have to get me book out again, cause it's all gone. You forget, you see? (Harold, aged 71)

Similarly,

I prefer to have everything written so that I could go back and look at it, and work it out slowly. So if I'm told, it-, I don't retain it. And then get one thing muddled up with another one. (Clara, aged 83)

Implied in Clara's case, reduced processing speed, another feature of impaired cognition, can also affect older people's learning ability. Ubiquitous in the sample, participants often found it challenging to follow the instructions from their tutors on troubleshooting or learning about a new feature of the Internet-enabling ICTs. It was particularly the case when they learnt from their younger family members, who were either impatient or insensitive to the cognitive differences. The interviews were pulsed with sentiments concerning speed, marked by an aversion to 'fast' and an appeal for 'slow' and 'repeat'. For instance, Beatrix and Lucy shared their learning experience with their children being the tutor:

> *…often with the children, they say [interviewee speaks in fast speed and dramatic tone] "You do this, you press that, oh yeah you just do this mum, dah, dah dah dah dah dah dah, that's it" and I like [takes deep breath], what did they say? What was it? And I say "Can you just so-, can you just tell me again?"* (Beatrix, aged 65)

> *…the trouble is, he'll tell me, and he tells you so quickly and shows you so quickly. I can't take it in, I take a while to learn it.* (Lucy, aged 72)

Slowing down the pace of teaching and repeating the instructions were thus imperative to keep older people in the loop for steady progress in learning, to retain their motivation, and as Valerie (aged 75) and Fred (aged 73) put it, to help it "*sticks better in the brain*".

The use of the Internet is demanding of sight where screens are primarily used as the primary medium for human-computer interaction. Meanwhile, sight impairment is prevalent among older people and just like other cognitive functions; it becomes more prevalent as age increases (A. Sinclair, Ryan, & Hill, 2014). This was factored in the participants' decisions on the adoption of devices. Many participants were still using old desktops or other bulky devices for a bigger screen, for example:

> *…I have a monitor, you know, a big screen, so I can see it, my eyesight's not too good…I generally don't like iPad. I like myself at home with a nice big monitor, that I can sit back and see clear as day.* (James, aged 71)

Cognitive ageing and decline always come in bundles with one or more long-standing illnesses (Age UK, 2019), which added an extra layer of difficulty for some of the participants who were coping with other health problems. Simon explained how poor sight attributed to diabetes and reduced cognitive ability caused fear towards the use of computers:

> *…when you're going to the hospital, you know, sign in on the computer, and I'm like that, "No, I'll go to the desk", totally lost. I cannot read it fast enough, some people can just scan things, whereas I'm looking at the words-, I've got diabetes-, erm, my eyesight is poor.* (Simon, aged 69)

In a study conducted with vision impaired older people, Okonji and his colleagues (2015) also reported similar life experiences from their interviewees that caused frustrations and a sense of inadequacy, drawing upon which, they commented that such barriers to computer/Internet use were discouraging older people from making use of, and benefit from the Internet as expected.

Learning difficulties such as dyslexia can also cause a deficiency in sensory perception, leading to dysfunctions in cognitive processing where multiple parts of the brain collaborate (Perrachione et al., 2016). The participant who suffered from this disorder shared her experience with a computer that was fraught with confusion, fear, and frustration:

> *…even though I do know more about it and I know how to do it, I am nervous that I will do the wrong thing, at the wrong time. My thinking process is quite slow. I am sure that's partly an age thing, but I also now know that it's my dyslexia as well. My sense of direction isn't very good, sometimes I struggle with left and right…I have to be doubly sure that I am pressing the right button because when you press, it's just gone, hasn't it? And then you've got no more control over it anymore.* (Doris, aged 65)

Although it was a rare case in the sample, the zigzag road that older people like Doris with cognitive decline and other health conditions had gone through in adopting ICTs was not unfamiliar. Although everyone aged differently, it was universal among the participants that several others always accompanied the decline in one dimension of physical and psychological functions. Like Clara, who complained about the heaviness of the iPad, also had issues with finger dexterity, memory, and eyesight. Overall, what was clear from the data was a pattern that due to ageing-related impairments and functional decline, the participants were prone to face problems in their digital engagement, for which a long journey of learning and maintenance was inevitable. Through the experience, perspective, and feedback gained along the journey, a practice of Internet use was sustained, altered, or lost.

5.6.2.2 Socioeconomic factors

The practice of getting online cannot be carried out without its material foundation (Power, 1999). When asked about their day-to-day use of the Internet, the participants often talked about the devices they had and the economic decisions made on updating their devices (e.g., computer, input devices, and router) or paying for related service charges (e.g., data package) based on their individual financial circumstances. For Clara, not being able to afford the cost of a computer and the Internet had largely altered and delayed her route to digital inclusion:

> *I thought it was big and expensive thing and in those days, you see. I mean I was only, well I was on the widow's pension and another little pension…now I would be able to afford to pay more.* (Clara, aged 83)

Despite a growing number and proportion of older people getting online, some older people were never online (Age UK, 2017, 2018b, 2019). Although not directly represented in this sample, lights were shed on this cohort of older people through the participants' accounts. One of the reasons for them being offline as financial circumstances:

> *I've got relatives who haven't even got a mobile, like my cousin. She's my age exactly, and she's got an ordinary phone that just does type, text and phone calls, and her husband is older than her, he's in his eighties and they haven't got much money.* (Elaine, aged 70)

Financial related trade-off decisions were mentioned repeatedly by the participants not only when it concerned the question of whether to continue but also whether to go an extra mile with the Internet. For instance, Valerie and her husband Fred explained their choice of mobile data plan:

Some like the thirty forty pound a month sort of thing, that was a lot. We just got that the basic funcs and everything, so, does what we need, really. (Valerie, aged 75)

It's more or less ringing people up and take a photograph isn't it, that what we need our phones for, you know. (Fred, aged 73)

While unaffordability could lead to a rejection of adoption, devices and services that were free of charge served as an encouragement to the participants to try new things. To the participants, it was a second-hand device that was no longer needed by a younger family member, a free birthday gift, or from schemes for improving digital equality, and promotions from various service providers. Like many other participants, it was one of the main reasons behind Clara's decision to get online, and then later, to try out an iPad:

…I said I don't want the Internet. I didn't want to bother with it you see. And then because I got a BT phone line, they actually got in touch and then said, they were going to let certain people have the Internet free. So I said to my daughter "Well, if it's going to be free, I might as well have it."…and when this [iPad]came free, I thought well might as well be free [laughs]. (Clara, aged 83)

In a similar case, Simon was only able to start learning how to use an iPad because of a council-led iPad loan scheme:

…I said, "I do not know how to use a mobile telephone or a computer or anything else." And he said, "I know someone who will get you, er, an iPad on loan from [city name] Council." And I probably would never afford one anyway, you know, on pension, there's too many bills and one thing and another, you know. It were just a good opportunity. (Simon, aged 69)

While some participants managed to get connected, others began to make more use of the Internet with apps and software free of charge. Free communication software, in particular, helped the participants to cope with isolation and loneliness and kept them and their friends staying online:

WhatsApp is good for the old-, elderly, I think. Cause it helps with company if you're lonely. Yeah, so. And, you know, you don't have to worry about paying [laughs]. (Eileen, aged 66)

The extent of older people's online activities, as presented in the sample, was not entirely based on the merit of the cost incurred from digital maintenance, but also influenced by that from other aspects of daily living such as paying for rent and eating, as exemplified below:

> *I'm getting it free, I don't want to subscribe, I can't afford to, you know. Paying rent, you've got to pay rent for so much.* (Harold, aged 71)

Similarly, Patricia shared her experience of finance management and gave her view on prioritising spending in later life:

> *I have a free download, the security-, I've tried all sorts of security programmes and they're still always trying to get me to take extra subscription and pay money. And I have to watch my money. I did all the things everybody wanting me to do, won't be any money for food you know. It actually-, a lot of poverty in older people…I would never try to coerce somebody into having a computer, if they say "I can't afford them", I wouldn't try to persuade them that they can.* (Patricia, aged 84)

As a critical indicator of socioeconomic status (SES), people with higher positions in the occupational hierarchy were commonly found on the more favourable side of a digital divide (Harris et al., 2016; Yoon, Jang, Vaughan, & Garcia, 2018). A reason may be that people at these positions can enhance their social and economic capitals more easily, thus in turn gain more opportunities (e.g., more affordable of digital costs), more robust network (e.g., more people they know of are connected), and better environment (e.g., more application of ICT in the workplace) (Van Deursen et al., 2015) in digital-related activities.

In this sample, the participants had diverse occupational backgrounds before they retired, including carpenter, self-employer, factory worker, nurse, teacher, artist, manager, etc. Some participants were able to take up computers ahead of others because of their professional advantage. For example, one participant commented:

> *…I had to do it in my job. But, there are other people…working-class guys who, you know, have not had those kind of-, and would run a mile from-*

[computers]*…There's a film called "I, Daniel Blake". And this guy…he said, "I've never had to use a computer, I've been a joiner for God's sake. I got things, I measured things, I did physical work, I never had to use computers." So, there's loads of guys, in* <u>*that*</u> *kind of position.* (Carole, aged 74)

However, some cases were at odds with this capital-reinforcing effect. Some participants with higher occupational status were also digitally disadvantaged and struggled with gaining digital competence and confidence in later life, just like those who had worked in an environment with limited resources and a digitalisation movement. One participant from a lower SES background explained his situation:

I'd never, well, with being a joiner-, I think they've brought computers in more in joinery places now, but when I started, there was nothing and when you retired you never used anything like a computer. (Roy, aged 73)

Unlike Roy, who had no facilitating environment for digital learning and use, Sylvia was lagging in ICT acceptance and use because she had a proxy user and therefore missed her opportunity on an earlier digital engagement:

I had me own secretary at work, so it made me very lazy when I was working. Big mistake. I've not got a laptop. That's why I found it so hard. I had a secretary who did my-, so easy, you know, so I stopped. (Sylvia, aged 78)

Although, in general, many of the participants had their first interaction with a computer at work:

the first time I actually came across one at work was in 1989, and I do remember that 'cause that was-, I was doing this particular job. (Trudy, aged 73)

For some participants, accessing and using early generations of computers at work regardless of their occupational background added an asset for learning about modern technologies such as laptops and tablets in their later life. For example,

…it's a combination of things, learning both the laptop and the iPad. But I think it helped that I already knew how to do the word processing and the typing. I think it helps that I had that background. (Doris, aged 65)

Another influence on the participants' involvement in a digital environment was their employment/active status. Most of the participants were retired, while some of them continued to engage actively in community volunteering. According to the participants who were still working or volunteering, they often used computers and the Internet. They received more technical support from a wider social network than others who were largely reliant on close family members and friends. These advantages made them more resilient in the evolving digital society. For example, one participant continued working with local government and charities after retirement on matters concerning the wellbeing of older people, from which she gained a network of support:

> *I have friends from some of the schemes that we've been working on with the Age UK. They know a lot more about the computers than I do, and always will. They are very patient with-, if I've ever problems, should I do this or should I do that, you know, they are giving answer to me.* (Patricia, aged 84)

Julia volunteered at local learning centres to help people her age get online. This, in turn, kept her updated with new things:

> *if somebody comes up with something new I'm not sure of, then I will make a point of thinking, "When I get home I'll find out, so I can then discuss it with them next week." So I quite enjoy doing that.* (Julia, aged 73)

Overall, the participants had diverse occupational backgrounds, and they each lived a different retired life. Those who had more privileges and opportunities did not necessarily get a head start in digital inclusion. There were always many other elements at play in the field, reinforcing their advantages while others were balancing out. Due to drastic technological developments throughout their lifetime, computers that some of them used in their earlier life stages were already outdated when they started to re-engage after retirement. Nonetheless, participants found it easier to learn modern computers such as laptops if they were required to use computers in their work, even at a fundamental level (e.g., just follow procedures). Meanwhile, technologies are continuously changing, and new knowledge and skillsets must keep up with the changes. Participants who were still working or volunteering in settings where computers were used often had more facilitating conditions for sustained use.

The level of education that the participants received had both direct and indirect influences on their learning and use of the Internet. Direct benefits the participants gained from education include traditional literacy, such as reading, writing and comprehension, as well as hands-on skills development and practical application such as using a computer for writing. However, the latter was rare because of the historical constraints in their generations (Van Deursen & Helsper, 2015a). For example, Lucy explained:

> *See, we never had anything like that, there weren't any computers or anything when we were learning at school…*(Lucy, aged 72)

This lack of access to computers at schools was universal among the participants in their earlier life stages. Typewriter, on the other hand, was a prevalent input device for document processing back then and was taught at school, as one participant recalled:

> *Many many years ago when I was at school, I did typing on an old-fashioned typewriter…lots of people of my age went on to do office work straight from school. At that time, they'd be shorthand typist.* (Beatrix, aged 65)

Some participants were able to carry on the skills of typewriting, and this transferable skill later made it easier for them to pick up a keyboard:

> *Years and years ago, I did a typing course at night school years ago. So I can roughly do a bit of key- , touch and typing…I hit a lot of wrong keys, but I know how to use a keyboard you see. I call it "my glorified typewriter" [laughs].* (Clara, aged 83)

> *I knew nothing more than the old typewriter keyboard, and I think that was universal. You might have the same thing, and it was so easy, no problems.* (Andrew, aged 78)

There were a few participants who pursued further education at a time when computers were commonly used in the education sector. Those participants benefited the most from education and became earlier adopters and more proficient users of ICTs in comparison to the rest of the sample:

I probably wouldn't be so familiar with, erm, having to use digital technology or whatever, if I hadn't done a kind of late university degree [laughs]… (Carole, aged 74)

Years of education that the participants received also impacted the types of activities they engaged in online, although this influence was circumstantial other than direct. Different education backgrounds steered the participants to different social circles, career paths, and lifestyles. What the participants used the computers for was thus influenced by this dimension. For example, one participant used LinkedIn to extend and maintain her personal social network:

I like LinkedIn, because that's more to do with work and professional work. And I found a few people I know have LinkedIn that I worked with them in the past. It's been interesting, so I find LinkedIn, worthwhile doing and I want to do more of it. (Patricia, aged 84)

Many participants with fewer years of education often used the computers and the Internet for entertainment and basic online searching that required minimal knowledge, skill, and purpose of use, while keeping them company and active. Some participants gave examples:

…just for fun and checking this and that, put a bit of weather on or, you know, look at the news, you know what I mean? Time goes faster, doesn't it? (Harold, aged 71)

I do that Candy Crush and, you know, it keeps your mind going, and you're looking round, and the same with jigsaw puzzles. I do about three of them a day on here [community centre], and I do it at evening time. And then, I'll get onto the Solitaire. (Irene, aged 82)

5.6.2.3 Emotional and psychological factors

During the interviews, the participants frequently talked about their emotions and psychological status to explain their digital life and the rationale behind the choices they made regarding ICT use in daily life. Several cases were used to give a more detailed illustration.

Emotions may be momentary and subtle, but they can exert long-lasting feedback effects that influence how people feel, react, and regulate themselves when in the face of life events and changes, such as those caused by digitalisation. The participants often talked about their emotions, either positive or negative, that swayed their feelings towards learning and the Internet. One participant expressed a sense of shame, frustration, and anger in her experience of dealing with changes caused by digitalisation and explained why she constrained her use of the Internet:

> *…it's constantly having to ask for help gets to me because I don't like it, I'm quite an independent person. I like to be able to do things myself and work things out myself. And I've always been able to do that. And now I feel-, it makes you feel…thick, I suppose, you know when people are talking about all this and it's going on all around you and you think, why can't I do all that? So it makes you feel lacking in confidence and lacking in expertise and-, as though there's something going on where you think, oh gosh, I can't do this*. (Alice, aged 69)

Fear and frustrations were the emotional factors that the participants constantly referred to, such as,

> *I was dead scared.* (Harriet, aged 68)
>
> *I learned the fear way, terrified.* (Sylvia, aged 78)
>
> *It's a bit frightening.* (Lucy, aged 72)

There were different layers and kinds of fear. One fundamental reason was a lack of knowledge, skill, and confidence in adapting to new things such as computers that came later in their lives, as explained:

> *When you do something new, you're always a bit apprehensive, aren't you? You know, no matter what it is.* (Lucy, aged 72)

Indeed, to most participants, computers and the Internet were new and constantly changing. What the society required of them to count as being sufficiently digitally included and independent kept changing. This is echoed by the continuously expanding definition of 'digital divide' from divides in access to the Internet, divides in basic skills, divides in meaningful engagement, to divides in sustained use (Olphert & Damodaran, 2013; Scheerder et al., 2017). It thus made the emotional element of fear a constant that the participants needed to manage long-term.

Some participants further explained that fear came not only when they were coping with the new and unknown but also closely tied to the possibility of getting unfavourable results or consequences that they were aware of, such as scams on the Internet. One participant commented:

> *It's the not knowing what might happen and what might come up. And I think that's the base of everything for me. That-, that not knowing and that fear of totally losing everything again.* (Alice, aged 69)

Most participants, who were already using the Internet for various things, talked about their grave fear towards the growing pressure on them to adopt online shopping and online banking and how they resisted. For example,

> *I don't feel confident and-, we don't feel confident, and we've heard of so many where they've been wiped out, clever people who are, you know, really deeply into IT and all the rest of it, who've made a mistake and they've been cleaned out, and it terrifies us, you know…I think it'll be something where you've no choice, so I think you would have to.* (Hugh, aged 79)

Thus, like Alice and Hugh, when explaining why they limited their use of the Internet, many participants attributed it to a lack of confidence, control, and autonomy when they could not get a full picture of what was going on and the possibility of making a mistake that they could not fix:

> *So, it requires a bit of me saying that to him* [her son] *"explain it to me", and then I might understand a bit more what's happening. Otherwise, you are a bit just being-, well, you're not in control of it anyway, but you're even less in control of it, and if something goes wrong, you can't do anything, can you?* (Carole, aged 74)

Not being able to retain independence and control in their digital life caused not only fear and a lack of confidence but also a mix of other negative emotions (e.g., resentment, insecurity, worry) and psychological distress (e.g., anxiety, depression), which further constrained older people's digital footprint, as one participant illustrated:

> *Cause some people are backwards at coming forwards, they don't like to feel as though they're inadequate.* (Lucy, aged 72)

Another added:

> *Nobody wants to make a fool of themselves, do they?* (Sylvia, aged 78)

It was certainly the case for Joan. Joan was first approached during the recruitment because she defined herself as a non-user (choose not to) who was defiant of the increasingly digitalised society replacing the old culture. She later admitted that she had only made such claims because she often felt helpless and clueless when asked to do things online without getting proper help:

> *I mean, talking to you about it like this, I feel really rather foolish. I've never really felt foolish about it. I felt annoyed, I felt superior because I think I know better, but I'm feeling a bit foolish, it all sounds really quite pathetic really [laughs]. They [the computers] make me feel as though I don't know what I'm doing. Make me feel out of control. I think, that's what it is. I think that's part of it, yeah, that's why I won't participate with them [the computers] really. I don't want to interact with them at all.* (Joan, aged 69)

Having access to timely help/assistance when needed was repeatedly mentioned by the participants as a way to counter fear and anxiety:

> *…yet if I just had somebody who would sit down with me-, and teach me, I know I could do it. But it's where to turn for that help, that I find really frustrating.* (Alice, aged 69)

Like many other participants, Alice resorted to a local digital skills drop-in session. However, for Alice, a session that lasted for one hour once a week was like "*a drop in the ocean*". Similarly, Andrew stated:

I only see [tutor name] two or three times a month, and that only amounts to about two and a half to three hours. It's not enough. (Andrew, aged 78)

Their situation mirrored that of many other participants deep in this dilemma: when using and exploring on ICTs and the Internet, it was common for older people to 'get stuck'. However, for many of them, help was limited and sometimes not being able to follow the tutors/family members due to reduced cognition made them feel diminished:

It's dehumanising you, if it's making you feel less. (Carole, aged 74)

For those who were stuck in a dilemma, this inevitably damaged their confidence, reinforced the fear and frustration, which then, in turn, further limited their online activity:

So I'm just working in the dark really, you know, trying to teach myself and learn little bits and then something will come up and I'm almost frightened of pressing anything in case-, oh about two years ago, I lost everything and I don't quite know to this day how it happened (Alice, aged 69)

As evident in the sample, fear, technophobia, or technology anxiety were mingled with other emergent negative emotions during the experience of learning, using, and exploring the Internet. The fact that older people needed to cope with ageing-related learning difficulties on the one hand, and that technology, online content, and the society were fast-changing on the other hand, implied that the 'divide' or 'gaps' were ubiquitous, which highlighted the importance of the provision of efficient and practical support to cope with the 'negative' feeling of "*walking in the minefield*" (Fred, aged 73).

Not wanting to be left behind was found to be a common motivator among the participants who carried on with their digital learning, as one participant stated:

I'm afraid I might end up, if I don't do something about it, living in a cave. So, things like that spurred me on. (Hugh, aged 79)

Although driven by fear, the participants were able to turn it into a positive for better ageing and keeping up with the digital society:

> *…that's why I feel as though I need to continue learning all the time because you can get left behind. And if you don't have any online skills, you could be left out in the dark as it were and, and feel completely isolated so, the world is carrying on and you are no longer a part of it, cause you can't keep up. Got to, you got to, cause things are moving on and changing constantly* (Beatrix, aged 65)

The majority of the participants were continuously learning about how to better manage their digital life. Some participants learnt how to cope with the changes (e.g., computer or software updates that changed the layout or design) that occurred in devices they frequently used and online spaces visited. Others explored how to do more things with their devices or on the Internet. Confidence, as well as positive feedback such as a sense of accomplishment, and satisfaction were established during the learning and engaging processes that the participants went through:

> *When you create, if you create something, you feel good about it, and I get this with a computer. If I get over a problem, put it right, and then I can write a good email about it, I feel I've achieved something, I've taken life forward another step, yeah.* (Andrew, aged 78)

In another example, the participant felt very proud of herself when she could surprise her daughter with her digital skills. This sense of achievement and self-value gave her momentum to be more proactively in living a digital life:

> *Sometimes I taught her something, and I was well chuffed, because I probably learnt it from [tutor name] or whatever. And I said, "You can do blah, blah, blah," and she went, "Can you? Hey good-," you know, [laughs]. So, I thought, "Wow", you know. It does make me feel good and keep me going.* (Harriet, aged 68)

Many participants mentioned a motivational effect of positive feedback from progress-making, which gradually built up their confidence and competence:

> *I think it's about, nearly three years now, I was really bad. I had to start from the beginning. I couldn't even switch it on, I was that bad. I'm good-, now, I do-, I've now gone onto online banking.* (Sylvia, aged 78)

Some participants actively embraced the Internet, and they often spoke of good online experiences and the benefits they achieved from the Internet. For example:

> *With your bank account, some people are really scared of it. But I've never had any trouble, I've never missed any money, and Barclays is good, they will tell you if the app is not working, or if anything is up, or if anybody has gone into your account. You see, it keeps your mind-, I always was worried about being overdraft and how much money I've got, and you can just click it, and it's there.* (Eileen, aged 66)

Like Eileen, some participants gained trust over the services, support, and information they gained online. But overall, the positive emotions mainly were developed throughout the learning processes that they persevered through, or simply put, gained through experience.

With both positive and negative emotions accumulated over time since the adoption of computers and the Internet, the participants frequently expressed somewhat mixed feelings towards their digital life. These critical views reflected the participants' explorations of the meanings of digital engagement as well as the summary of their digital journey thus far, which then set the tone for the future dynamics of their digital life, for example, to settle with the current extent of digital use, to reduce use in certain aspects, or to use the Internet more extensively. Examples of representative sets of mixed feelings are given below.

It improves life, but it disrupts it too. Although the participants welcomed the benefits of getting online, they also repeatedly spoke of the downsides that came along with it. One frequently mentioned theme was time. According to the participants, using the Internet for certain tasks saved their time and effort; however, it was also sometimes intrusive:

> *I do feel it has its uses and saves a lot of time and legwork in some ways…but you have to be careful because it can eat into your life really. It can. Erm, yeah, so my husband-, I watch television and my husband sits by the side of me and he's on his iPhone all the time playing with his iPhone.* (Alice, aged 69)

Using the Internet was also time-consuming; participants felt the need to reduce their time online. One participant said:

> *I spent so much time on Facebook. I don't want to waste-, because I get my screen time coming up every week, telling that I've been…no [drawling tone], I need to cut down.* (Beatrix, aged 65)

While social media such as Facebook improved the well-being of some participants by reducing loneliness and keeping them in touch with their family members and friends, they also found it addictive. Many participants also expressed their concerns on the widespread disinformation and misinformation on the platform, drawing upon the Cambridge Analytica data scandal. As such, these participants restrained their use of Facebook, and other time-consuming online activities for other parts of their life:

> *This is it; you have to slot what you're doing, and only leave so much time. Otherwise, you can spend hours on it, and you don't realise how long you've been on, and if I've got to be in a certain place at a certain time, then it's difficult.* (Lucy, aged 72)

Like Lucy, many participants placed interactions with people in real life at the core, considering the digital part as an addition or an enhancement. This principle explained the extent of digital integration in their day-to-day living. For example, participants frequently mentioned the importance of getting out of the house, talking to people, and maintaining physical fitness. They further explained that when they felt using the Internet was going against being active; they would choose to keep active and healthy over the Internet. This was especially evident in cases where shopping online or booking GP appointments online were turned away from. As an alternative, participants often searched for basic information, such as the shop address, then visited the shops in person. More examples are given and discussed in themes 6 and 7. Here, a comment from one participant is presented to highlight their critical view on the Internet:

> *…I must admit I like to interact with people, I don't think it's good in that it's a machine and you're not speaking to anybody, you're not interacting with them. I think in that way, it's a bad thing…Now, the other way you could look at it is if somebody was disabled, they could go on a computer and they wouldn't feel isolated. So, you've got two sides of the same coin, haven't you?* (Joan, aged 69)

It's beguiling, annoying, yet amazing. The learning experience some participants went through was a bittersweet one; rarely had they faced complete negative feelings or pure positive emotions; it was always mixed. Many participants found the computer concepts and jargons beguiling, such as 'bluetooth', 'apple', 'app' and the myriad of cyber languages. Frustrations were commonplace during digital learning and application. They often felt annoyed by the changes (e.g., updates) when they just remembered the steps or got used to the designs (e.g., website layout, operating systems). Yet, participants often found the Internet surprising and amazing, for example, when they found long lost friends on social media platforms (e.g., Facebook) or found dietary information or online discussion fora that can help them better manage their health conditions. One participant stated:

> *I do sometimes run into a brick wall when I don't know what to do or something happens I don't understand, especially when it just disappears from the screen. I'm learning more about how to get it back again, but it did frustrate me at first, and it was so bad, I could pick it up and throw it through the window. But I kept away from all that, fortunately. I kept my temper and I've learned a lot. I discovered that your computer can become a very good friend, and I don't know what I'd do without it. My Pad and my computer are my helpers.* (Andrew, aged 78)

Even for Joan, who declared herself as a non-user so that to defy the increasingly digitalised society, computers were not just all about frustration:

> *I find them very frustrating with the changes and things like that which as I say does put me off, but I am quite satisfied by the albeit very limited scope that I have with the computer. I'm actually quite satisfied with what I can do*. (Joan, aged 69)

It's only good when it's working. A recurring theme that emerged from the interview data was on the occasions when computers did not work as intended, as stated:

> *So frustrating if something doesn't do what we want it to do, when technology is working as it should it's wonderful.* (Beatrix, aged 65)

Computer complexity and computer malfunction were noted as common risk factors to sustained use of the Internet in the general population (Gonzales, 2015). Older people who faced more challenges in gaining and maintaining digital skills were more susceptible to "falling off the bandwagon" when their self-efficacy began to gradually erode by repeated failures (Damodaran et al., 2014). Another participant commented:

> *I got very disheartened with it…I wonder if people are like that when they're using the computers, when they're not very sure of what they're doing, and they get it wrong, in inverted commas, because you can't get anything wrong really. But I wonder because they don't get the outcome they want, does it make them feel less of a person, because it can sap your confidence a little bit, when things don't work properly.* (Lucy, aged 72)

The participants also referred to 'working' as usefulness, which was linked to the outcomes or differences that the Internet made to its user. This concept is akin to the third level of divide (i.e., divide in outcomes) in digital divide literature (Scheerder et al., 2017). It also implicitly refuted the position of technology determinism, such as that implied in the technology diffusion theory, in which technology was deemed with a major power in driving the society forward, and that technology adoption was advanced and beneficial (Van Dijk, 2012b). One participant argued:

> *I think technology can be amazing, it depends who's controlling it, doesn't it, obviously, and how it's being used. You know, if it's dehumanising you, if it's making you feel less, but if it's making you feel more, and able to do more then it's facilitating, isn't it? It's making you more creative, more able. But if you don't get the hang of it, it's oppressing you, isn't it?* (Mary, aged 72)

It's only good if it's relevant. The last type of mixed feeling that was salient in the data was concerning the relevance of computer use. Participants talked about the benefits of computers when it was relevant to their individual circumstances. Use scenarios that did not fit in their lifestyles or match their needs were avoided. For example,

> *I don't understand Bluetooth and when I bought my new car, the guy said, "Oh you can connect this to Bluetooth". I don't want that [laughs]. I just want to drive it. I just want to go, you know, I don't want to be connected all the time. I don't constantly feel the need to be in touch.* (Alice, aged 69)

Not only had this perspective affected the participants' attitude towards the adoption of specific technologies or apps, but it also shaped the organisation of their learning activities. This may explain why some survey participants indicated that they have learnt everything they needed and discontinued digital skills courses (see Chapter 4). More of the participants' limited use or learning due to a lack of relevance of their daily life are presented in more detail in the following themes (theme 4 and the integrative theme).

5.6.2.4 Historical and cultural factors

Another intangible set of personal factors that influenced the degree that digital incorporated in the participants' lives was rooted in their historical and cultural background, or in Bourdieu's terms, the participants' own embodied history and cultural capital (e.g., the upbringing) (Ignatow & Robinson, 2017). The historical set of influencing factors was anchored mainly on one's *habitus*, a product of a person's life experiences, and was constituted of that person's generational background, ingrained skills, capacity, habits, and dispositions (Tan & Chan, 2018); they created a sense of *knowing*, or a "feel for the game" that navigated the participants through the field of ICT use (Rivera & Cox, 2014). In addition, the specific cultural background that the participants lived in also shaped how the participants perceived and understood the digital world through the knowledge they gained and the values and personal beliefs they developed through time. This collection of influences from the historical and cultural aspects of the context in which the participants were immersed provided further explanations to the differentiated levels of digital participation among the participants.

It was evident from the sample that a lack of experience in dealing with computers from earlier life stages impacted the participants' digital inclusion in later life. One participant said:

> *I wasn't really brought up with computers or have had any training in them. I didn't use them in my career at all.* (Hugh, aged 79)

One participant used an analogy to highlight the importance of lifetime accumulation, mainly through education and working, in determining the scope of computer use:

> *It's a bit like how you post a letter…That is so basic, but you would learn that at school…whatever you're learning now is built on what you've learnt over years and years…So what happens if I learn all that then and then I'm not working, I'm not using those skills again. I'll forget that, won't I, because I've not developed that over the years.* (Mary, aged 72)

The participants were born between the mid-1930s and the mid-1950s. It was not until the 70s that the first generation of personal computers was introduced to the public. One participant recalled:

> *I finished when I was 48, computers were just sort of coming in really, the big beast, big BBC mainframe things.* (Hugh, aged 79)

Since then, computer technology has gone through rapid changes, and what computers can do has grown dramatically.

When asked about the barriers that they encountered, the participants frequently mentioned how a lack of general understanding of computers constrained their use. For older people like Hugh, reduced cognition made it even harder for them to take a leap in gaining a comprehensive understanding of the digital devices that had become much more complicated than their precedents, such as the "*BBC mainframe*". One participant who was computer savvy attributed her success to an accumulation of computer knowledge and skills over the years:

> *I suppose it's built up more gradually than somebody all of a sudden, at the age of, say, 60, having to start to use technology that there is at the moment, because there's so many more things that a smart phone or a laptop can do. There's so much more to learn, whereas, you know, at least it was sort of quite gradual, from just putting a disk into a slot and having some little silly programme.* (Trudy, aged 73)

A lack of digitalisation in the workplace was another historical reason that had an impact on digital inclusivity. This was also reflected in earlier discussions on socioeconomic factors. Due to the specific socio-technical context at that time, a lack of access to computers at work was universal, regardless of individual intelligence (Friemel, 2016). A small proportion of the participants could use computers in their work, which gave them an advantage to gain skills and develop their "feel for the game" of computer use. One participant compared her computer capacity and competence with that of her neighbour, who was at an older-old age:

> *…he's a very clever guy, he's a maths guy, he's a everything guy, but he's 75, he's never had to use it in his job, so he's never-, he's struggled, to kind of do the basics. "Oooh, what's happened?" You know, the address has slipped somewhere, and he can't even do basic things that I can do. But that's 'cause I'd had to do it at work.* (Eileen, aged 66)

In addition to illustrating a gap in computer use between the younger-old and the older-old, many participants compared their generations with the younger generation in terms of digital environment and opportunity:

> *…there's been a massive shift for our generation in terms of technology being introduced. The next generation won't have this 'cause they're already-, three year olds can do…they know how to change from Mickey Mouse to something else, don't they?* (Mary, aged 72)

> *I've got two grandchildren and they're forever on the phones…but they've been brought up with it…and for us it's only in later life.* (George, aged 81)

> *See, we never had anything like that, there weren't any computers or anything when we were learning at school. For them now, they can switch on the television, we didn't have televisions or anything like that…things have moved so quickly in our lifetime.* (Lucy, aged 72)

Their observations and comments highlighted the widely recognised 'grey digital divide' (A. Morris et al., 2007) under the fast-changing climate of the surrounding socio-technical system. Thus, their digital participation or the lack of it was influenced by their own life trajectory and the trajectory of technological and social developments.

Individual characteristics and personal traits such as one's personality, habit or disposition were also frequently mentioned by the participants to elucidate the sources of momentum that drove them forward. Perseverance appeared as a common quality and a rule for success among the participants that were more inclined to keep learning:

> *…if you don't know the keyboard it takes you ages, isn't it, to do things. <u>But I've got there in the end</u>. Nothing comes easy, really.* (Valerie, aged 75)

> *…I forced myself in. I did. Well, that's the secret. Not to give up. I'm struggling for dear life on this, but I'm not giving up. It is hard. I'd go home at times, it were bloomin' hard, but that's where you have to persevere, and keep on and keep on. If you find anything in life gets hard, just grit your teeth.* (Sylvia, aged 78)

Some participants' dispositions that developed during their early life persisted along their life journey. This gave underlying reasons for their aversions towards certain online activities, such as managing money online. As Hugh disclosed, being cautious was not just a habit on financial management but a gained disposition that framed his mode of thinking:

> *I'm very cautious on all these things. I think I was brought up like that. I mean, [we] didn't have any money, and it made you very cautious about money in all respects…and that's always stayed with me…And it's like so many things, I won't take changes. I'd be wanting everything nailed down and no chance of this wrong or that wrong, and then I would cautiously go ahead.* (Hugh, aged 79)

Thus, this disposition of risk-aversion dictated his behaviour pattern on the Internet and in life in general:

> *Someone once said to me, "You're an analogue person in the digital world". If it [the Internet] could give me 100 percent like, "Yes, it cannot be breached," yes, I would, I'd go with the flow, but I'm always looking what's happened, blimey, that's not quite safe yet, you know. I don't take risks. I've never taken risks. I'm not a risktaker…which is probably why my wife does more on her iPad than I do on my tablet.* (Hugh, aged 79)

This tendency of thinking and behaving also continuously developed under the influence of older people' surroundings. As Bourdieu (2005) theorised, this acquired disposition formed one's *habitus*, a "structuring structure" that human agents like older people follow to organise their daily activities (disposition) and adapt to the broader social world that they dwell (strategy) (Tan & Chan, 2018). This was observed by Julia, who was also a peer tutor/volunteer. She commented on many of her learners' reluctance of using online banking services despite her attempts on widening their digital participation:

> *Well, I've tried, but, you know, they're very set in their ways, and they see things on TV about people being scammed.* (Julia, aged 73)

Indeed, many participants mentioned the Internet fraud cases that appeared in the news from time to time, the scams that caught someone off guard in their social network, and their own near-miss experiences. These negative experiences reinforced older people's perceptions towards 'risky' online practices and shaped their overall online strategy.

Each participant was different; they had their own personalities, personal history, and habitus. They thus developed their own taste, hobbies, value system, personal belief, and lifestyle. Many participants started their informal learning and the use of the Internet based on their personal interest (see Harold and Andrew) and carried on with the support of their own philosophy of learning (see Harold and Patricia). For example:

> *…basically, mostly to do with the media. I'm not into all that email and stuff like that…I don't use it every day, but I do dabble, I mess about. That's how you learn, ain't it? He [the tutor] told me that, "Don't be frightened of pressing a few buttons," you know what I mean?* (Harold, aged 71)

> *I love astronomy and I can find a lot out on my computer about that…I found by trial and error.* (Andrew, aged 78)

> *I found and I do believe in this is came from my theory when I did my postgraduate diploma in continuing education, you don't learn as well if you're very tense, unrelaxed. So I've learnt if can't do what I want to do, I sort of close it down and I go and have a walk.* (Patricia, aged 84)

In addition, there emerged this sense of shared values or beliefs on learning and the adoption of new technology/new things from the interviews. They had a firm belief in the value of lifelong learning (see Quote 1), but in the meantime, they seemed to be in a 'forced-choice dilemma' of accepting the prevalence of digital technologies (see Quote 2).

To some extent, it reflected the participants' struggle as their influence and value in society became marginalised (see Quote 3) and their effort to re-position themselves for social acceptance (see Quotes 4 and 5).

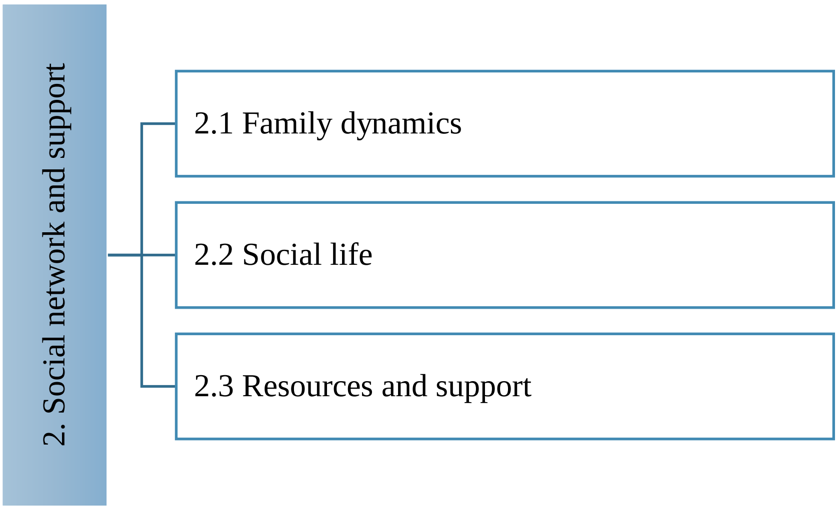
> **Quote 1**: *Learning is one of the great joys of life, and it enhances the quality of life. It has a spill-over effect of so much in life, it's very important.* (Andrew, aged 78)
>
> **Quote 2**: *I know more and more it's going online, I know that, and you've got to go along with it. Technology's inevitable and you can either try and live with it and go along with it, which is what we do, but we don't go in head and shoulders. We do what we need to do, and we have the reservations.* (Hugh, aged 79)
>
> **Quote 3**: *I spent quite a few years learning skills that are now, like museum pieces, typesetting, hand-lettering, things like that. They have no value in the modern world, do they? Of course, it has a value, all skill has a value, doesn't matter what it is. What I meant is, it isn't valued, by the modern world.* (Joan, aged 69)
>
> **Quote 4**: *I've semi-moved with the times, but I still try and keep the traditions. It's only if I have to do something without a face-to-face person that I can deal with, so that's my way of thinking.* (Frank, aged 75)

These values and beliefs affected older people's digital participation and how they used informal learning opportunities. Comparing to the sociodemographic factors, the historical and cultural factors made less appearance in the existing literature concerning older people's digital divide. However, they appeared to be the factors that had a far-reaching impact on the shape of digital life the participants had. This will be further discussed in theme 6 "Ageing in the digital society".

5.6.3 Social network and support

Theme 2 is concerned with influences from the participants' social and support network. It consists of three subthemes. They are shown in Figure 5-6 below.

Figure 5-6 Sub-themes (second level) under Theme 2 *Social network support*



Echoing the findings from the quantitative study, the interviews revealed that older people's informal learning and digital engagement were influenced by their social relations and, in the meanwhile, practised for social purposes. They are discussed in detail in the subsections that follow.

5.6.3.1 Family dynamics

The home appeared as one of the main sites for older people's daily practices that involved the use of computers and the Internet, especially for those who owned a desktop. The home was also mentioned as a private informal learning setting where some of the participants picked up skills from their more digital-savvy family members. Although how the participants used and learned about computers at home were very different and closely related to their living arrangement. Those participants who lived alone often spoke of a lack of immediate support at home when they stumbled upon troubles they could not fix.

> *There's always something happens-, and I can't figure that out it. Cause, I mean, it would be lovely if I had [tutor] sat beside of me at home.* (James, aged 71)

Those who lived with their spouses/partners did not necessarily get support at home as they often do not share their devices but rather had their dedicated computers/tablets. This had both positive and negative impacts on their digital engagement: on one hand, they could complement each other's skillset so that together they were better digitally included. On the other hand, because they used their spouse/partner as a proxy user in certain ways, they lost their motivation to learn how to do these things independently. Moreover, because they each used different devices, there was still a lack of help at home when their own devices challenged them. Informal learning sessions, therefore, were sought after by these participants. For instance, one participant's story may have explained why she routinely attended an iPad learning session in the community:

> *We got a laptop at home but, I don't really use it. It's my husband that uses the laptop, which again it, it limits me…I can't print out with my iPad then I send emails to my husband's account who uses the laptop. He loads it on and then prints out the ticket for me. He's in charge of that bit.* (Beatrix, aged 65)

Using a proxy user may have given older people temporary advantages from the Internet; it would also put them in trouble once this relationship was no longer sustained. Referring to the quantitative study, some participants went to the LMW courses because of a loss of proxy Internet users. One participant in this study further illustrated:

> *…you know like in a household, if you have a couple, very often one person takes the bills over so the other person, unless they're doing it at work, gets left behind, because it's easier to say, "You do it," than learn…but my husband died and that put me in a different position, because I was stuck then with not knowing…*(Mary, aged 72)

Most of the participants did not live with their children or grandchildren. Therefore, although they could still ask their younger family member how to do/fix things, there was always a lag in time:

They don't live near enough. They live about five or six miles away, so it's not that easy. (George, aged 81)

An implication of this was that these participants would turn away from the computers before either their children or their tutors came to help:

I'll say to him, "Hey [son], there's such a thing-". He said, "I don't know what you're doing because I'm in [City 1] and you're in [City 2]." But there's something I couldn't get in. So he said, "Wait, I'll do it when I come." Well, when he come, there was a virus on it. He sorted it out. (Irene, aged 82)

The participants who lived with their younger family members had undoubtedly benefited from immediate help at home. But for some of them, it turned into a similar dilemma of proxy Internet use. Carole made a critical review on the support she received from her son and the possibility of becoming disengaged like one of her friends once the support is gone:

He [son]'ll kind of explain it and say, "Give me your phone." I say, "No, no, no, I'm not just giving you my phone, can you show me how to do it?" But no, he doesn't, he just does it. So, that makes me a bit dependent on him as my kind of technician…Some day I might turn into somebody like [male name]. Because he hasn't got [son], I've got [son] there all the time. So, I can ask him. If [son] wasn't there, I might be a [male name] and think, "Urgh, I can't-, it's not working, just put it away in a cupboard." (Carole, aged 74)

Overall, living with someone seemed to have brought more possibilities for the participants to get immediate help and keep them online. However, depending on the family dynamics, this help may not be transformed into the opportunities to gain skill and knowledge, but rather some quick fixes. The sustainability of this support system is crucial to the participants' continued digital engagement.

5.6.3.2 Social life

The social life of the participants was a frequently mentioned topic during the interviews. For most participants, social life impacted their online footprint and the informal learning they engaged with. This was mainly due to different social networks and types of social activities they were a part of. The extensiveness and the dynamics of a participant's social network seemed to have a direct bearing on how the participant used the Internet, especially for communications and social media purposes. For example, 83-year-old Clara had a reduced social network as she aged. She mainly used the Internet for emailing her daughter and was not interested in using social media such as Facebook due to a lack of meaning for socialising. Her social activities, such as going to the church, did not require the use of the Internet. She explained:

> *…most of the people I go out with haven't got the Internet. We are just old-fashioned people [laughs]. We ring each other up. I have Facebook, I don't really use it. There's not a lot of, you see, I won't put friends on…I've only got [family name]. I mean, they are always giving you a list of friends, and I don't know half of these people, and I don't want to get in touch with people I don't know. So, having said that, I don't really use it. I sort of got it, but it's just stop.* (Clara, aged 83)

For participants like Clara, their use of the Internet revolved around a small scope overlapping with their daily needs, such as basic online information search or online entertainment.

In comparison, there were some participants who had a dynamic social network and tended to engage in a wider range of social activities such as going to the theatres, travelling with friends, and going to the football match. As a result, they were exposed to more use scenarios of the Internet, such as registering attendance, checking train times, arranging travel, and buying tickets. Attending these social events and engaging in social activities in general also provided a ground for communication and social network apps such as WhatsApp and Facebook to maintain social relationships. One example was from 65-year-old Beatrix:

> *My phone's always with me and I use it for the basic stuff, making phone call, I'll text, WhatsApp, facetime. My iPad, I use it [for] Facebook, I use it for shopping, searching Google, I use it for…[pause]…so much, so much. I'd be lost without it [tone up]! Train times, you know when I'm out and about, I use my various apps, I go walking in Yorkshire with my friends, google maps, it's just…an essential part.* (Beatrix, aged 65)

It appeared that the pattern for most of the participants' social life and their corresponding use of the Internet aligned with the age groups that Clara and Beatrix each represented. This also accords with a general understanding that as older people grew older, their social connectedness and social activities were likely to reduce due to an effect of ageing (Campos et al., 2016). As one participant stated:

> *A lot of my generation have gone upstairs somewhere, you know, and it's very difficult. I was the youngest of the lot. I do have a friend, he's 83, he does have a computer, but he never used it.* (Andrew, aged 78)

However, there were also some exceptions where the participants in their late 70s and 80s maintained a dynamic and Internet-engaging social network through volunteering and joining various social groups. In contrast, some others below the age of 70 were more active in social activities that required less Internet use. Although they also made rather limited use of the Internet, the latter type of participants was different from participants like Clara and Andrew, who were relatively socially isolated. They appeared to have lived a vibrant social life:

> *I have used it [the Internet], as I say I've started a yoga class and I used it to Google yoga and looked for classes in the area. But other than that, not really, no. 'Cause, you know, I drive, I've got a large circle of friends. I'm in several groups, and I can have access to all of that without the computer really.* (Alice, aged 69)

Therefore, many of the benefits of the Internet to reduce social loneliness were not attractive to them. In fact, even those participants like Beatrix, who were relatively socially active online, shared the sentiment of Alice's below. Online activities, as they viewed, were subordinate to the 'real' social life that kept them active and benefited their wellbeing. This 'us' (still being healthy and active) versus 'them' (house-bound or socially isolated) thinking, in a way, reflected their perception of the role that the Internet plays in different life stages. This justified the participants' reservations in Internet use, although at varying levels, were because they did not think they were 'there' yet.

> *But I know some people if, they're perhaps disabled or a bit lonely, that they can use it to meet other people online and friends or, play games or whatever. But I'm, thank god at the moment, not at that stage.* (Alice, aged 69)

Participants' accounts disclosed a reciprocal relationship between vibrant community life and continuous informal digital skills learning engagement. Most of the informal learning sessions the participants were drawn to were community-based. The informal learning was then maintained through the routinisation of socialising at the learning sessions. One participant illustrated:

> *We go every week, every Monday, and we all look forward to it. And if we're not going, we ring one another up and say, "Won't be there next week, I'm doing such-and-such a thing," And we get the worksheets for the other people so that they can keep up.* (Lucy, aged 72)

Thus, the convergence of community life and informal learning had kept many participants like Lucy forward on the path of sustained digital engagement.

5.6.3.3 Resources and support

The participants from different municipals and different informal learning sessions had uneven access to the broader social support on Internet adoption and use. While the participants like Lucy mentioned above had benefited from regular community-based informal learning sessions, there were other participants like Joan who struggled to find support:

> *… I applied to go on a course, and I was turned down for it, because I was too old, or I wasn't in work, or something anyway. It was just a community thing. I think they were prioritising people for whom it perhaps would be a bit more useful than me. Work, I think, basically. So, I never got to do it, so I never really-, nobody's ever shown me or taught me about it.* (Joan, aged 69)

This echoed the previous research finding that older people generally had less access to resources and support on digital skills training as most courses were designed for the digital economy (Ramondt et al., 2013). In Joan's case, a lack of training support inevitably inhibited her digital participation. Another participant from the same municipality also complained about the reduced resources in the area:

No, I find it very difficult to get anywhere. I mean, there's no evening classes anymore, not for anything, they've just stopped everything. I want to learn about computers, but [tutor name]'s my only contact at present and it's not enough. (Andrew, aged 78)

Some participants mentioned a lack of general support from the wider society and that they were assumed to know how to go online:

All these companies just think everybody knows-, you know, or you know someone that'll go online, and it's not like that. They just think that everyone knows about these type of equipment [iPad]. (Simon, aged 69)

Simon's account represented the general view among the participants that as the digital technologies advanced and the society became further digitalised, their needs for ongoing and tailored social support on digital inclusion were neglected and misinterpreted by the technology companies, the authorities, the wider society, and the younger generation:

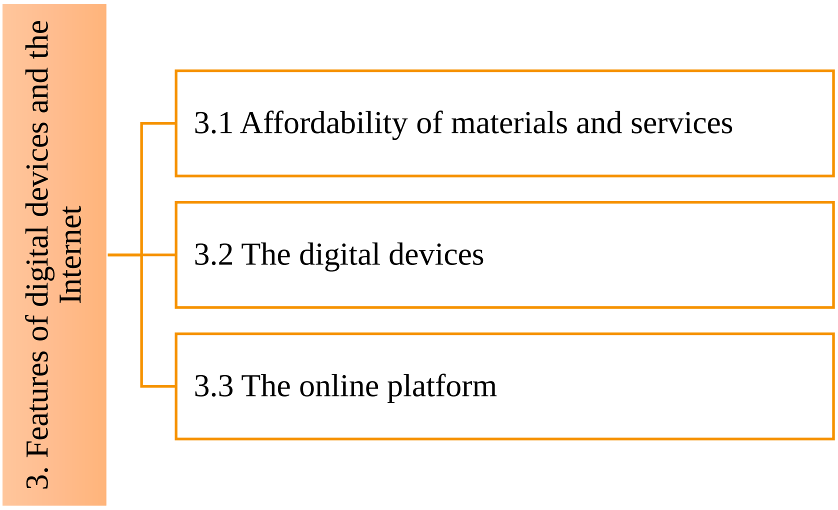
Nowadays that everybody is computer literate or-, and there's not an awful lot of help, I don't think, that's advertised or made easily accessible, erm, onto courses. (Elaine, aged 70)

The informal learning opportunities at home or community contexts became an indispensable part of the participants' digital and social life, like a larger wheel that made the little wheels turn. They were, however, as many participants voiced, scarce resources that were unevenly distributed.

5.6.4 Features of digital devices and the Internet

This section discusses the recurring theme concerning the technological factors that influenced the participants' digital engagement. There were three sub-themes identified. They are displayed in Figure 5-7 below. These three aspects organise the discussion of theme 2.

Figure 5-7 Sub-themes (second level) under Theme 3 *Features of digital devices and the Internet*



5.6.4.1 Affordability of materials and services

As existing literature on the digital divide pointed out, digital-related activities are built on access to a wide range of materials, including hardware, software, contents, peripherals, infrastructure and even services (Van Deursen & Van Dijk, 2019; Warschauer, 2002). The cost of these materials is an essential factor that influences the acquisition of digital devices. This was reflected in the UTAUT2 model as the construct *price value* that influences the intention for technology use (Venkatesh et al., 2012). The majority of the participants in this study were already adopters of computers and the Internet. Thus, the challenges they faced had shifted to the long-term maintenance of the materials and services that enabled them to go online. Depending on their personal financial situation discussed in Section 5.6.2.2, their individual technology maintenance pressure varied. Those participants with a lower level of socioeconomic status seemed to struggle with the very 'basic' materials such as the Internet connection at home:

> *The researcher asked: "So because you don't have connection at home, what do you do with the iPad when you are at home?". The participant answered: "Er, basically switch it on and off and that's it [laughs]".* (Simon, aged 69)

A lack of connection at home significantly impacted Simon's 'rhythm' of Internet use and learning. Simon was the only participant that did not own a personal computer device. The iPad he used came from a loan scheme that the local council promoted to widen digital inclusion. Although Simon could take the iPad home, it was in a way meaningless as he lacked other essential ingredients for the realisation of his intended online engagement. Simon's experience confirmed the long-established understanding that the simple provision of access does not translate to the actual use of the devices (Warschauer, 2002). In addition, it further highlighted the fact that although a significant amount of online content is free to access, the Internet itself came at a cost. The affordability of the Internet infrastructure still largely constrained some older people's current digital participation, let alone the long-term digital engagement.

Although they were financially better off than Simon, many of the participants also broadly faced affordability issues concerning their sustained Internet use, such as repairing broken devices, replacing old devices, acquiring peripherals, and paying for software, online content, and services. The affordability is a relative concept and perhaps can be better explained by the UTAUT2 construct *price value*. What appeared unanimous among the participants was a sensitivity on cost and personal/family financial arrangement. This was mainly because of the life stage that the participants were in. Later life and retirement imply reduced income expectations and increased potential expenses. Thus, being cost-sensitive became an acquired disposition for a sense of security during the ageing process. The participants mentioned how they traded off between the benefits from paying for the materials and the potential risks to their (financial) security, in other words, assessing the price value of the materials. As the participants revealed, this trade-off was dominated by their perception of the usefulness of digital technologies for ageing well and reflected in their Internet use behaviours.

> *I don't subscribe to any of these [digital media], same as that Spotify, I'm getting it free. I don't want to subscribe, I can't afford to, you know. Paying rent, you've got to pay rent for so much. So I don't do that.* (Harold, aged 71)

Many of the participants owned more than one device at home. Some of these devices were handed down from their younger family members and thus, were quite out-of-date. Those participants faced a common dilemma in whether to invest in new devices while the current ones still functioned, albeit being slow or incompatible with other devices at home. Moreover, buying new devices meant to go through the learning curve again with the transferability of those hard-earned skills hanging in the balance. This depreciated the price value of the new material:

> *… perhaps I need to change my phone, to bring it in line with my iPad so that the two of them work together. But again, I'm frightened of spending a lot of money if I can't get them to work, you know.* (Alice, aged 69)

Similarly, many participants tended to be very cost sensitive to the phone data. They often limited their use of the Internet on their smartphones when there was no free Wi-Fi. They mainly carried out online activities on their other bigger and less portable devices (e.g., computers and tablets) at home. Because of this, their use of the Internet was often limited by time and space:

> *Roy: We're just on pay-as-you-go, so, we look out for the Internet places. Harriet: Yeah, free Wi-Fi, nip in a McDonalds.* (Roy, aged 73, and Harriet, aged 68)

Some participants explained that the cost of additional materials (e.g., phone data) was also matched against their needs and what they already had (e.g., connection at home):

> *Fred: We just got that the basic funcs and everything, so… does what we need, really. It's more or less ringing people up and take a photograph isn't it, that what we need our phones for. And we don't book anything on the phone, do we? We are on the computer, aren't we?*
> *Valerie: It's enough for us.*
> *Fred: It's enough…It <u>does</u> what we want it to do, to phone people and to take pictures.* (Fred, aged 73, and Valerie, aged 75)

Similarly, James explained:

> *I don't want to spend a lot of money on a phone that I don't use. I've got the Internet at home.* (James, aged 71)

Thus, for the participants connected to the Internet at home through traditional computers, the adoption and use of the smartphone seemed to be less attractive because it implied additional cost on phone data (and on the smartphone itself). The advantages of being connected anytime, anywhere, also did not suit their needs and how they used the Internet.

Trading-off between the cost and benefits of the digital materials were not always done in the 'box'. The participants often thought out of the box of digital materials. They focused on the affordability of the daily life tasks per se, that is, to compare the cost of digital materials with its offline alternatives. For example, Harriet and Roy, a married couple, pointed out how paying for the Wi-Fi saved money for their daily communication with family:

> *Harriet: I use WhatsApp now. I spend an hour on the phone to me sister, every day.*
> *Roy: Yeah, 'cause it cost us nothing now, does it [laughs]?*
> *Harriet: Yeah. Well, we obviously pay for the Wi-Fi, don't you, but-, yeah.*
> *Roy: But compared with like, you know, phoning-, phoning up like years ago [laughs], you know, it cost a fortune.* (Harriet, aged 68, and Roy, aged 73)

For Harriet and Roy, reduced cost on communication helped them to keep in contact with family members. For some other participants, talking on the phone (through Internet-connected apps) in length without worrying about the bill helped tackle their loneliness. This increased price value of being online, in turn, spurred the participants' on to discover what the Internet had to offer. On the whole, the affordability of the materials and services directly impacted the participants' involvement in online activities. Although being a product feature of the materials, the issue associated with affordability often reflected older people's circumstances in later life.

5.6.4.2 The digital devices

The digital devices' designs, usability, and compatibility were frequently mentioned by the participants as the factors that either facilitated or inhibited their digital engagement. The impacts that the design features of the digital devices inflicted on the use experience were closely related to the participants' own health conditions (see Section 5.6.2.1). For example, small-sized screens of the smartphones were regarded as "fiddly" and not user-friendly for the participants with decreased hand dexterity or reduced eyesight. Some participants found the operational logic of the computers and the peripherals challenging to understand and to master:

> *I find it very difficult actually to understand the multiplicity of the keys…Sometimes when I write an email, suddenly, the whole thing disappears. I thought, "What have*

I touched?" As you know, all keys on the computer are multi-functional. I go for the draft, I found it. So, I found out where it's going and I don't know why it goes, but it does. (Andrew, aged 78)

The issue that Andrew encountered also happened to several other participants. It was found prevalent among the participants that they were easily frustrated over the operations on input devices such as a keyboard, a mouse, or a touchscreen. The reasons behind this were related to the conceptual knowledge or the understanding of how things work and concerned with physical skills (the practical know-how). The acquisition of bodily know-how requires repeated practice to improve hand-eye coordination. This can be challenging for older people because of their less frequent use of computers and declining physical, sensory, and perceptual functions due to ageing. As many participants repeatedly stated, it was frustrating and error-prone, which then triggered a chain of negative emotions such as fear, anxiety, self-doubt, impatient, and a sense of lack of control. As a result, a lack of the most fundamental operational skills (Van Deursen & Van Dijk, 2015) to navigate through the basic configurations of the Internet-enabling devices turned out to have a far-reaching impact on the participants' use of the Internet (e.g., fear of putting the wrong numbers in and a feeling of lack of control inhibited their use of online banking). One participant who was a peer tutor at an informal learning centre spoke from her teaching experience:

I say, "Well, touch it [the screen]." You know, and she touches it and the keyboard comes up, you see. But I think when she's doing it on her own, she might touch it too hard or not quite in the right place or-, so then she says it's not working. You see they've no patience, a lot of people haven't got the patience. She's the only one I know who will use it [online banking], but only to look at a statement. (Julia, aged 73)

Some of the design features intended for the benefit of the users were found to be disruptive and upsetting to some participants. For example, password, a default configuration to many devices and online contents for the sake of data security, was frequently mentioned by the participants as a barrier to their intended use of the devices and the Internet:

> *There's a bin in my life of passwords. Cause everything you want to buy, it always get a password to it…this is what frustrates me.* (Patricia, aged 84)

> *… and the password, you know, it's a mixture of different names and addresses and things, nicknames and that. But sometimes you can have so many passwords. We have some of them written down sometime because you have so many for different things, you can't really just use one.* (Fred, aged 73)

> *Creating a password can be labour intensive, you know, 'cause you're-, it's suggested that you don't pick anything simple, you make it as complicated as you can. So from that point of view I think it's labour intensive.* (Elaine, aged 70)

In addition to the password, computer jargon such as 'mouse', 'airdrop', 'Bluetooth' and 'cookie' can be very confusing to some of the beginners:

> *…air drop or something. I don't understand the vocabulary linked to computers half the time.* (Alice, aged 69)

At a deeper level, the computer-related terminologies represented a whole new set of (digital) literacy and culture that the participants were unfamiliar with. Some participants even felt that their traditional literacy skills and established worldview were challenged and that their individual intelligence under attack. For example,

> *I'll tell you what confuses me <u>the most</u>, and that is the terminology. I don't understand what they mean by things…I'm <u>not</u> a stupid person, it's just that the terminology seems to overlap with words I already know, that mean something quite different. I know what a cookie is, but what is it on the computer? Downloading? What the hell do they mean downloading?* (Joan, aged 69)

Joan described them as the things that never entered her "cosmology", that they were not part of her life. She thus became very resistant to the digitalisation underway in the society to the extent that she just claimed she did not know what a computer was whenever she was recommended to check information online (e.g., at the banks, stores, social events). Joan's position was, of course, caused by the interplay of many other factors, such as a lack of access to informal learning (see Section 5.6.3.3). But undeniably, the features of the devices and the new set of literacy skills, social norms, and culture that these features mirrored were what sent Joan to a different path of digital participation in the beginning.

It appeared that computer terminologies not only posed challenges at the conceptual level (i.e., understanding "what" it is about) but also at the operational level (i.e., knowing "how" things could be done). One participant pointed to the confusion at the operational level caused by the computer jargon:

> *It isn't always what you understand…you had to press Start to close down. Well, why press start when you want to close down? The vocabulary is being very difficult for older people to understand what it means on the computer.* (Patricia, aged 84)

Not all design features of the devices were inhibitors to Internet use. As one participant illustrated, the smart functions such as spelling prediction and word association on the phone were facilitators to her daily use of the Internet, especially for messaging and online information searching:

> *One of the things I like about the phone and I think it's really good for this [using Google], is the predicted text. It just comes up and that's a great help. Also, on a Smartphone-, the predicted messaging.* (Eileen, aged 66)

Another frequently mentioned theme was the diversity of digital devices and operating systems on the market. Although many of the design features have become standardised, such as the layout of keyboards, there still exist distinctions between different types of devices and across different brands. The participants felt unsettling when they use and learn a certain type of device/operating system (e.g., usability, see Quote 1), when they migrate from one type of device to another (e.g., transferability, see Quote 2), or when they try to work with multiple devices (e.g., compatibility, see Quote 3). For example:

> **Quote 1***: It was Windows 8.1, and I had difficulty saving things, with all sorts of different ways of saving and I didn't understand it at all.* (Patricia, aged 84, talking on usability)

Quote 2: *… if we had to have a new laptop, it would probably be a year or two before I could discover how to download them [digital paintings] again onto a different-, with a different format.* (Joan, aged 69, talking on transferability)

Quote 3: *I'm using three different devices, none of which talk to each other. So I've got a laptop, that's got Windows 10 on it, that I've just had installed and I can't use it. That's Samsung, my phone, is different, and my iPad is Apple. So none of them relate to each other.* (Alice, aged 69, talking on compatibility)

These accounts illustrated the prevalence and persistence of the entry barriers to (sustained) digital participation concerning operational skills. As have also pointed out by Damodaran and Olphert (Damodaran & Olphert, 2010), one of the main barriers to digital engagement was the steep learning curve older people had to go through before they can navigate themselves around the instruments with confidence. As they noted, older people then tended to adopt a "rote learning" strategy that allowed them to memorise the specific sequences of the operations for the devices they were using. This "rote learning" approach also emerged from the participants' accounts and will be further discussed in Section 5.6.8.4. Here, this learning approach explained the usability, transferability, and compatibility of the digital devices that the participants commonly reported.

Like Alice, many participants had more than one type of device gradually acquired at different times. Each device had a unique attraction to them. The use of different devices appeared to have significantly affected the ways they were connected to the Internet. The participants who anchored on the desktops tended to use the Internet less frequently, narrowly but more purposeful and pragmatic. They often spoke of the big screen as one of the main benefits of using a desktop:

I'd rather be sat down with, you know-, get the big screen up and you get bigger pictures and everything. And I suppose if that were ever broken in an emergency I might try and use the phone. (Harold, aged 71)

The main drawback of a desktop was the lack of mobility. The physical location of a desktop circumscribed the digital-related practices. The participants who preferred the desktops often used them for limited and routinised tasks such as checking information online, sending and receiving emails, and browsing online media. For these participants, the improvement in the *materials* (e.g., portable devices such as tablets and smartphone) not only brought less *meaning* to them because they did not need to use the Internet more frequently and more spontaneously, but also brought extra requirements on stepping up their *competence* so that to be able to utilise the new device. This gave them enough reason to stick with the desktops:

> *She [her daughter] just told me how to put me code in [on the iPad]. <u>That was it</u> you see. I don't use it [the iPad] much. It just sends me going upstairs [to the desktop] sometimes. I mean I felt as though I knew enough to do upstairs… there's not really much I would want on there [the iPad].* (Clara, aged 83)

The laptops, tablets, and smartphones, as the participants found, were more portable and flexible for more spontaneous use of the Internet. The participants who used a laptop often spoke of the similarity it had with the desktop computers, such as a physical keyboard and the compatibility with a mouse. The laptop thus had a unique advantage: the hard-earned skills from using a desktop was relatively easier to transfer to the use of a laptop than a tablet or a smartphone. For example, Lucy had previous experience on desktops at work and found it easier to centre her digital-related daily practices on a laptop:

> *It wasn't easy at first to pick up on the tablet, no, it was hopeless. I think now as well, because it was so frustrating with that, I didn't use it at all, I just used to put it in me bag and that was it, and just use the laptop…and the laptop's fine for everyday things that I can just come down in the morning, look if I've got any emails.* (Lucy, aged 72)

By contrast, many participants celebrated their adoption of a tablet or a smartphone:

> *I don't use my laptop any more now, at all. I just totally use my iPad.* (Alice, aged 69)

These participants appeared to be more active on the Internet for communication and information seeking purposes. The portability and connectivity of tablets and smartphones suited their needs well. One participant gave an example of spontaneous use of the banking app on a smartphone on the go:

So I've just gone on my phone. I've put my bank-, er, I've got online at home, but it's so much easier on the phone… like walking round here, thinking, "Can I afford that new…whatever", and I can just [check right away]. (Elaine, aged 70)

To many participants, using tablets and smartphones lowered the entry barriers that they experienced with the laptops. The tablets and smartphones were ready for use anytime and easy to 'wake-up', whereas the use of a laptop required them to go through a much longer process to get it ready:

You have to go through so much [on the laptop], put in your password, do this, do that, it gets on your nerves [laughs]. So, your phones-, it's more convenient. I find meself not using it [the laptop] often enough because the phone is so easy, it's so convenient, you can take it to bed and everything, you sort of tend to neglect these [old laptops]. (Eileen, aged 66)

This was also reflected in Clara's account on how she tried to avoid the procedures of turning on a computer:

I sleep it <means to put the PC into sleep mode>, because if I start from scratch, it's a very very long time. (Clara, aged 83)

To some participants, the adoption of tablets and smartphones implied a better connection to the Internet that broke the constraints of space and time and a better connection with contemporary society. It made them feel that they were part of what was going on and thus not left behind:

… it's [the smartphone] sliding about and you've no control and you want buttons again to start with, and then of course, if somebody gave you a button phone, you'd think, "What, now?" (Carole, aged 74)

I mean everything now is touch screen, isn't it really. Part of -, so I mean I'll just keep with the tablets, as things now, the touchscreens, aren't they? (Valerie, aged 75)

And,

We went to the bank for something and she [the staff] said, "Oh, go on the computer," and there was a mouse and I'm like, oh-, I didn't know-, you know, [laughs]. I thought, "Ooh, what do I do with it," you know? I suppose you move on, don't you? I found the mouse like-, "Oh, God, this is old-fashioned". Never thought I'd hear meself say that [laughs]. (Harriet, aged 68)

For these participants, this enhanced sense of 'connectivity' further motivated them to stay online, keep up with the developments, and make the most of the Internet in their daily living.

5.6.4.3 The online platform

The participants had unanimously found the online content surprisingly rich and helpful. As described by one participant:

I didn't know that there were literally millions of sites throughout the world, and it's got quite amazing that you-, at your fingertips you can get in touch with Australia, 4,000 miles away. I scroll sometimes on the computer, it's absolutely incredible. You can go around the world sat in your house, it's amazing. (Andrew, aged 78)

Despite their varying levels of online activities, the participants demonstrated a solid intention to sustain their digital engagement because of the benefits they gained from their online participation. Discontinuing the Internet, to the participants, sounded like a mission impossible:

I'm not being without the internet now. (James, aged 71)

I'd feel lost without it [the smartphone]. (Mary, aged 72)

The participants still had to deal with various problems associated with their use of the devices and the Internet. Most of these issues were due to a lack of skill or self-efficacy like Mary stated:

So there's some things that we can do very well. And also it depends on how-, I mean, I love the internet. It's the actual [pause], pushing buttons…[that is the problem], and there is that fear… (Mary, aged 72)

However, the rich online content and the convenience that the Internet had brought to their daily living outweighed the difficulties they encountered. This was an important factor that kept the participants motivated to stay online. As James further explained:

> *I just carry on. I do sometimes run into a brick wall when I don't know what to do or something happens I don't understand…it did frustrate me at first. And it was so bad, I could pick it up and throw it through the window, but I kept my temper and I've learned a lot. I discovered that your computer can become a very good friend and I don't know what I'd do without it. My Pad and my computer are my helpers.* (Andrew, aged 78)

Many participants shared the same view and experience as Andrew's. This finding is at odds with what Schreurs et al. (Schreurs et al., 2017) reported in their study: older people tended to succumb to the cost and pressure on improving digital skills despite a recognition of the benefits from using the Internet. This may be because the participants in this study received a certain form of support for informal learning. In addition, it could be related to a (lack of) positive feedback gained from the actual experience of going online. In other words, older people who had an awareness of the benefits of the Internet but without any experience may be more similar to the type of older people reported by Schreurs et al. (Schreurs et al., 2017). According to Julia, a peer tutor from an informal learning centre, these types of participants could be those who were previously dependent on offline resources and were 'forced' to go online under the impact of digitalisation:

> *…the banks are shutting down, libraries are shutting down, shops are shutting down, you know, everything's now on the internet. Which I love, you know, but a lot of people don't. But they're being forced into it. So they realise that they need to learn it.* (Julia, aged 73)

While the rich online content facilitated sustained online participation, some online space features inhibited the breadth and diversity of the participants' digital engagement. The most frequently mentioned theme was online safety/online environment. The proliferation of online content had complicated the online environment. This put forward higher requirements on the Internet literacy of the participants to stay safe online.

As discussed in Section 5.6.2.1, due to declined cognitive abilities, older people found it difficult to adjust to the speed at which digital devices and the Internet interact. They frequently talked about the Internet being too fast for them:

> *One time I used to book a holiday on it, and by the time we got nearly the end of booking it, it turned out run out of time and to say "sorry, run out of time". So, I am getting a little bit faster now.* (Fred, aged 73)

It often led to a lack of confidence in dealing with sensitive information online. This sense of insecurity, then, became further exacerbated by a lack of understanding of how things are operated in the online environment (i.e., Internet literacy) and the lack of control over it:

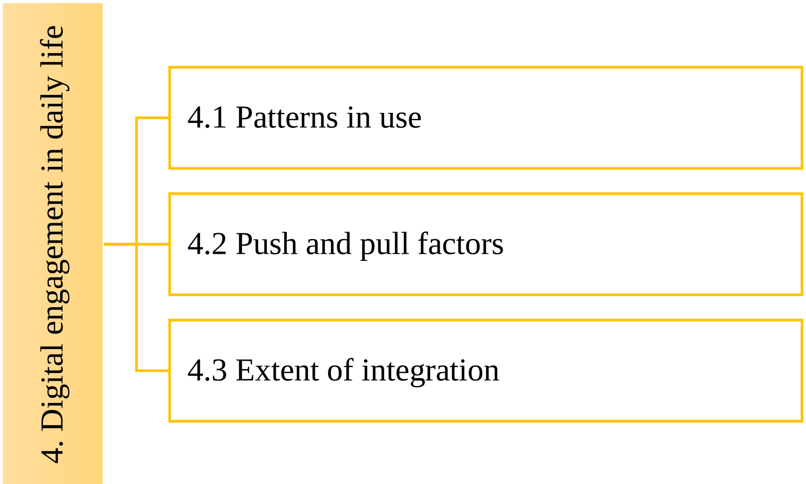
> *I wouldn't bank on the Internet, and I certainly wouldn't buy anything on the Internet. I think it would be foolish for me, because I'd be a prime candidate to get ripped off, because I don't understand, you know, the importance of things and, really I suppose the protocols of using such technology.* (Joan, aged 69)

Thus, Internet literacy was essential for the participants to understand, trust and use the Internet with confidence. As the online environment becomes more complex, training to improve the Internet literacy of older people should be promoted simultaneously.

5.6.5 Digital engagement in daily practices

The engagement of digital technologies in the context of day-to-day life was another recurring theme identified in the interview data. There were three sub-themes identified within this theme. They are shown in Figure 5-8 below.

Figure 5-8 Sub-themes (second level) under Theme 4 *Digital engagement in daily life*



When asked about their digital use and online participation, the participants did not merely talk about the 'digital' aspects but rather described how their daily practices gradually incorporated the elements of digital technologies and the Internet. This perspective on digital engagement revealed a hybrid model of online-offline practice that many participants adopted. This will be discussed in detail in the following sections.

5.6.5.1 Patterns in use

The extent to which the participants used the Internet varied from person to person. Some participants reported that they used the Internet frequently daily, while other participants indicated that they did not use the Internet every day. It was interesting to note that some participants who claimed to be in the latter group checked their emails daily. For example:

> *I don't go into it [the Internet] every day. I'll have a look every day on my laptop for emails.* (Frank, aged 75)

This in part aligned with the findings from previous studies that suggested emailing was one of the most frequently used computer services among older people (Choi & Dinitto, 2013a; Sayago & Blat, 2010). Frank's account, however, contradicted these studies in the concept of emailing as he disregarded it as a form of online activity. There existed such a division in the extant literature: while studies like that from Choi and Dinitto (2013a) and Sayago and Blat (2010) counted emailing as one of the primary forms of online activity, others juxtaposed emailing and Internet use (Gatto & Tak, 2008; Woodward et al., 2013). This division in literature seemed to be associated with their research scope, for example, the need to separate communication/emailing from general Internet use for information. It was not clear if Frank also made such a distinction subconsciously or simply due to a lack of understanding that the emailing services were also run on the Internet.

A lack of understanding of what the Internet is was not uncommon among the participants. For example, during the recruitment process, Eileen was first approached because she claimed she did not use the Internet. But she later took out a smartphone and started to consult Google for something that occurred during the conversation. She explained, "*Oh I use me Google. I don't use the Internet, I just use me Google, Professor Google.*"[22]. It implies that the adoption and use of the Internet among older people may not always be as clear as on the book and under the same banner of digital/Internet terminologies. With the accelerated integration of digital technologies and the Internet into all aspects of people's lives, the daily lives of older people have also been affected. This impact is sometimes not under the control of their subjective consciousness but imperceptibly. This was reflected in the examples of Frank and Eileen that part of their daily life has been digitalised and connected to *the* web, but their level (lack) of Internet literacy did not make them aware of this change. Clearly, these patterns of Internet use were cloaked and challenging to capture from quantitative surveys (or cause discrepancies in the data). Their accounts have pointed to examining their everyday practices for a more comprehensive understanding of how this pattern of digital engagement was built upon and integrated into the established daily practices.

On a slightly different track, Trudy was aware of her online engagement in terms of emailing:

> *Most of the stuff I do on the Internet, I wouldn't say it's part of my daily routine at all. I mean, I do get quite a lot of emails and I do check emails, but I wouldn't -, I certainly don't use the Internet for searching for anything every day.* (Trudy, aged 73)

[22] This is not an exact quote of her original words. The researcher restored the dialogue through her experience from the recruitment process and her fieldnotes.

Trudy's account, on the one hand, further confirmed the prevalence of email use among older people, and on the other hand, pointed out the lack of routinisation of other Internet-related activities in her daily life. Although they used the Internet frequently in certain aspects, many participants, like Trudy, maintained a limited use of the online resources and services. Many of them mainly used the Internet for email, news/general browsing and information seeking that required fewer digital skills. Meanwhile, adopting these online alternatives made less significant changes to how things were traditionally done before the time of the Internet but brought tangible benefits such as saving time, money, and legwork. Emailing, for example, was adopted as an online equivalent to the social practice of writing a letter. Thus, the participants tended to use the emails to contact their family and friends for non-urgent matters, with no expectation to receive an immediate reply. It was just like posting a letter and waiting for a reply to arrive in the old days. However, emailing became less effective and efficient when they needed a quicker reply or a more interactive conversation. In these cases, the participants tended to resort to a telephone call or an in-person visit. Clara gave an example of the scenarios of emailing (online) or telephoning (offline):

> *I know they [children] are working or something like that, I'll put something on [in the email], knowing they're going to pick the Internet…if it's something I tried to do and I couldn't [on the iPad]…I'd ring her [daughter] up and say "What do I do for this?" Well, you see, if I don't ring- , if I emailed her, I got to wait for an answer, whereas if she's at home at night, we can talk over the phone and work it out together, which is easier.* (Clara, aged 83)

Similarly, Hugh gave examples of when he found emailing was helpful and when it was not as efficient as talking over the phone:

> *I rang the chap who'd done the alarm and fitted it and I said, "Can you send me email, can you send me the bill?" So he did and then we printed it off on the laptop… our local town hall, you can get in touch with them very, very easily, with an email or a text, but they often don't reply, whereas if I talk to them on the phone I've got an answer.* (Hugh, aged 79)

This tactic of switching between online and offline channels for different daily tasks characterised their general pattern for Internet use, not just for email. For example, it was frequently mentioned by the participants that they would look up information such as telephone number, shop address, or product information on the Internet, and then go offline to get things done:

> *Google Good Deals and you get all the good-, I wouldn't buy, but I can see what they are. You know, the same as I was wanting shoes from Hotter's in [town name], so I Googled "Hotter's [town name]" and it came up and it showed me all the shoes they have. Things like that, you see, so then I went to [town name] and I got a pair [laughs].* (Irene, aged 82)

Thus, as many participants described, they used the Internet for simple things and followed the contents they could understand. In addition to the activities mentioned above, these simple online activities they referred to included civic participation, price comparison for car insurance, online media/online entertainment such as Youtube, holiday booking, and communication via apps such as Whatsapp and Skype. Like emailing and online information seeking, these online activities had their roots in existing practices in daily life. They required less investment in learning (the HCI and website layout are straightforward) and less effort/cost to carry out.

In comparison, online shopping, online banking, and social media were less commonly used by the participants. Online banking, in particular, were avoided by most of the participants. One participant's account illustrated this pattern of selective use of the Internet:

> *I do use the Internet for information purposes, lots and lots and lots. But that's about it. I've never shopped or anything like-, never bought anything…absolutely no way on earth would I put any of my bank details into a computer…So, I wouldn't bank on the internet.* (Joan, aged 69)

As have discussed in Section 5.6.4.3, the participants were wary about online scams and identity theft. Therefore, they did not go in head and shoulders because of the lack of understanding of how things worked on the Internet, especially when it concerned their online safety:

I needed it to be sure of what I was doing with the computer, before I- , did banking. (Patricia, aged 84)

Comparing to the Internet use for information purposes, online banking not only had higher requirements on Internet literacy and proficiency but also bore more financial risks to the life that the participants had established:

We've taken a long time to earn our money. And now we've got some money, we don't want to lose it by doing something wrong, you know. So we just rather not do it [online banking]. We'll stick to the old way. (Valerie, aged 75)

Under a similar rationale, the participants made limited and selective use of online health information and health management services. Although being aware of the abundant resources available online, the participants often questioned the credibility of information online. They were scared of being the victims of misinformation and disinformation. Then, similar to the approach adopted for online banking, they tended to trust and rely on the traditional offline services. Their accounts pointed to information discernment (or information evaluation), a constituent of traditional information literacy as a critical factor influencing their online health behaviour. The participants appeared to be sceptical of online health information and more inclined to trust health professionals like their GPs because such information sources required less cognitive effort to make judgements on the quality of information (Walton, Barker, Pointon, Turner, & Wilkinson, 2020):

When you Google things, you're getting information and you think, "Well, where's the source of this? Where exactly is this coming from?" And you're just getting blitzed with people kind of putting stuff on… Talk to the doctor…that kind of information is sometimes useful, but, in an academic work you have to be very careful about giving all your references and all your sources. You haven't a clue where half the stuff comes from on the Internet, have you? (Carole, aged 74)

Therefore, most participants made limited and selective use of online health information to help them make better-informed decisions, such as adopting a healthier diet, looking for general information on pains, and finding dentists or specialist hospitals. The benefits gained from this limited level of online engagement for health information then outweighed the risks:

> *I Google it, you know, I've got a sore wrist at the moment, have a look, is it my tendons? I know it's not good but I Google research this, that and the other. I've hurt my foot, I've been and had a look at my foot, see whether it's worth going to the doctor's…I know you can't believe everything, but general information is fantastic, in't it?* (Mary, aged 72)

In addition to the limited, hybrid, and selective patterns of online behaviours, the participants' use of ICTs and the Internet was often characterised by another feature: an assisted or intervened use of the Internet. This was different from a direct proxy use of the Internet. Instead of having someone from their social network perform certain online activities for their benefit, the participants often received assistance on preparatory work such as setting accounts up and installing apps. For example:

> *Watching telly in bed last night, I've got Netflix, my son's set up for me*. (Elaine, aged 70)

These forms of assistance helped to remove the entry barriers to adoption and use and thus contributed to a more positive online experience. For some participants, this assisted use of certain online features made them realise the convenience and benefits of the Internet:

> *… the only thing I ordered was hair stuff, 'cause my husband put me on that site, but then he sorted me out for PayPal, and I've ordered one and I've thought, "God, this is so easy, isn't it? God, no wonder people aren't going to the shops."* (Mary, aged 72)

Moreover, the participants also used interventions/assistance for some challenging online tasks, such as having family members or tutors at the informal learning sessions to supervise their use to boost their confidence or troubleshoot the issues that emerged during their use. These forms of help, in a way, nudged their digital participation forward.

> *I'm still nervous about ordering things. I don't feel confident, you know, about where my money's going or my details. I mean, I always check it out with my husband.* (Elaine, aged 70)

Overall, the participants used the Internet in a narrow way that mainly served their communication and information needs originated from their daily routines. The extent of Internet use depended on how convenient, effective, and effortless it was to adopt. The participants, thus, developed new forms of practices that were neither wholly digital-dependent nor a simple reproduction of previous practices, but rather a combination of Internet-based practices and traditional ways of doing. This hybrid model of online-offline practice marked a unique pattern of online participation and digital inclusion among the participants. Moreover, the participants had reservations about Internet use by limiting themselves from online activities deemed risky to their financial stability, social status, and health and wellbeing. Their way of countering these risks gave rise to an assisted and intervened mode of Internet use, which sustained their digital engagement.

5.6.5.2 Push and pull factors

The way digital technologies and the Internet were used and integrated into the participants' daily lives were pulled (informed) by the participants' needs and pushed (supported) by their digital competences/digital skills and the facilitating conditions such as the informal learning opportunities.

Although they used the Internet at varying levels, the participants frequently referred to the concepts of 'relevance' and the 'basics' to justify their level of digital engagement and the informal learning sessions they attended. Real (as opposed to virtual) life experience in the material world was highly valued and prioritised by the participants. Thus, there emerged a conflict between the public perception of 'relevance' and that of the participants' own. The digital devices and the plethora of online content were viewed as of high relevance to older people for their ability to address the information inequality older people frequently faced and the loneliness and declined physical functions that often accompanied later life. Under this view, older people were expected to dip into the full potential of digital services and online media and learn how to reap these outcomes correspondingly. This is, in fact, the dominant discourse featured in the digital divide literature where some activities (e.g., online health information management) were regarded as more meaningful than others (e.g., gaming) (Tsatsou, 2021; Van Deursen et al., 2015), and a lack of use of the Internet compared to the average was deemed as a disadvantage that needs to be rectified (see Van Deursen & Helsper, 2015b). However, the participants from this study strongly voiced against this expectation.

> *It's really everything for an easier life really, now, we want an easier life, we don't want to be, you know "oh.. have you done this, have you done, have you done….?". We just want an easier life, and we do the things we know we can do it right, don't we? [taps on the table]* (Fred, aged 73)

To them, relevance should be taken on the merits of how well the digital elements fit into their daily routines and complement, not compete with the old ways of doing things:

> *I'm doing things [on the Internet] but I'm doing them my way, not the proper way. I use it for what I want to use it for. And I would rather be gardening or painting or walking the dog, or doing my yoga, or being out there and talking to real people rather than talking via Facebook, or whatever.* (Alice, aged 69)

Like many other participants, the activities Alice valued the most were those physically/bodily engaging life experiences that do not take place in the virtual world. One cannot walk their dogs, attend gardens and exercise on the Internet. These daily life activities involved the bodily movements (Rivera & Cox, 2014) that "transpire" in the site built upon the arrangements of physical materials (Schatzki, 2002). Similarly, online chatting does not bring the same embodied experience of talking and interacting with a real person. In this regard, the Internet was less relevant to the participants' lives and their needs/perceptions of staying healthy and active. The online activities were thus 'pulled' gently to the realm of daily life. This, in part, explained the limited use of the Internet that the participants demonstrated.

Often, the online activities not only bore less meaning (thus less relevance) to the participants' ways of living but also competed with other daily activities for the valuable resource of 'time':

> *I mean, all these media, Facebook and all them other ones, these people must be spending hours on the computer. I don't know where they find time. I'm retired and I can't find time [laughs]. I've got me gardening, I've got all sorts to do*. (Harold, aged 71)

Contrary to the social perception that older people have more free time to learn about and use the Internet as they withdraw from the working force, Harold represented the voices of the participants and many older people, making it explicit that time is a scarce resource that they would like to spend wisely and on the things that had more value to them.

Some participants spoke of the inconvenience of the digital aspect. As critiqued by these participants, introducing digital devices and the Internet for some daily practices had inhibited their reproduction of these practices. One participant gave an example of photo-sharing to explain this kind of situation:

> *Well, they're [the photos] locked away somewhere in a computer, you know, so it's not a question of getting an album out of a cupboard. It's going switching the computer on -, that greater sense of -, it's one of those areas I think maybe technology has slowed things down a bit in some respects.* (Elaine, aged 70)

To Elaine, sharing photos used to be a spontaneous act that was as simple as picking up the albums directly from a cupboard. It would be less than a minute or two before she could hold the album at hands and flip the papers back and forward. In comparison, using a computer for photo sharing introduced additional procedures/barriers. This example restates the point that the Internet lacks the soil for certain daily practices with embodied features and meanings. In addition, it further revealed that digital engagement in daily life has a 'scale effect'. The more engaged people are with their digital devices, the more likely they are to acquire suitable devices, and the more readily and effortless the digital devices are for new tasks. It was much more convenient for a few participants to extract a digital album or find a photo instantly from their phones or laptops because they were always on it. While for participants like Elaine, their scope of digital engagement was reduced.

The perception of relevance had an implication on how the participants engaged with learning. The participants, regardless of the types of informal learning settings that they attended, stated that they chose to learn the basics that can enable them to utilise the Internet as they intended:

But that's my main reason for coming here [informal learning session]. It's like the social thing. And, I don't think I can learn any more than what I'm using. (Frank, aged 75)

I couldn't access my Google emails…my friend uninstalled Google and put it back on for me to get rid of the problems. And I can't do things like that. I don't see why I should be an expert. (Patricia, aged 84)

I don't want to be advanced, knowing this, knowing that, like I'm going for a computer science tech job, no, no, no. I don't want that [laughs]. (Eileen, aged 66)

The participants made it clear that their needs were not static but moving with time. Rather than learning about everything at once, they were more inclined to maintain what they had unless new needs emerged:

I think I've got a lot to learn [laughs]. But I probably won't bother until I have to. (Trudy, aged 73)

The participants' digital engagement patterns were informed by their needs and supported by their level of digital competences. Inadequate digital/Internet literacy had a limited power to push the participants to a desirable level of Internet use and engagement:

I love the Internet, I love the information. I just don't like the fact that I'm not very good at it. Once I get so that I was good at something, I'd be quite happy with it. (Mary, aged 72)

I don't know what a computer can do. It's very hard to know what you want to do if you don't know what's available to do. (Joan, aged 60)

I don't do any money online, 'cause again I don't think I've got the knowledge to-, to make it work … I can do emailing and text, er, texting on it [the smartphone]. And make phone calls but that's all I do on that, that's all I know how to do. (Alice, aged 69)

Alice further pointed out the lack of facilitating condition is another factor that constrained her online participation:

And it's not that I'm unintelligent. It's just I haven't got anybody to help me, really. (Alice, aged 69)

As have pointed out in Section 5.6.3.3, the convenience of informal learning opportunities and support was influential to the participants' (sustained) use of the Internet. Alice's account was another firm example of how a lack of support confined her Internet use.

Moreover, a lack of conditions to facilitate the use of the Internet prevented the participants' skills from being consolidated (see discussions on cognitive functions in Section 5.6.2.1). Unfamiliar skills then, in turn, affected subsequent use:

I can send an email, but there are times when I've got to think, "Oh, what's the next step?" Because I don't send that many emails, so that's a bit of a drawback. I do find that it's sometimes hard to retain the method because you're not repeating it and you're consolidating it in your mind. (Elaine, aged 70)

According to the participants, a good environment also facilitated their digital engagement and informal learning. The environment here refers to the context of daily life, including spatial context such as the layout of the room (see Quote 1) and the spatial location of the equipment (see Quotes 2, 3 and 8), social context such as the devices that were used in the participant's social circles (see Quote 4), temporal context such as the timetable of informal learning sessions (see Quote 5) and the time of the day that the Internet was used (see Quote 6) or the computer was ready for use (see Quotes 7 and 8), and the infrastructural context such as the availability of Wi-Fi (see Quotes 9 and 10).

Quote 1: *I'm making a table. I'm using one of these chairs. I've taken the seat off. Putting a lump of wood on, sticking the monitor there, and putting it sort of at side of me, so I can swing-, to make it swing out-, to go to the toilet, to get another can of beer. Swing it back. And I'll have the laptop at side of me.* (James, aged 71, talking on spatial context)

Quote 2: *You can't really do much about helping them out with the devices that they've got at home, only what they bring in to you, you know.* (Julia, aged 73, talking on spatial context)

Quote 3:*…before we had to go upstairs 'cause we had the big screen and keyboard and all the stuff was underneath, but-, and then we got a laptop and we found we could just sit in the front room* (Valerie, aged 75, talking on spatial context)

Quote 4: *I know. Why indeed buy an iPad. I don't know in all honesty. Because I couldn't cart that all around with me, 'cause the laptop was too big. And everybody in my group seemed to have an iPad that they were using…it seemed like a good idea at the time.* (Alice, aged 69, talking on social context)

Quote 5: *I've not been to that course for two weeks and I haven't looked on my laptop at all. I've just used my phone, so I'm using my phone all the time.* (Mary, aged 72, talking on temporal context)

Quote 6: *I don't really use-, well, I do if there's something there that I've got to tap into on a certain time, on my day. I'm using iPad to suit me in many ways. I get up in the morning, about eight o'clock, and I start looking round my iPad usually for news that's come in overnight.* (Andrew, aged 78, talking on temporal context)

Quote 7: *[Going on to a computer] is labour intensive unless you live in a household where the computer's on all the time, like in our house. Our computer's on from when [husband name] gets up to when he goes to bed, so, er, I--, but if it was me by myself, I'd think, "Oh, blow it, you know, I'll ring somebody tomorrow."* (Elaine, aged 70, talking on temporal context)

Quote 8: *But then I've got to remember to look up on mine [the iPad] because mine's just stuck on the cupboard. So unless you're using it all the time, you wouldn't pick up the answer [email] either.* (Clara, aged 83, talking on temporal and spatial context)

Quote 9: *A lot of buses in [city name] now, they've got free Wi-Fi on there now, so you can put your phone on, and you go into their website.* (Harold, aged 71, talking on infrastructural context)

Quote 10: *I mean, there's the odd little niggle, you know, like-, unless I knew that they'd [her friends] got Wi-Fi, I wouldn't bother taking it [the iPad], there's no point is there really?* (Lucy, aged 72, talking on infrastructural context)

The participants' narratives expanded the field of vision for studies on digital engagement. By zooming out from ICTs and Internet use behaviours, a complete picture with the details of the background was revealed. The features in the background or context did not exist in silence as if they were the decorations but in fact, an active part in the interplay of the participant's digital-related practices. This gained vision on the environment, background or context accords with Schatzki's (2002) theory of *site*, a concept that could not be simply encapsulated in notions like space, place, or location that James, Julia and Valerie mentioned. Meanwhile, what the participants disclosed also echoes Shove et al.'s (2015) extended attention on the *infrastructure* of the social practices in terms of materiality. The infrastructure they referred to is a broad term that transcends the common understanding of physical structures like road network or energy supplies but a general support system that enables the production and reproduction of the practices (e.g., air is an infrastructural material in sports-related practices). In this regard, Alice mentioned the social context and the *temporal context* that Mary and Elaine referred to were part of the *site* and the *infrastructure* that enabled/supported the participants' digital-related practices. It is worth mentioning that *site* and *infrastructure* are two different concepts. The former describes the multi-dimensional environment in which the social practices occur, while the latter depicts the matters in the social practices focusing on materiality. However, a commonplace between these two different concepts perhaps is the conceptual approach of zooming out/extrapolating from what is directly involved in and visible from the performance/enactment of the practices. In the context of this study, the participants pointed out the table, the room layout, the house structure, the location of the informal learning courses, the schedule of the courses, the acceptance of devices in the social network, the readiness of the devices, and the availability of Wi-Fi in private and public places as part of an enabling system for Internet use and engagement. These were the parts that tended to be simplified, if not overlooked, in the digital divide study that focused on digital use behaviours (Blank & Lutz, 2018; Ma et al., 2016; Van Deursen & Van Dijk, 2015).

Although being inspirational theories/concepts, Schatzki's (2002) theory of *site* was conceptualised at a very broad scope [23] to define the context in which all social phenomena [24] take place, while Shove et al.'s (2015) concept of *infrastructure* was primarily focused on defining the nuances of materiality in the social practices. Thus, neither of them seemed to be a suitable concept that mirrors the context/environment of the digital-related practices in their daily life that the participants alluded to. Referring to it as an *ecosystem* of digital-related practices seemed to be a better fit in the context of this study. For instance, the informal learning sessions (such as the LMW courses mentioned in Chapter 4) can be seen as a part of this ecosystem that provided social context and spatial context to the digital-related practices.

5.6.5.3 Extent of integration

In addition to describing their patterns of Internet use and the influencing factors, the participants also frequently stated how they perceived the extent that digital technologies and the Internet had integrated into their lives.

The extent of integration varied from one participant to another. Some participants stated that they had grown a habit of using digital devices, especially their smartphones. For them, the Internet occupied a certain weight in their lives and continued to expand its influence:

> *I'm not being without the Internet now.* (James, aged 71)

> *Mary: I wouldn't like to be without my mobile phone, would you, Elaine?*
> *Elaine: No, I wouldn't, no.*
> *Mary: I couldn't stand it. I hate it if I've forgotten it.* (Mary, aged 72, and Elaine, aged 70)

> *I'm sort of on it 24/7, on one thing or another.* (Julia, aged 73)

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[23] This is similar (not the same) to Bourdieu's theorisation of *field*, a concept that describes the social structures in which *capitals* (a term Bourdieu used for resources) are transferred and transformed through various social practices.

[24] They were described as the *constellations* of social practices by Schatzki (Hui, Schatzki, & Shove, 2017; Schatzki, 2002).

Eileen further illustrated how she used the Internet in many aspects of her daily life:

> *Every day something new comes up. You see something new [on the Internet], you know? And I like to check the weather on it, and me recipes and food and things like that. And music, I use it most for.* (Eileen, aged 66)

Eileen and Julia were relatively advanced Internet users among the participants. Although James, Mary and Elaine used the Internet relatively narrowly, they went on it frequently and continuously depending on their needs. The degree of this integration, in the words of another participant, was:

> *Even though I don't use it a great deal. I find it very helpful…it's a small part of my life, but it is quite important.* (George, aged 81)

It is true that the use of the Internet, even if it was only for querying information or communicating with family and friends, had brought great convenience to these participants' life. After enjoying and getting used to this convenience, it was unimaginable and unacceptable for them to lose these benefits. Alice used her example to illustrate the fear of losing her social relationships that were managed through her iPad:

> *Because now that iPad is my lifeline, if you like. 'Cause we're going away tomorrow. That's my connection with friends and family…if I lose that, I feel urgh. And I think it's fear of losing all that. It's a fear.* (Alice, aged 69)

While acknowledging the benefits they had gained from the adoption and use of the Internet, many other participants considered the role of it in their lives was only peripheral. As Hugh described:

> *Yes [It is useful]. But, not as a central core of my life, as a peripheral thing. Where I needed to, I did.* (Hugh, aged 79)

Joan revealed that the marginalised role of ICTs and the Internet in her life was related to how she used it. Unlike Alice, Joan mainly used it as an entertainment tool instead of tying it to her social life:

I don't use it for anything important really. It doesn't have that status in my mind of anything -, that you would use for anything important. It's an entertainment device really, that's how I use it. (Joan, aged 69)

Meanwhile, Lucy explained that this limited, even marginalised, Internet usage was based on the needs of her own life, which she seemed to be content with:

I suppose really I'm not using the full potential of it, but, it suits, it's fine how I use it, so. (Lucy, aged 72)

She then further revealed that her current state of use was rooted in the idea of being in control of her own life. Indeed, for the participants, maintaining independence and autonomy in their later life was a priority. Meanwhile, time was a precious resource to them. Excessive Internet use not only consumed their time that could have been used to exercise or socialise but also increased their level of dependence on the Internet:

I think they're [ICTs and the Internet] good, but I think you have to be sensible about them, you can't let them rule your life. And I think a lot of people these days let them rule their life. (Lucy, aged 72)

Like Lucy, Carole put forward a critical view on the integration of the Internet in daily life. She believed that the Internet could not be allowed to occupy life uncontrollably, thus causing her to lose control of her life. To her, the explosion of Internet information seemed to have the power to overwhelm people and disrupt the rhythm of everyday life:

It can be incapacitating; it can make you feel totally out of control 'cause you're just having information thrown at you. Whereas you have to regulate things a bit, don't you? Boring as it may be, but you have to eat at times, you have to walk a bit, you do need to do things in a certain kind of order. And I think if you speed it up too much, you can get a bit carried away. (Carole, aged 74)

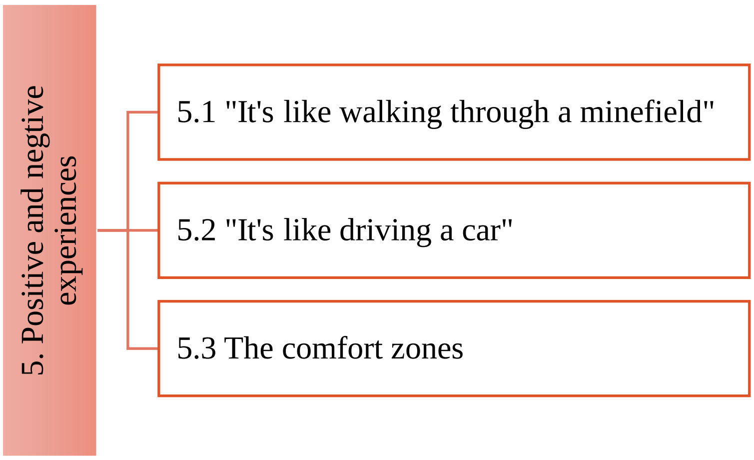
Like that of Lucy, Hugh, and alike, her view reflected disapproval of the excessive penetration of the Internet in all aspects of life. From their perspective, the Internet should be a subsidiary part of life, not the main theme. This was precisely reflected in their regulated Internet use and digital engagement.

On the whole, although the participants had different practices in how to place the Internet in their lives, they all recognised the convenience brought by the use of the Internet and attempted to integrate it into their daily routines as to how they felt appropriate. However, only a small number of them closely matched the use of the Internet with the rhythm (as Carole put it, the "order" of daily activities) of their daily living. Most participants regarded the Internet as an accompaniment to their life's main theme, which consisted of the embodied daily practices such as eating, walking, and socialising. This reflected how they traded off and balanced between a more inclusive digital participation and a more active lifestyle. This will be further elaborated and discussed Section 5.6.7.1.

5.6.6 Positive and negative experiences

The experiences that the participants had from their digital engagement was a prominent theme that recurred in the interview data. This theme is organised into three sub-themes, as shown in Figure 5-9.

Figure 5-9 Sub-themes (second level) under Theme 5 *Positive and negative experiences*



Some of their digital participation brought them positive experiences and feedback that helped them maintain or better participate in online activities. In contrast, others had brought negative experiences that inhibited their digital engagement. Although both reflect the shades of participants' feelings and perspectives, this theme differs from the emotional and psychological factors reported in Section 5.6.2.3. The positive and negative emotions and psychological reactions were presented as the internalisation of the participants' digital engagement and learning experiences. At the same time, this theme displays the constituent elements of these positive or negative experiences explicitly.

Sub-themes 5.1 and 5.2 were named after the metaphors used by the participants, representing two main negative experiences: fear of fell in the pitfalls as if being struck by a 'mine', and fear of lack of control over the mastery of digital engagement. Sub-theme 5.3 was dedicated to present the positive experiences that the participants frequently mentioned.

5.6.6.1 "It's like walking through a minefield"

The participants frequently mentioned their encounters with the *dark patterns* on the Internet. The original concept of dark patterns raised by Brignull (2010) pointed out error-induced network designs, which were often intended. He summarised these types of malicious designs into categories such as "trick questions", "hidden costs", "bait and switch", "forced continuity", and so on. Bösch et al. (2016) analysed such design features in detail. They revealed its prevalence on popular websites such as Facebook, Tripadvisor and Google to the extent that even young people with high Internet literacy would be confused and mislead. One participant explained that due to their limited computer literacy and operational skills, anything that was beyond their understanding and competence could turn into the hazards that hindered their continued digital participation:

> *We can't possibly keep up with everything, we've just got the basics. I think that's the thing. If you can keep up with the basics, then you're okay, but the minute it starts running away, I don't know what would happen then.* (Lucy, aged 72)

The dark patterns that the participants referred to mainly were the subscriptions, scams, updates, and certain features of HCI interaction that made them felt insecure, confused, addicted, frustrated and fearful. The online scam was the most scared 'dark side' of the Internet for the participants, although many were not the victims themselves. However, the spread of online fraud stories in the media and the circle of friends around them made them highly cautious when using going online. This nervous and negative experience was the main reason why many participants refused to use online financial tools such as mobile banking, as reported in Section 5.6.5.1. As the investigation went on, what gradually emerged was a ripple effect from this passive approach to mitigate the online risks. Many participants even felt annoyed and apprehensive by software updates:

> *It worries me when there's, "Put on these new updates." There's always software for you to update, it could be another scam. So I'm a little bit hesitant in doing it. I've got to learn more to be able to spot these scams. That worries me when I get these updates, I get a lot of them.* (Andrew, aged 78)

Cases of being defrauded around the participants intensified their fear. This fear further dictated their computer use and had a continuous negative effect on their experience:

> *Our daughter, she's professor. But even she, who does all her lessons online, sends them, marks them online, everything like, she nearly got caught out a couple of months ago. She nearly gave information that was asked for, and she realised as soon as she said. If she can burn her fingers, I can burn mine.* (Hugh, aged 79)

> *Lots of people were Internet banking when I thought, no, and then, you start hearing things about people you know, just generally making mistakes really, and I think I'd be very prone to making mistakes.* (Joan, aged 69)

Email subscriptions and commercial subscriptions were pointed out by the participants as another potential hazard for them. Most of them spoke of the fear of making mistakes that they could not fix or entering a loop that they did not know how to exist:

> *When I'm sort of looking through these mindfulness and meditation apps, I'll press something and it'll say, subscribe now, ten months or ten weeks free. I avoid things like that because I fear if I press that and get my ten free weeks, next thing it'll carry on and I won't be able to get out of it. You're on this loop, aren't you?* (Alice, aged 69)

It appeared that what made the whole experience of going online like walking on a minefield were the unknown and unpredictable little things that were pervasive and disruptive. As Fred explained:

> *It's a minefield, a minefield with unexpected problems*. (Fred, aged 73)

Many of these negative experiences were clearly related to a lack of digital skills and support system that enable the participants to navigate through the 'minefield' safely. Alice gave an example of the frustrating 'little things', while James developed a coping system to get assistance from the local library:

> *I'm on a very steep learning curve and I don't know whether the-, the printer will work if it's not connected to my laptop. So it's all these sort of <u>little things</u>, the actual technology of it all I don't understand.* (Alice, aged 69)

> *I found out I could get some help here [in the library] when I got stuck which I <u>frequently</u> do.* (James, aged 71)

Other participants further described the nerve-wracking online world they experienced. Elaine and Mary easily got lost in the hyperlinks, as well as the forward and back buttons on a webpage:

> Elaine: *You get something going, say, on Google, and then say you want to go back and look at something you'd seen previously, that can be a problem-*
> Mary: *You keep going back to the beginning again.*
> Elaine: *If I press something that I think is going to take me back and it doesn't, it takes me somewhere else, I'm then worried about, well, how can I get back to what it was in the first place.* (Elaine, aged 70, and Mary, aged 72)

Fred and Valerie found the complexity of web design misleading and time-consuming:

> Fred: *I don't know why they can't make things easier. I did that <u>for ages</u>, and then you might not get the right thing, what you <u>want</u>.*
> Valerie: *Yeah, took a while to do what we were doing, isn't? We <u>persevered</u> and got there and in the end, well, it wasn't easy, was it?*
> Fred: *And it, it was just a <u>minefield</u>. It didn't give ya any information [taps on the table].* (Fred, aged 73, and Valerie, aged 75)

Some found the online contents (e.g., social media like Facebook) were rather distracting and overwhelming, and they quickly got side-tracked or became addicted:

You can be guided into another direction completely but it might be really interesting so you spend longer on that. It's too much time, can be quite addictive. (Beatrix, aged 65)

So, it's distracting, it can be distracting. (Carole, aged 74)

I got into it too much, if you like. It's sort of taken me over. (Frank, aged 75)

Trudy pointed out that the pop-up advertisements targeted towards older people made her feel discriminated against and violated her privacy. However, she struggled to find a way to block them:

They [websites] advertise that because I suppose they think, "Oh well, she's getting older" and they do target adverts to what you've looked at previously. And sometimes there's certain things you can't get rid of. I mean, some of the adverts, you can say, "I don't want to see this," but sometimes they appear again anyway. (Trudy, aged 73)

Lucy pointed out that the online tasks involved operations at multiple levels. Completing the tasks required strategic skills that help them find and assess the information and operational skills that involved the use of physical equipment. It was this multi-level coordination that was somewhat challenging and error-prone:

[It is] when you're doing several layers, of different things, you can go off track. (Lucy, aged 72)

Indeed, the participants reported many issues such as "why things disappeared on the screen", "why things did not come up", and "why is it not doing what I wanted it to do". Some participants had their emails accidentally sent before they were finished for various reasons (e.g., accident hit on the keyboard due to reduced hand dexterity). For Clara, this little 'mine' was dropped by a system update:

They [email service providers] changed all the screens over and did some things and their emails have got very difficult. Sometimes they just shoot off and go before I press end. Then I've got to say "Part two" to another one…that would rather upset me. (Clara, aged 83)

The examples the participants gave were rather discursive and somewhat messy. However, it was indeed this messiness and fragmented issues that precisely captured the online experience they had. Again, using Fred's account to summarise:

1) This negative experience was influenced by both the online environment and their level of digital skills. Such a passive experience seemed to have a reinforcing power to drive them away from further online interaction.

> *You turning on something, then that you turning on a mine you don't want. Sometimes you think, "Oh where do I start?". So, if you can't do it, you might be pressing the wrong, so you just don't bother about doing it.* (Fred, aged 73)

2) Walking through a minefield was not an exceptional but normal experience to the participants.

> *We've all had happy moments and stepping in our minefields. We just can't remember them all. But we've had them, all the time.* (Fred, aged 73)

5.6.6.2 "It's like driving a car"

While the metaphor of "minefield" described the uncertainty and hazards associated with the participants' online experience, the analogy of "driving a car" that the participants commonly used revealed a different stream of negative experience linked to their lack of control and skillset. One participant explained:

> *It's a bit like driving a car and you don't know if something goes wrong, what to do about it. I thought, "If I break down in the middle of the road I might not be safe, but if I know kind of how this works, I could do something about it." So, similarly, it would be better if I had a grasp of how it [the computer] worked.* (Carole, aged 73)

Many participants acquired their digital skills through "rote learning" (Damodaran & Olphert, 2010). Some of them kept notes of the sequences of operations and practised strictly by script. Then, when the design features changed from a system update, they had this feeling of losing their grip on the computers:

> *…you think "oh I know how to use that now", and then all of a sudden it'll update…you think "oh no where's that gone, it used to be there and now it isn't.* (Alice, aged 69)

> *They [the updates] change things. So I've got to do the things that I was doing before to find out if it's a different key I have to press or a different click on something. The laptop's taken control of me until I get used to it again. And then I have another update…So I would say I've never been in control of my laptop.* (Frank, aged 75)

To some participants, losing control of things made them feel diminished and dependent on the others:

> *I'm like diminishing myself by keeping saying, "You used to be able to do this, what's wrong with you? Am I deteriorating?"… I'll search for a phone number and then I'll ring up, and I just throw myself on their mercy.* (Mary, aged 72)

The participants had frequently pointed out their lack of confidence as the main reason for not getting a good experience from computer use:

> *It's a lack of confidence in how things work and how to make them work for me and do what I want them to do and not take my life over.* (Alice, aged 69)

The passive experience then, in turn, further weakened self-confidence:

> *I wonder if people don't get the outcome they want [from going online], does it make them feel less of a person,? Because it can sap your confidence a little bit, when things don't work properly.* (Lucy, aged 72)

Confidence is based on one's ability to deal with the problems encountered independently. As mentioned by Carole at the beginning of this section, such an ability is built upon an understanding of how the car (the computers and the Internet) worked. It concerns not only Internet literacy but also traditional literacy. After all, computers and the Internet are only carriers of content. Thus, completing tasks like filling out official forms on the Internet requires the skills to operate hardware instruments and understand software design and language and the traditional literacy to interpret the content online. As Carole put it:

> *…they'll [older people] know how to Google stuff, and they'll know how to do Facebook stuff, but they wouldn't know necessarily how to do official forms.* (Carole, aged 73)

Meanwhile, some participants maintained that not being able to identify the problems they encountered was the main issue. To them, gaining control did not concern knowing how to fix the problems (i.e., hands-on skills and practical know-how), but only knowing what might have gone wrong (i.e., the ability to discern and describe the problems). Like Joan explained:

> *Like a car…I thought, "I can get in a car and I can drive, but I've no idea why I'm doing what I'm doing." So, I went and learnt how it worked because it seemed the only way to put me mind at rest. I'm no mechanic, I don't know how to mend it, but I have got an idea of how to diagnose it.* (Joan, aged 69)

Joan's perspective differed from that of Carole's. This philosophy of 'how to drive/control a car' underpinned some participants' informal learning strategy. They tended to be more reliant on additional support (e.g., from family, friends, and tutors) to help fix the technical/operational issues. A consequence of this was that when the support was not available, which was common for those who lacked immediate support at home, they had no choice but to wait or try on their luck (e.g., turn it off and back on, or poke on the screen until it responds again). Either way, they easily became frustrated or disheartened.

5.6.6.3 The comfort zones

The concept of this comfort zone was not built on the level of digital competences, but a state of digital engagement that had continuously brought positive feedback to the participants. This positive experience played a significant role in sustaining their online participation and maintaining an excellent online-offline life balance.

Being able to receive support from family members was the most mentioned contributor to the comfort zones.:

> *I can ask my son, you see. My son is very literate, so without him I'd be absolutely lost.* (Mary, aged 72)

Having this support system around at home eased Mary's technostress and anxiety towards the potential hazards she may stumble across when she got online. This was the case for other participants who had this close network of support.

A fixed pattern of online engagement seemed to have also placed the participants in their comfort zones. They often felt very content with what they knew and what they could do. Their online engagement always took place in the same online space where they became very familiar. For example:

> *I don't want to be advanced, as long as I can listen to me music, send a WhatsApp, take a picture, do little things like that, I'm fine [laughs].* (Eileen, aged 66)

> *I'm quite happy. I don't really want to get into it anymore. Just keep what I'm doing.* (George, aged 81)

For some participants, even if unexpected problems occurred, it did not seem to be an issue that they would become upset about because of their low dependence on the Internet in life. These participants tended to be the ones reported a marginalised role of the Internet in their daily life (see Section 5.6.5.3):

> *I mean, maybe sometimes things don't seem to download very well but, you know, I'm not that bothered. It doesn't bother me, not a big deal.* (Trudy, aged 73)

Like Fred mentioned, there were happy moments accompanied by the minefield experience. Some participants gained positive experience from the signs of progress they made in daily use and learning or the tasks they achieved. This gave them a sense of achievement and empowerment, which in turn encouraged them to keep going forward:

> *But if I didn't know about eBay, it's still a bit of a struggle finding stuff. But I am getting better.* (James, aged 71)

[grandson name] asked me a question about the computer the other day, I was able to help him with that. It's what it's all about for me. (Anne, aged 67)

The examples from James and Anne and many other participants mentioned in Section 5.6.2.3 highlighted the enabling role of a positive experience in keeping the participants socially engaged and digitally included. Andrew, in particular, explicitly stated:

When people get on the Internet and buy a computer, their life will change for the better, and I would recommend that. I mean, in your report do say that I'm very pleased with it and it has changed life very much for the better, it enhances the quality of life, and it's given me a good reason to get up in the morning. (Andrew, aged 78)

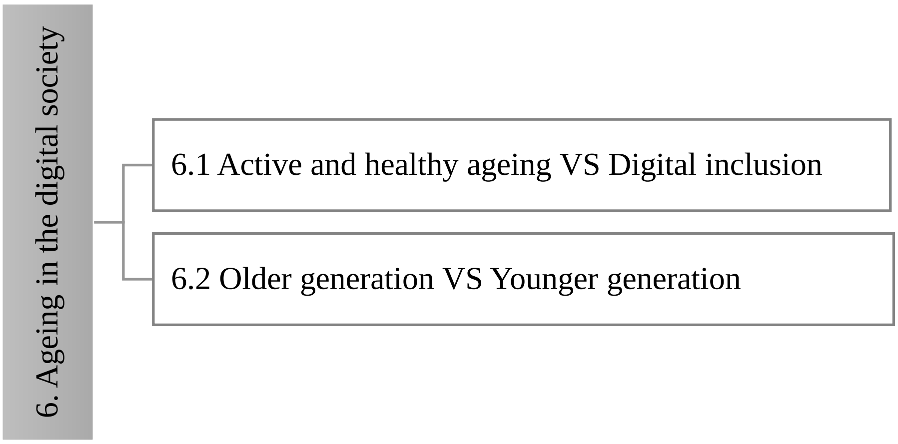
Overall, the forms of the comfort zones varied, depending on each participant's level of use, access to support and the benefits and sense of satisfaction they gained from the Internet. There was nothing bad about staying in the comfort zones if the participants stayed motivated to get online from a positive feedback loop. Informal learning sessions at institutional settings were essential enablers to the comfort zones. This will be discussed in more detail in Section 5.6.8.2 *Informal learning and adapting*.

5.6.7 Ageing in the digital society

This section discusses the recurring theme concerning the participants' experience of ageing in the digital society. Two sub-themes were identified; they are displayed in Figure 5-10 below.

Sub-theme 6.1 presents the participants' experiences of and perceptions on how their daily practices were influenced by the different meanings of active and healthy ageing and digital inclusion. Sub-theme 6.2 discloses the participants' perceptions towards the inter-generational differences in digital engagement and social interactions.

Figure 5-10 Sub-themes (second level) under Theme 6 *Ageing in the digital society*



5.6.7.1 Active and healthy ageing VS Digital inclusion

When asked whether the digital devices and the Internet had made their ageing more active and healthier, the participants revealed the two sides of getting digitally engaged. As they disclosed, digital technologies were sometimes enablers that kept them socially active and sometimes an inhibitor to living a more active lifestyle. This perspective they showed was consistent with their mixed feelings towards the Internet reported in Section 5.6.2.3 and varying levels of digital engagement in life discussed in Section 5.6.5.3. The participants noted:

> *Oh, it[the Internet] is convenient, it's definitely convenient. I mean, it's hugely useful, but it can become too much.* (Carole, aged 74)
>
> *It works both ways.* (Trudy, aged 73)
>
> *I think it should be balanced. A bit of computers and a bit of interaction with people.* (Lucy, aged 72)

It appeared that the participants were walking a fine line in balancing the impact of ageing. On the one hand, staying socially engaged online was deemed a major benefit of the Internet for older people, particularly for those who were housebound; it helped address their loneliness and social isolation. Being connected to the Internet also brought about a myriad of other beneficial outcomes. It made the participants feel connected with their family and friends, included in their community and the society, informed of what was going on locally and worldwide. It empowered them to become independent (e.g., look up information online or book tickets by themselves). For example:

> *It keeps you in contact with everything.* (Irene, aged 82)
>
> *It's certainly altered my life for the better. I feel [like] a world citizen.* (Andrew, aged 78)
>
> *I do sometimes do food shopping online. I haven't got a car, so if I've got a lot to get or really heavy things, I'll just do an online order.* (Trudy, aged 73)

The participants also gave more examples on Internet-enhanced independence from different aspects of daily living:

> *Occasionally I'll go into the shop, they'll say, "Oh, we can order it in for you." Very politely. I'll say, "No, thank you, I can get it on the Internet.", which I can. Then I can have it delivered to my door, I don't have to go three, four, five miles into town. It's good for me in that respect.* (Anne, aged 67)
>
> *Like coming here today to meet you, our train timetable locally has just changed, so I was able to just fire up the computer and went on to Trainline, found the time of the train and made life so much easier. So, it does make you more independent, I think.* (Elaine, aged 70)
>
> *I think of me sister, she is Mrs Independence. She uses the Internet to find her way round when she goes to places, to book flights, to do this, to find hotels and stuff like that…but if I lived on me own, I can see that I might feel that my independence was in fact quite impaired by my having to rely on other people to do things for me.* (Joan, aged 69)

However, on the other hand, many participants critically pointed out that excessive reliance on the Internet can damage the mental wellbeing of older people. As Trudy noted:

> *With mental health, if somebody finds it really hard to get out of the house physically then perhaps social media can be quite a useful form of communicating, and it might make people feel a little bit more connected to what's going on. But on the other hand, if people are going to stay at home and do their shopping and*

> *everything, get everything online, and they're not having that personal contact.* (Trudy, aged 73)

Staying socially active online and offline appeared to have very different meanings for the participants. Digital technologies indeed helped some participants to connect with their family and friends from a distance. In this regard, it had a great value in maintaining their social connections. Nevertheless, it was not everything in the participants' social life. Prioritising an in-person social experience and face-to-face communication in their daily living was a core value shared among the participants (also discussed in Section 5.6.2.4). It was a way to enjoy their later life. Thus, interacting with strangers on the Internet through social media websites was seen by the participants as a waste of time and detrimental to their mental and physical health, whereas interacting with strangers (e.g., on the bus or train) or people in the local community (e.g., in the shops) was regarded as a booster for their wellbeing; it gave them a sense of belonging and social participation, as well as an opportunity to keep physically fit. Moreover, staying active in offline life implied status of independence and autonomy that the participants highly valued as a symbol of successful ageing:

> *I thought, "I'll leave it at home on purpose, so nobody can get me on me phone", you know. I know eventually one day I suppose, they'll make it, so you have to do everything online-, 'Cause I always say, "You'll be able to just sit there on your backside and never leave the house." Which-, that's very sad. I hope that never happens in my lifetime.* (Harriet, aged 68)

> *There's an awful lot of old people who don't ever talk to anybody, from one day to the next, and I think that's really sad.* (Trudy, aged 73)

> *I go to a club in [Town name], it's for people to go and have a coffee and to chat, and that to me is very very good because it gets them out, it gets them chatting…Computers don't help in that way. They don't give you that interaction.* (Lucy, aged 72)

Indeed, comparing to online activities, offline activities are embodied. They give older people the opportunities to exercise their physical functions to counter the ageing-related cognitive and physical deterioration. Thus, while staying active online (e.g., socialise and shopping) might result in an unhealthy lifestyle, keeping active offline often improve one's mental and physical wellbeing (e.g., socialise offline involves person contact, shopping offline involves walking and exercising). Some participants explained:

> *While I can drive, I'll like to pick me own shopping and choose what I want. And that's another way of <u>keeping active</u>. If you didn't do this and you did it all on the Internet, you wouldn't go out and go for a walk…<u>I've got to do, I have to do things</u>, while I'm independent…we try to stay at the fresh air as much as we can.* (Clara, aged 83)

> *I think physical health as well, because if you can do everything online and you just stay at home and you're sitting about, you're not walking up to the shops or you're not doing this [exercise].* (Trudy, aged 73)

Thus, to many participants, attending the informal learning sessions at their local community or central libraries was not just for improving their digital literacy and gaining practical know-how, but also for getting out of the house, socialising, and keeping their minds active through informal learning. As some participants noted:

> *It [library drop-in sessions] got me out of the house as well. I don't hardly see anyone, so it just got me out of the house.* (Simon, aged 69)

> *It [the informal learning] keeps your mental state going. Like I said before, the social side, you know, it keeps your brain going, speaking to people and whatnot.* (Frank, aged 75)

> *It takes me mind off-, I do have an illness which is called anxiety and depression, and it affects me every minute of every day. I have to try to find things to do, to take me mind off it, so that's really why I go to the computer class.* (George, aged 81)

In this regard, the digital inclusion projects also benefited the participants' ageing process indirectly.

5.6.7.2 Older generation VS Younger generation

The participants frequently reflected on the inter-generational differences in digital and social participation. Referring to their perceptions of a good lifestyle discussed in Section 5.6.7.1, they commonly expressed concerns and disapproval over younger people's deep reliance on the Internet in daily life. Addiction and overuse of the Internet, for instance, were often mentioned by the participants:

> *I'm appalled when my grandchildren sit with the phones like this* <u>*all the time*</u>*, we really are appalled by it.* (Joan, aged 69)
>
> *They're [younger people] sort of surgically attached to looking at their phones.* (Trudy, aged 73)
>
> *You see, young people have their phones with them all the time and they are always fiddling with them, aren't they?* (Clara, aged 83)
>
> *To him [son], the phone is another person, it's absolute key, it's like your heart, you wouldn't leave your heart behind, so he marches around with his [smartphone]. It's part of his brain, I think… he's got it somewhere here all the time, I haven't. I'll walk away from it.* (Carole, aged 74)

The participants were also critical of how quick the younger generation changed/updated their devices. In contrast, the participants themselves were more inclined to keep their device as long as it served the purpose. As discussed in Sections 5.6.2.1 and 5.6.6.1, this was related to the fear of change due to a steep learning curve. This difference also resulted from different worldviews based on different roles/positions in society between the older and younger generations. The speed of smartphone upgrades reflected the speed of digitalisation that was underway. To the participants, it was moving too quick for the younger generation, thus leaving older people behind:

> *Old people don't like change. I think it is frightening in a way, that the turnover has got to be so quick. I think a lot of the technology encourages people to have a very very short patience threshold. Things have to be constantly changing or updated.* (Carole, aged 74)
>
> *It's sort of come into our lives and so much more, and more, and more now is being done through computers and technology. And I think we're all being a wee bit left behind, us golden oldies.* (Alice, aged 69)

> *I do think older folk are being squeezed out of a lot in terms of technology, you know, unless we make the effort to be on a course or something, then really nobody's interested in you.* (Mary, aged 72)

Some participants pointed out that this tide of digitalisation was especially challenging for more senior older people to survive out of it:

> *I think we're at the age that's on the cusp of technology, in your seventies you can catch up with things. Those people in their eighties I don't think-, unless they were doing computers all the time, no chance.* (Elaine, aged 70)

> *I feel sorry for people who are a lot older than us, because it's even worse for them.* (Lucy, aged 72)

As Elaine mentioned, there were the factors of reduced cognitive function and historical background in play. However, what concerned the participants more, not only for people older than them but also for themselves, was that the old and familiar culture was taken away and replaced under the digitalisation movement. They were, in a way, forced in. As one participant commented:

> *In the '70s, I heard an old lady say, which I thought was really funny and I know exactly what she means now, she said, "Why doesn't the government wait till us old people die out before they bring decimalisation in?".* (Mary, aged 72)

This had a full effect impact on their daily life: as digital becomes the default, more and more shops, and services (e.g., banks) are closed (see Quote 1), the ways how people socialise has changed (see Quotes 2 and 3), the ways of communication are different (see Quote 4), the forms of community interaction and social participation are altered (see Quote 5). New social norms were introduced to the participants as digitalisation continued, and what used to be 'fixed' was replaced by constant changes (see Quote 6). With the boundaries between online and offline lives becoming blurred (see Quote 7), as they observed, the younger generation started living in the information and social bubbles that they could not interact with (see Quote 8). Moreover, as this digital gap between generations widened, the social perceptions of older people changed. The participants observed more ageism against them (see Quote 9).

Quote 1: *The retail, they're in trouble aren't they, everybody's online.* (Sylvia, aged 78)

Quote 2: *Neighbours don't talk to you, people on the bus don't talk to you. And particularly now I think the young don't interact with the old. They are just behind these artificial things all the time. I think we are losing an awful lot of friendliness.* (Clara, aged 83)

Quote 3: *Whereas young people are still sociable, but they've got their head in their phone all the time. So they might be with a crowd, but they're all looking at their own phones*. (Julia, aged 73)

Quote 4: *So all my book group are on WhatsApp now but I'm not. 'Cause we can't get it. So you feel a bit excluded.* (Alice, aged 69)

Quote 5: *When there were only two channels on television, you would say to your neighbour, "Oh, did you see that programme last night?" So, you had a shared experience. Now, because you can choose to watch anything at anytime, anywhere, nobody can talk about it. It kind of fragments the culture.* (Carole, aged 74)

Quote 6: *Things used to last, so you didn't need to keep replacing things, but I think with these sorts of devices…things don't last these days. Nothing's static.* (Lucy, aged 72)

Quote 7: *I don't want to be connected all the time. I don't constantly feel the need to be in touch. As the future goes on, I think people will live their lives totally through that little box.* (Alice, aged 69)

Quote 8: *People don't seem to care for each other, they are in their own little bubble, and with their own little mobiles and their own little friends.* (Clara, aged 83)

Quote 9: *There's an advert of a little device, and it's basically like a spy thing, and you can switch on your computer and see what your parents are doing. Now this company are selling it as, "It helps me keep in touch with my parents. I know that my dad's watching the television now and he's safe."* (Elaine, aged 70)

The participants felt then, indeed, excluded from this lifestyle and marginalised in the digital society. The ageing process seemed to have pulled them in a different direction from where the society dominated by the younger, working generation was moving forward.

It appeared that many participants chose to semi-move with the time. They acknowledged that this digitalisation trend was unstoppable and decided to go along with it:

> *You can't really stand back and say like King Canute, "Don't let the tide come in," 'cos if we stop, everyone else will be doing it and you've certainly got to compete.* (Hugh, aged 79)

> *I actually think that I'll probably never be very comfortable with it [digitalisation] at all. But I do see the advantages, I'm not a complete Luddite, you know.* (Joan, aged 69)

Meanwhile, they admitted that they used the offline alternatives as much as they could. This, as they revealed, was not just to stay active offline like discussed in Section 5.6.7.1 but also to follow their traditional value of keeping people's jobs and saving the local stores:

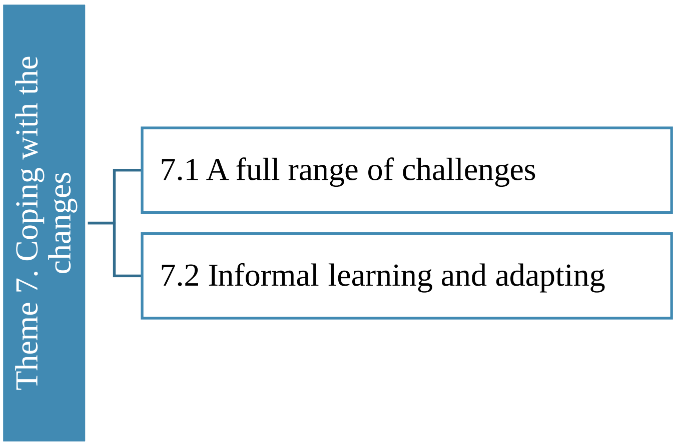
> *It's this old-fashioned idea of trying to keep people in work, you see.* (Frank, aged 75)

It seemed to be an attempt to preserve their culture under the socio-cultural and socio-technological changes as a way to keep their identity, self-value, and position in society.

5.6.8 Coping with the changes

This section discusses the integrative theme that permeates all the other six themes (see Figure 5-4 in Section 5.6.1). The participants' accounts on the changes from personal, social, technological, and societal dimensions constituted a recurring topic summarised in sub-theme 7.1. Equally pervasive in the data was the participants' engagement in various forms of informal learning as a way to cope with such changes (i.e., sub-theme 7.2). The structure of the themes is displayed in Figure 5-11 below.

Figure 5-11 Sub-themes (second level) under Integrative Theme 7 *Coping with the changes*



The discussion of this section is thus revolved around these two sub-themes as follows.

5.6.8.1 A full range of challenges

Reflected in the previous six themes, the challenges that the participants faced as they aged in a digital society were all-around, including internal changes such as deteriorating health conditions and external changes such as reduced social relationships and connections.

As have discussed by the end of Section 5.6.7.2, the participants recognised that the shift towards digitalisation was inevitable and whether willingly or not, they needed to accept and adapt accordingly:

> *I think you just have to embrace it because it's going to happen.* (Harriet, aged 68)

However, under these changing circumstances, the participants, and many other older people in the society, appeared to be the most vulnerable to digital inequalities in all aspects (e.g., in 'access' to devices like that reported in Section 5.6.4, in 'skills and use' like that reported in Sections 5.6.3, 5.6.5 and 5.6.6, in 'outcomes' like that reported in Section 5.6.7, in 'motivation' under the influences of personal traits reported in Section 5.6.2, and in online experience discussed in Section 5.6.6).

Many participants frequently pointed out that these changes were associated with the transitions in different life stages, particularly relating to retirement. Retirement had a significant impact on the participants' organisation of daily life:

> *When retired, change, a big change yeah, and I think the social aspect of it as well. And it's the…[long pause]…daily routine as well. You know your whole day is, your whole day changes. I mean my life is quite busy, I keep very busy…but…not everybody adapts easily to retirement, it's a big life change.* (Beatrix, aged 65)

To these participants, the meaning of maintaining continuity in their lifestyle was paramount. This was partly the reason for some participants who took voluntary work after retirement (see Table 5-2). Meanwhile, it was also the primary motivation for the 21 participants (77.78%) who joined informal digital skills learning sessions in their local community (see Table 5-3). To these participants, attending the informal learning sessions in their local communities or the central libraries in the city centres was a way to stay physically and psychologically active. One of the major changes that the participants faced was ageing-related health deterioration (see Section 5.6.2.1). By getting out of the house and practising their digital skills, such as using a mouse or a stylus, they engaged in several forms of physical exercise. Meanwhile, socialising with their tutors, volunteers, and peer learners while doing informal digital skills learning kept their minds active (see examples in Section 5.6.8.2).

Some participants, especially those who were older (e.g., in their late 70s and early 80s), also disclosed the turning point in their ability to engage with digital skills learning and Internet use due to accidents. Andrew, for instance, was hospitalised after a fall. This put him off the digital skills sessions for several months:

> *I went into [shop name], it was pouring down with rain, and I went in and ten seconds, my feet went in the air, I knocked my head on a display stand, and I've gone totally deaf in this ear. And I fell on my ankle, and I got a fracture. Well, since then, that's slowed me down a bit [in digital skills learning], yeah.* (Andrew, aged 78)

Discontinuation with learning had a big impact on Andrew's Internet use. This was not only just because of the accident but involving many other factors. For instance, he depended on his tutor to troubleshoot/fix computer issues; his laptop was outdated and was running on Windows 7, thus frequently went down. The accident triggered changes in these areas like a chain effect. Andrew's case was an example of the diversity of challenges that the participants constantly faced in their daily Internet use and learning, including those in technology maintenance (e.g., the updates and computer malfunction discussed in Section 5.6.5.2) and access to support system (e.g., loss of a proxy user or support/assistance due to changes of personal circumstances).

Adjusting to the changes in technological and societal domains was also a recurring theme mentioned by the participants. As reported in Sections 5.6.4.2 and 5.6.4.3, many participants talked about their anxiety caused by system updates:

> *When you turn it on, what comes up on the screen was just totally different, absolutely and utterly different. I find that very disconcerting, I think, "Well, it's not the same."* (Joan, aged 69)

In addition, the speed of digital technologies upgrade and the replacement of traditional human services/assistance brought more pressure. For example:

> *Technology changes quickly. You get used to a new idea and suddenly there's something else that gets brought in.* (Mary, aged 72)

Many participants pointed out that with digitalisation becoming the norm, everything seemed to have moved online. As they observed, there were fewer offline options whereas more and more things were computerised, such as in the banks, hospitals, shops, libraries, and council services:

> *The thing is, you know like, I get like the gas board writing to me, "Go online." Or it might be about my pension, "Go online." And I think, "Well, it's not going to happen".* (Simon, aged 69)
>
> *I am very concerned, that increasingly people are being expected to do things online or with machines.* (Trudy, aged 73)

> *You're getting the Councils and everybody saying-, and tax people saying, "Everything's going online," forms, filling forms in and everything.* (Irene)

The participants had very different reactions to the changes, with a few accepted the change and actively engaged in learning, for example:

> *Things started to expand and-, that I decided to take more of an interest.* (Elaine, aged 70)

Many participants passively adapted to the changes out of a fear of getting left behind:

> *I suppose you've <u>just got to get used to it</u>. I mean it-, this is the only thing about it, isn't it? New things-, new fangled things come in and they decide to change it, you've just got to put up with the change. You've <u>no choice</u>. So, [lower voice] some've already found out how to cope.* (Clara, aged 83)

> *I've only just started it, and I'm not-, you've got to, we'll be left behind, you know. You'd be left behind, and I don't like being left behind.* (Sylvia, aged 78)

> *If you don't have any online skills, you could be left out in the dark as it were and, and feel completely isolated so, the world is carrying on and you are no longer a part of it, cause you can't keep up. So you have to go with it.* (Beatrix, aged 65)

Some participants mentioned the lack of choice with the services moving online:

> *You can't ignore them if that's the only thing you can get information from, can you? ... so from that point of view, I was sort of jigged along, jigged along.* (Hugh, aged 79)

While a few expressed their anger over this digitalisation trend and protested/resisted this shift whenever they were asked to go online, like Joan:

> *I actually thought, "I'm going to make a stand, I'm not going to do it at all." I found that an infringement.* (Joan, aged 69)

This sentiment of not wanting to get left behind was strongly expressed by many participants. The examples they observed from their surroundings propelled them to adapt and not to be like those who, as they saw, were left behind and excluded:

> *You know like the poor gentleman who, who was scared when he saw this iPad being passed around the class when we did the first aiding knew he had to-, "so what do I do with it, I don't have one". And he was really left out, he was the only one that wasn't comfortable with it. Not nice feeling. That's why I feel as though I need to continue learning all the time because you can get left behind.* (Beatrix, aged 65)

Indeed, as Beatrix and many other participants disclosed, keeping up with societal and technological changes became essential for them to renegotiate their identity and role in society after retirement. As they noted, these changes were coming all the time and required continuous management. Therefore, it was particularly important to learn how to sustain their digital engagement through learning.

5.6.8.2 Informal learning and adapting

Following the thread from the previous section, informal digital skills learning sessions were resorted to by many older people to keep abreast of the times. Julia, a volunteer who taught other older people, revealed:

> *Most older people come here [the session] because they realise that nearly everything is online now, anything they want to do is online.* (Julia, aged 73)

It appeared, as mentioned in the previous section that the participants used the informal learning sessions for staying digitally included (therefore socially included) in several ways, such as socialising. One participant explained how their focus shifted from digital skills learning to socialise at these learning sessions:

> *Originally, it was getting to know things. But now, it is like a social thing. I mean, we know a lot of things now, we don't know everything, but we know a lot of things now. So it can be a social event as well.* (Fred, aged 73)

His account is consistent with the findings on how the participants used the Internet (e.g., limited and only used for what was relevant to their lives) reported in Section 5.6.5. Indeed, most of the participants who regularly attended the informal learning sessions at various types of sites, such as the community learning centres and the central libraries (see Table 5-3), stated that they enjoyed the socialising aspect of these sessions.

The dynamics of each site was different (see Section 5.3.2). In some learning sites out of the participants social circles, such as the central libraries in the city centre, the participants built a stronger relationship with their tutors than with their peers. The social dynamics with their tutors and the 'teaching'/facilitating styles of the tutors seemed to play an essential role in keeping these participants going:

> *He [tutor] taught me how to email, and I've been sending email ever since to him. He likes my email he says. I try and put a lot of humour in, which is different [Laughs]. I try and make him laugh a bit.* (Andrew, aged 78)

> *Well, he [tutor] half tells me, and if I get completely stuck, he does a bit and then, "Right, what's next?", you know? He won't do it all for me if he can force me [laughs] to do it meself.* (James, aged 71)

In comparison, the participants who turned up for sessions in local community centres or social venues maintained a lasting relationship with their tutors/volunteers and their peers in the community. Communities of practice were formed and sustained with the natural development of subdivisions in the learner cohort based on their devices, such as iPad groups, smartphone groups, and tablet groups. They, therefore, built a closer relationship within the group by exchanging knowledge (e.g., a helpful app on the iPad), helping each other out (e.g., how to manage the security settings), and sharing their experiences (e.g., their 'best practices' on mitigating financial risks by using Paypal instead of bank card for shopping). Those who had less digital/Internet literacy and hand-on skills were able to learn progressively through following what those more experienced learners (and sometimes from the tutor) were doing. Some participants pointed out this situated learning environment to be encouraging and enabling:

> *Everybody is made welcome and it's the exchange of ideas, also talking to other people. Some people might come here and think, "oh I am going to be the only one*

that doesn't understand this". So talking with other people similar to yourself helps I think. It's for sharing, and it's that comfort feeling that gives you encouragement. It builds self-esteem and it builds confidence. (Beatrix, aged 65)

I think it was the people, that gang [the tablet group] in there. They make you feel comfortable. And they didn't laugh at me [laughs]. That lady that you saw before, she's really good. I learn a lot off her, I watch her, yeah. (Sylvia, aged 78)

Some participants disclosed that the community of digital skills learning were extended from their original social circle. This strengthened social bonding sustained their learning engagement, and therefore, online participation:

A few of us got our heads together and decided we'd come and join. And we go for company because we catch up with all our news and everything each week. We help one another because if one of us gets stuck-, you ask somebody else and they've had either the same problem, or they've not had a problem, but they look at what's happening to you. (Lucy, aged 72)

Because it is in a community and local area, and you see people around the community and bumping into the other people in the class and you know, you can say hello and say see you on Friday, so that part of it is nice. It gives you more confidence. (Doris, aged 65)

According to the participants' accounts, it was not only the social aspect that sustained their learning and digital participation but the overall environment of these sessions that made them feel secure and comfortable. It appeared that they developed trust and gained confidence in 'fiddling' with their devices and exploring the online spaces within this specific environment. Although many participants felt that they had learned everything they needed to know (as Fred disclosed at the beginning of this section), they still had the pressure from the rapid changes in technologies and the fear of getting left behind (see Section 5.6.8.1). They found the handouts/learning materials that the tutor prepared and the discussions with other learners very useful in keeping them updated with what was new. In this regard, the learning sessions became the gas stations to fuel up and keep 'driving' (see Section 5.6.6.2 for this analogy of 'driving a car' used to describe digital participation). Many of the participants expressed how much they valued the learning opportunity and that "*every little trick helps*" (James):

> *I could come here for an hour and if I learn only one thing, then it's worth it, cause I go away knowing something that I didn't know before I came. Sometimes you can learn a lot in a lesson, sometimes maybe just one thing but so valuable.* (Beatrix, aged 65)

> *Because I just felt that I've just had to keep on with it. That's why I just keep coming to this class. I do know a lot more now than I did when I started but, because it changes so regularly.* (Doris, aged 65)

> *It is a social thing, yes. But I would say you do gain a little bit of experience each week, of the ins and outs of how things are altering and everything, so it's very good. It broadens your mind.* (Lucy, aged 72)

Doris then further pointed out the importance of repeating and consolidating what they have learned. Like Doris, many participants thus used these sessions to practise their skills through reviewing and repeating the learning notes/handouts:

> *If there's been a lesson and I haven't used it straight away…you've kind of forgotten really how to do it. So, by keep coming to the class we keep going over things, you reinforcing the information.* (Doris, aged 65)

Many participants revealed that they also relied on the sessions to fix the problems they encountered. Thus, the learning sessions also served as a supporting role in maintaining the participants' continuous use of the Internet by helping them to clear away the little 'mines'. For those who did not have immediate help at home, they would write down the problems that they encounter and then bring them to the tutors (see Section 5.6.5 for more on use patterns):

I'd take it-, well, I'd go on the Monday sessions. And I'd make a note of what I wanted to ask them [tutors and peers]. This is what I do if something crops up, and they just sort it out for you. We all do that, we all take our problems on the Monday. (Lucy, aged 72)

A few participants developed more dependence on these sessions and started to only go online for certain things during the learning sessions. This gave them the sense of security and boosted their confidence, knowing that help was at hand:

Now and again I use it [the laptop] here. 'Cause I'll say, "Oh, [tutor name] what's up with this?" on the laptop and she'll help. (Irene, aged 82)

So having found out about coming to the library. I started to enjoy, coming here, and just tinkering about on it. (Simon, aged 69)

The tutors were frequently referred to as a great value in the learning courses. The participants reflected on different learning experiences they had. They pointed out the good qualities of the tutors (and the learning sessions) that kept them going, such as being friendly, avoiding or explaining the jargon in the ways they could understand, sitting with them and spending time with them to help them cope, using informal and flexible teaching method, doing it for free, and most importantly always explaining and not just doing things for them unless necessary. This last quality was in contrast with the helpers (e.g., family members) that some participants had at home. As reported in Section 5.6.3, many participants found that although their family members helped sustain their digital participation and general learning, they tended to be impatient and fix things instead of explaining what went wrong. For examples:

I found it really useful, having somebody sat with me, helping me for the whole time, rather than telling me to do something, then disappearing, and I press the wrong thing and then I have to wait for somebody to come back again. So, I quite like that buddying-up system. (Alice, aged 69)

Overall, the participants found these learning sessions helpful in getting them started (e.g., with the basic computer skills), taking their fear (of breaking things) away (see more discussions on Section 5.6.6.1), and keeping them going in many ways (e.g., reinforcing their skills, troubleshooting for malfunctions, and maintaining up-to-date digital literacy) that without which, they would be digitally disadvantaged and gradually, become digitally excluded. As one participant reflected:

Me friends had all got laptops, so it [the iPad] was stuck in its box. So, I don't know what I'd have done without this place [learning session]. (Sylvia, aged 78)

I didn't know nothing before coming here. [Tutor] showed me. She's very good. I'm saying, "Will I get into trouble with this?" She says, "You won't. You're not going to break it." (Irene, aged 82)

There were, however, some limitations in the courses. One of the main limitations mentioned by the participants was the availability of the courses (see also discussions in Section 5.6.3.3). The courses were confined with time, space, the tutors, and the contents. Firstly, although many informal learning sessions were on a drop-in basis without the need to book in advance, they were run infrequently, such as once or twice each week. Secondly, some participants pointed out the disruption to their learnings due to renovation or repair work in their learning sites. In some cases, the closure of some learning centres or libraries caused more disruption to their continuity of learning as they had to travel a distance to an unfamiliar community or learning environment. Thirdly, due to limited funding, some learning centres had to largely rely on volunteers. As noted by the participants, the volunteers often had different levels of digital skills and were more familiar with the devices they used. There were occasions when the participants found supportless because no one had used the same device or software. Lastly, as the digital devices and online contents become more and more diversified, these informal learning courses (e.g., the prepared hand-outs with instructions) sometimes lag in synchronisation and accommodating different learning needs. For examples:

I only see [tutor name] as I say, two or three times a month if that, and that only amounts to about two and a half to three hours. It's not enough. (Andrew, aged 78)

They're shutting it [centre 1] down while they refurbish it. There was one down in [community A] but that closed up for some reason. I believe there was another in [community B], which I've been told has closed. So I don't know where the nearest one to us is actually. So, we're sort of all hoping that when it's all refurbished at [centre 1] then we shall, continue. (Hugh, aged 79)

The lady-, the information she was giving us was out of date. And she was trying to-, she got really ratty if you didn't do things her way [laughs]. (Alice, aged 69)

Nevertheless, these limitations of the courses seemed to be compensated by the advantages, in particular, the overall experience that such courses provided. As one participant put it:

> *I accept the fact that that is a voluntary course and it's free. They're giving their time up, and if I learn one thing, I'm grateful. And it's social, I speak to people and get a cup of coffee.* (Mary, aged 72)

Similarly, the communities of practice that many of the participants welcomed also had drawbacks. By doing things together in a group and sharing experiences, they often anchored on the same belief or view towards the Internet. While it encouraged and facilitated the participants' learning and progress, it sometimes inhibited their digital participation because of shared bias or fear towards certain online activities, such as online banking. One participant illustrated:

> *It's positive to come to the group and to listen to everybody's experience. But, the group also tell you their experiences that they've had that maybe negative, that they get the unwanted emails, the scam emails, and when they've ordered something online and it hasn't arrived or it isn't as good as they thought it was. You know, so that hasn't helped with my confidence in that respect.* (Doris, aged 65)

Being aware of these limitations in the learning sessions and the groups, some participants also resorted to other forms of informal learning, such as self-taught through computer books or online media (for those who could perform basic online information seeking). However, most of these experiences were negative, as one participant recalled:

> *I did buy a self-help book: 'iPad for Dummies', or something it was called. Well it started straight away using all this technical jargon that meant nothing to me. <u>Nothing</u> seemed to relate to what I was trying to work with.* (Alice, aged 69)

> *…iPad copy books. But it was over my head. Too advanced, it wasn't coming in, it was too high powered for me. I got cracking, but it's only so much you can learn on your own.* (Sylvia, aged 78)

Sylvia further highlighted the importance of having someone to facilitate their learning and progressing:

I'll say, "I can't do this," and they say, "Oh, well, have you tried this?"And, yeah, oh, why didn't I think about that? Some things you have to be told. A book can't do that. (Sylvia, aged 78)

Similarly,

> *But again, it's far better to have someone to explain things to you, it saves so much time. And you get there much quicker.* (Andrew, aged 78)

What Sylvia and Andrew valued was an in-person communication and interaction experience, as well as a learner-directed, problem-centred learning environment. These were the facilitating conditions that most participants highly valued in engaging in continuous learning and online participation.

5.7 DISCUSSION

This study aimed to understand how the digital divide among older people took shape, developed, and addressed informal learning. Different from most existing research on older people's digital use or non-use (Morris et al., 2007; Van Deursen & Helsper, 2015a; Vroman et al., 2015), this study placed the digital divide in the context of older people's daily life where the ageing process also took place. In doing so, the relationship between digital technology and ageing was reflected upon.

On the whole, this study revealed that the factors that influenced the participants' digital engagement were multi-faceted. They can be categorised into the personal, technological, and social aspects in a broad sense, as shown in themes 1, 2, 3 and 6 emerged from interview data. In addressing the first research question, "*What factors influence, shape, and change the digital divide among older people?*" these aspects were further examined in detail within each theme.

A multiplicity of factors taken from individual circumstances and perceptions, such as age, education, motivation and anxiety, have long been recognised as sources of influence on a person's level of digital inclusion (Helsper & Reisdorf, 2017; Scheerder et al., 2017; Selwyn, 2003; Van Dijk, 2005; Warschauer, 2003), and older people are no exception (Hodge, Carson, Carson, Newman, & Garrett, 2016; Peacock, Kunemund, & Künemund, 2007; Seifert & Schelling, 2016). Although compounded with age-related deterioration in physical, sensory, and cognitive functions (Age UK, 2019; Gamberini et al., 2006; Sandhu et al., 2013), as well as generational upheavals in digital technology and economy (Gatti et al., 2017), these factors were recognised to exhibit a more deterrent effect on the cohort of older people (Seifert & Schelling, 2016; Tan & Chan, 2018; Zaidman & Tinker, 2016a). This study corroborated these findings on the influencing factors from physical, psychological, and socioeconomic dimensions (see Sections 5.6.2.1, 5.6.2.2 and 5.6.2.3) and extended to the under-researched underlying historical and cultural aspects (see Section 5.6.2.4). Concepts within this range such as disposition, value and belief are intangible and often abstract, making them difficult to be operationalised and measured in quantitative models [c.f., (Macedo, 2017; Vassli & Farshchian, 2018; Venkatesh, 2003)]. However, they appeared in the sample as significant hidden factors that rationalised how digital devices were regarded and used by older people (as discussed in Section 5.6.5).

The technological factors encompassed the affordability of materials, the devices' features, and the online platform's environment. Within the sample, the ownership of tablets (75%) and smartphones (59%) were high. Similarly, Deloitte (2019) reported a high smartphone take-up rate (80%) among the 55-75 age group; however, they also highlighted that the actual use of smartphones for various daily activities among those aged 65 and over was rather limited. The findings of this study suggested that the smartphone adopters among the participants used their devices frequently. Still, indeed their use tended to be fixated with certain functions relevant to their daily living. Studies like the one conducted by Choi and Dinitto (2013a) have revealed a gap in digital equality among older people caused by the affordability of digital devices and services. While their results highlighted the risk of discontinuity of Internet use when older people could no longer afford the cost of maintenance, findings in this study revealed that the digital inequalities caused by the cost of digital engagement were more nuanced; it was not only a matter of discontinuation but also of limited participation that led to differentiated opportunities in the society. This study further corroborated the existing literature on findings suggested that online safety (e.g., scams) and media environment (e.g., misinformation) were the major concerns on Internet use among older people (Olsson et al., 2019b).

There was a widespread sense of the importance of money management among the participants. Many participants were alert to various forms of scams and fearful of losing their life savings. ‘Being careful’ and ‘being cautious’ were constantly expressed by the participants as a rule of thumb when it came to investing in Internet-enabling gadgets and services, as well as stepping out of their comfort zones of Internet use. It was most evident in cases where online banking and online shopping were shied away from. It may be because most of the participants were retired, and thus financial resilience was crucial to them to be prepared for life events. On the contrary, Blok and her colleagues (2020) noticed a growing sense of control in life gained by one older informant who used online banking. Nonetheless, it was confirmed that although their interviews, in general, took a different stance towards managing money online in contrast to that of most of our participants, both studies revealed the importance of gaining control over financial management (thus maintaining stability over later life) for older people.

The influence of social support systems and resources on older people’s digital engagement has been widely reported in existing literature (Helsper et al., 2015;

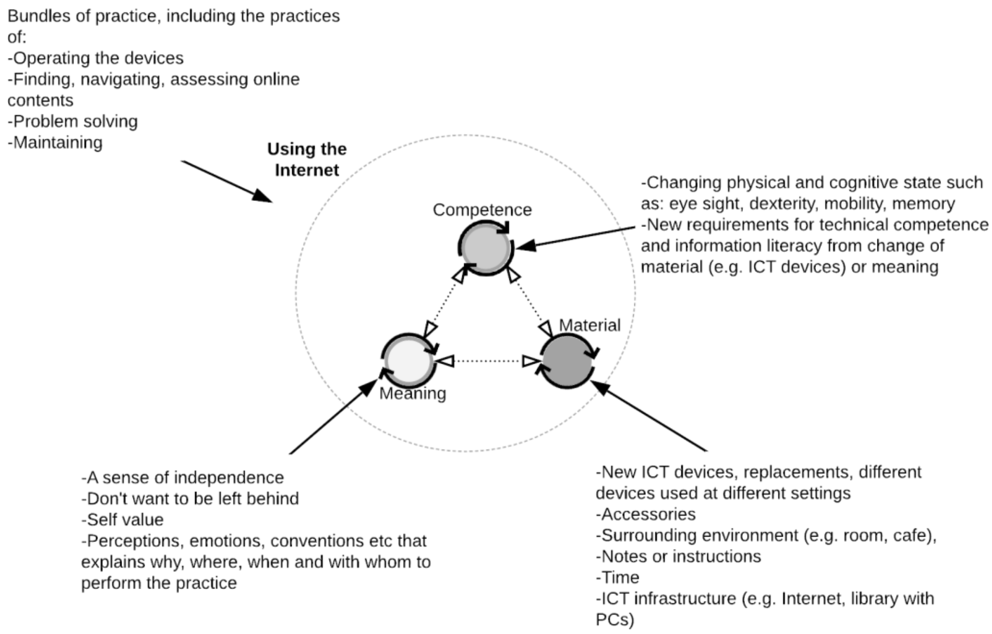
Martinez-Pecino et al., 2013; Barbara Barbosa Neves et al., 2015a; Rodney, Josiah, & Baptiste, 2021). When asked about their digital life, the participants often zoomed out of ‘the digital’ and brought more social aspects into the picture. These social aspects are indispensable in gaining a more comprehensive understanding of digital inclusivity in older people’s life. For example, findings from this study accord with that of Szabo et al.’s (2019) in that the social connections not only acted as support systems that helped the participants to go online but also as motivators that sustained the participants’ digital engagement (e.g., to keep in touch with social ties, or to look up information online for others in their social circle). In addition, the social network appeared to be the primary facilitator for the participant’s ongoing engagement in informal learning. This finding is supported by similar results from Morris et al.’s (2007) study.

Successful use of Internet-enabled ICTs in a desirable way requires the orchestration of one’s body and mind to interact with artefacts such as the keyboard. Both bodily knowledge and conceptual understanding of digital use can be gained (Cox, 2012). It was found that the digital natives, who use the Internet like second nature, often take for granted the very basic physical operations on the Internet-enabling ICTs and the judgements needed on human-computer interactions for what they consider as mindless steps that are just done by reflex (Di Giacomo, Ranieri, D’Amico, Guerra, & Passafiume, 2019). In comparison, for most participants who were considered as digital immigrants (Wang, Myers, & Sundaram, 2013), the most basic tasks such as grasping a mouse, tapping on a touchscreen and remembering the steps, as well as the acquisition of such elementary level of competence and skillset through informal learning, turned out to be the most difficult due to their declining physical and psychological status (Helbostad et al., 2017). This finding is consistent with that from a study on ICT adoption among Singaporean older citizens conducted by Tan and Chen (Tan & Chan, 2018), in which the recurring themes that highlighted the importance of *bodily capital*, the capacity of a person’s physical health including “tactile sensitivity, strength and sight” (p. 127), were identified. However, Tan and Chen’s (2018) study merely touched on the embodiment of Internet use at its face value. Their discussions were still primarily revolved around older people’s physical capabilities as the resources for technology adoption. In comparison, this study aligned with Cox’s (2012) call for recognising the role of embodied knowledge in addition to a traditional cognitive forms of knowledge/literacy in informing/enabling daily practices. As a result, the bodily capital in this study was not merely treated as resources, but also as a form of competence, the practical know-how of using certain digital devices.

A benefit of this view was that it enabled the researcher to address the research question better, "*How do older people manage and sustain their day-to-day use of ICTs and the Internet through informal learning?*". It appeared that the participants used the informal learning sessions to 'refresh' their practical know-how under the changing climate of ICTs and the Internet (e.g., technological influencing factors such as system upgrades or software/website updates) so that to sustain their digital participation. This finding extended the understanding of the usefulness of informal learning based on the acquisition of cognitive knowledge, such as the *perceived usefulness* and *perceived ease of use* of the technologies (Mostaghel, 2016). The Internet use pattern among the participants emerged as limited, assisted, and mixed use of online and offline resources to manage daily tasks. The former two types of use pattern were commonly reported in the digital divide research literature as indicators of the digital divide, with limited use of the Internet signifying the digital divide in the layer of 'use' and the assisted use of the Internet implying the digital divide in the layer of 'skills' (Lutz & Hoffmann, 2017; Tan & Chan, 2018; Tsai, Shillair, Cotten, Winstead, & Yost, 2015; Van Deursen & Van Dijk, 2014). The hybrid model of Internet use among older people was a recurring use pattern that emerged from the data. It represented the selective use of the Internet by the participants as a way to balance online-offline life. This study revealed that various forms of informal learning, especially those carried out in the participants' local communities, were used by the participants to sustain their online participation. The way the informal learning sessions supported the participants' online engagement is explained by the models shown in Figures 5-12 to 5-15.

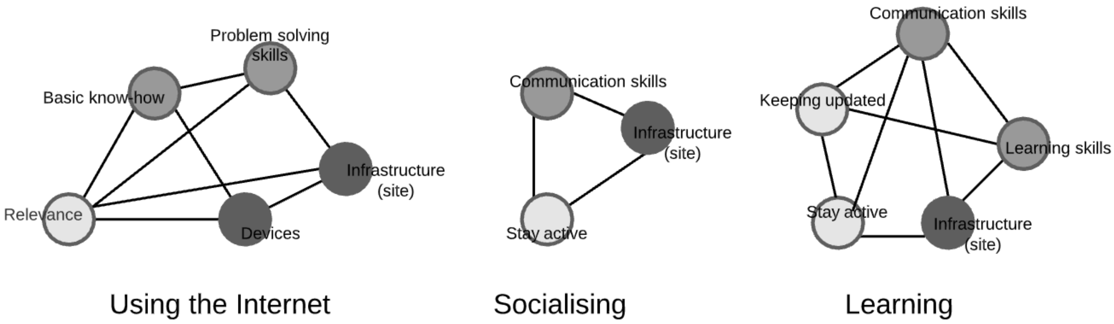
As explained in Section 5.6, the participants' practice of going online involved the constitutive elements of material, competence and meaning (see Figure 5-12, c.f. Figure 2-4). As study results suggested, the practice of going online itself involved a set of constitutive practices (sub-level practices), such as turning on the computer, logging in and so forth (Ramondt et al., 2013). These practices had their ways of linking and combining the elements shown in Figure 5-12. The arrow from outside the practice boundary indicates that going online consists of multiple sub-level practices. Problem-solving and maintaining their access to computers and the Internet are thus two essential sub-level practices that sustain the action of going online. It accords with studies that pointed out the importance of technology maintenance in preventing digital disengagement (Gonzales, 2015). It can be seen from Figure 5-12 that the 'ingredients' for these three types of essential elements are rich and constantly changing – the disappearance or change in one element affects the dynamics and sustainability of the practice. Comparing to the UTAUT2 model (see Figure 2-3), this model based on the practice theory better accounts for the nuances behind a simple behaviour of use or non-use. It thus is more capable of dealing with the dynamics and changes in Internet use, which are common among older people (e.g., see Section 5.6.8). The 'ingredients'/factors for sustaining a practice of going online are not exhaustive. A complete list of the factors is shown in Table 7-1 in Chapter 7.

Figure 5-12 The constitutive elements for the practice of using the Internet



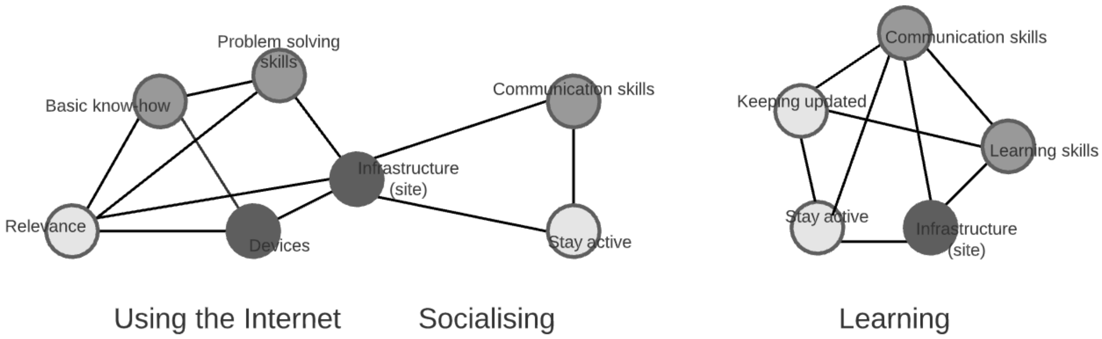
The value of Figure 5-12 is that it abstracted/prepared the rich findings from the interviews to further analyse the relationships between informal learning and sustained Internet use. In order to understand if and how the practice of informal learning sustained older people's online engagement, the practice of using the Internet shown in Figure 5-12 is further simplified by zooming out from the practice per se and looking into the context where other practices exist and interplay with it. Figure 5-13 provided a simplified view of the practices of using the Internet, socialising, and learning with the core elements for clarity.

Figure 5-13 Simplified illustration of individual performance of practices



As shown in Figure 5-13, the practice of using the Internet is simplified to one *meaning* (i.e., relevance, shown in light grey), two *competences* (i.e., basic know-how and problem-solving skills, shown in medium-light grey), and two *materials* (i.e., the devices and the infrastructure, shown in dark grey). These were the most mentioned factors by the interview participants (e.g., the relevance of the Internet to their daily life was the most important reason for use, as discussed in Section 5.6.5). Similarly, core elements were identified, elicited and shown in the other two practices. Based on the conceptual foundation laid in Figure 5-13, Figure 5-14 demonstrates a scenario when the practices of using the Internet and socialising bundle by their material foundation (i.e., infrastructure).

Figure 5-14 Simplified illustration of bundles of practices between using the Internet and socialising

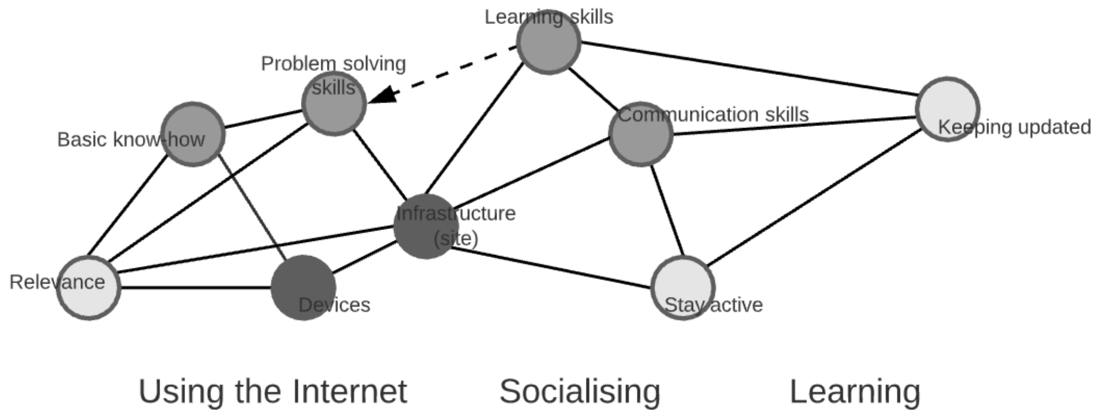


Maintaining social engagement is beneficial to older people's wellbeing (Bath & Gardiner, 2005; Shergold et al., 2015). Socialising is thus a priority for older people for staying active and healthy (see Sections 5.6.7 and 5.6.8). As discussed in Section 5.6.8, the participants commonly reported socialising as the main reason for attending the informal learning sessions. It was also mentioned in many studies, such as those conducted by Morris et al. (2007) and Choi and Dinitto (2013a). However, their findings did not take a step further to understand whether and how socialising at the learning sessions sustained older people's digital participation in addition to providing motivational reasons. By examining this question based on a practice view, this study found that these practices were bundled together through sharing a material foundation: the site of the informal learning sessions (also see Figure 5-15).

Previous studies have pointed out the physical environment factor in facilitating or inhibiting the learning and use of computers (Shapira et al., 2007) but failed to assess its long-term effect. This study pointed out that through the bundles of these practices (i.e., doing these things together), the participants' digital engagement was sustained. Nevertheless, a risk to this model is that the link between the two practices is only made at the material. Referring to Figure 5-12, the elements of the practice of using the Internet change with time (e.g., Sections 5.6.2 and 5.6.8). Once the current level of competence falls behind the new requirement (e.g., issues with system/software update), the practice itself becomes unsustainable.

Figure 5-15 provided a bundle of the practices of using the Internet, socialising and learning. It corresponds with most participants who went to the sessions for socialising or using their computers and informal learning (e.g., learning how to solve the problems, gaining new digital literacy to keep abreast with the time). In Figure 5-15, the arrow from the competence of *learning skills* to *problem-solving skills* not only stands for the scenario of skills being transformed from one practice to another (i.e., gained skills from learning), but also for the scenario of assisted Internet use (i.e., the tutor/volunteer/family helper helped to dissolve the issues). The participants commonly described these two scenarios (see extensive examples in Section 5.6.8).

Figure 5-15 Simplified illustration of bundles of practices between using the Internet, socialising, and learning



This finding adds to the existing knowledge on the role of informal learning in sustaining older people's digital inclusion. The study conducted by Zeidman and Tinker (2016b) has focused on formal training instead of informal learning and thus have concluded that the value of digital skills training is in promoting digital literacy among older people. Compared to their study, this study made theoretical contributions to understanding the sustainability of digital inclusion and shed light on the practical side (e.g., the value of community-based learning sessions/sites).

As explained in Sections 5.6.4 and 5.6.8, the participants' continuous digital use was under constant challenge due to rapid technological changes such as system update. Consistent with Damodaran and Olphert's (2010) finding, most participants used rote learning strategy to get online. Thus, the participants inevitably became susceptible to digital disengagement if additional help was not available. Informal learning was deemed helpful to help older people to counter these challenges. The sustainment of online engagement was thus dependent on the sustainment of access to such learning sessions. The convenient location and facilitating learning environment shared among these practices helped glue them together (thus sustaining). Comparing to merely using the Internet while socialising (see Figure 5-14), the bundle of all three practices (see Figure 5-15) further strengthened their relationship with additional links between these elements.

Regarding the third research question, "*Does sustaining digital inclusion contribute to an active and healthy ageing for older people? If yes, how? If not, why?*". Findings from analyses on themes 5.6.5 and 5.6.7 suggested a delicate balance between the level of digital inclusion and staying active and healthy to maintain: too much weight of digital engagement seemed to inhibit the participants' aim to stay active. At the same time, too little weight of online participation appeared to exclude the participants from various aspects of social inclusion. The former scenario was due to older people's need to stay physically and socially active. Engagement in embodied activities contributed to the physical (e.g., getting out of the house instead of sitting in front of a computer) and mental wellbeing (e.g., in-person interaction). It thus related to the participants' preferences of the management of their daily life. The latter scenario was mainly due to the digitalisation trend that was underway in society. As the participants commented, the offline alternatives seemed to be gradually replaced by online services. Thus, digital exclusion could result in and reinforce social exclusion (Helsper, 2008, 2009). As Russell (2007) observed, this could result in a gradual withdrawal from mainstream society, thus raising "*ontological* and *existential*" concerns for the participants.

Therefore, it is worth thinking whether the limited-, assisted-, and hybrid/mixed (e.g., selective) use of the Internet, which are traditionally viewed as forms of the digital divide that need to be fixed, is indeed 'disadvantaging' the group of older people. Aligning with Kania-Lundholm's (2019) call, this approach raises a question over the dominant rhetoric of technological determinism in digital divide research (see Sections 2.3.1 and 2.3.2).

5.8 CONCLUSION

In this chapter, the details of the second phase of this research were presented and discussed. Semi-structured interviews were analysed through a template analysis approach, which generated seven themes that demonstrated the influencing factors of digital engagement among the participants. A contemporary stream of social practice theory was used further to interpret the themes concerning the research questions. Illustrative models were developed to offer a visual representation of how the practices of Internet use and informal learning (including socialising) were bundled and anchored on the infrastructure of the learning sessions. The findings on the competitive relationship between digital inclusion initiatives and active and healthy ageing raised questions over the dominant view on the digital divide among older people. It will be further discussed in Chapter 6 through triangulating and discussing the findings from both quantitative and qualitative studies.

CHAPTER 6 TRIANGULATION AND DISCUSSION

6.1 INTRODUCTION

In the previous chapters, the background and rationale for undertaking this research (Chapter 1), research questions (Chapter 1) based on gaps in an existing body of knowledge (Chapter 2), the methodology (Chapter 3), and findings from the quantitative study (Chapter 4) and qualitative study (Chapter 5) were reported. This chapter is dedicated to discussing the whole research project (i.e., both quantitative and qualitative studies) and the triangulation of the results to better understand the research topic.

As introduced in Chapter 1, this research aimed to better understand the digital divide phenomenon among older people. It was a novel approach combining both dynamic and holistic perspectives in investigating this already widely researched theme. A dynamic view refers to acknowledging a 'fourth digital divide' in the sustainability of digital engagement overlapped with the first-, second-, and third- levels of digital divides regarding access, skills and use, and outcome. The existing digital divide framework was extended through social practice theory, and a new concept of a *digital minefield* was raised. Through this concept, the digital inequalities among older people were explained in more detail in Section 6.3.3. It also led to recognising how ICTs and the Internet for older people were closely coupled with learning how to manage and maintain such status under the pressure of changes and challenges due to ageing and rapid technological development. This research has thus brought new insights into the association between informal learning and digital inclusion among older people.

A holistic view, in this research, brought together the digital divide and ageing-related research and placed them in the context of daily life. The appropriation of digital technologies (or the lack of it), the learning and maintenance (or the lack of it), and ageing-related activities were found all blended in older people's everyday practices. The scope of understanding the digital divide was broadened to its context. The inquiry was thus extrapolated to a comprehensive investigation on how digital activities relate to other parts of life, rather than merely the digital technologies *per se*. In doing so, the contextual factors that influenced the formation and sustainability of digital inclusion among older people were uncovered. These factors interplayed with factors from the personal domain.

In this sense, this thesis added value to the research on the digital divide among older people with a more nuanced and comprehensive understanding of the influencing factors (see Table 7-1).

Following this introductory section, this chapter first triangulates findings from each component of this research from methodological and theoretical perspectives in Section 6.2. In Section 6.3, the research questions are addressed based on a discussion of the overall findings. This chapter concludes in Section 6.4 and looks forward to the conclusions of this thesis in Chapter 7.

6.2 TRIANGULATION

As discussed in Section 3.3, this study used quantitative and qualitative methods to explore different aspects of the research problem. The first study based on quantitative research methods was used to explore the status quo of the digital inequalities faced by older people and whether participation in learning and training would help address their digital disadvantages. This study was based on the existing theoretical models for the digital divide phenomenon. They are:

1) A taxonomic model based on the first-, second-, and third- levels of the digital divide by using the indicators of motivation, access, skills and use, and outcomes (Hargittai, 2002; Helsper, 2012; Lutz, 2019; Nimrod, 2018; Robinson, 2015; Scheerder et al., 2017; Van Deursen & Van Dijk, 2019);

2) A dynamic model based on the fourth digital divide (Olphert & Damodaran, 2013) in digital (dis)engagement (Damodaran & Olphert, 2010; Helsper & Reisdorf, 2013; Leonard & Hebblethwaite, 2017).

This study had certain limitations in sampling, including the use of the LMW training programmes to represent the overall informal learning context in the UK, and the fact that the participants of the two surveys were different. However, the impact of these limitations was not entirely negative. A positive impact brought about by this was that the social phenomenon under study could be better judged through different perspectives. It was achieved and reported in Section 6.2.1.1, where findings from the two surveys are triangulated.

The second study, based on qualitative research methods, investigated in-depth the digital life of the participants to the interviews and the overall circumstances of the digital inequalities they faced. From the perspective of the Social Practice Theory (Blue et al., 2016; Cox, 2012; Schatzki, 2011; Shove, 2010; Shove et al., 2012), this study also explored why these digital inequalities occurred, how they developed and how older people maintained their digital participation through different forms of informal learning. While following these 'how' and 'why' questions, the researcher also revisited the phenomenon of digital inequalities within the existing digital divide frameworks. It appeared that the existing frameworks were better conceptual tools for the quantitative study. In comparison, they were less effective in reflecting the context in which the digital inequalities take place and change. As a result, the researcher extended the existing digital divide framework with the more nuanced concept of a *digital minefield*. It will be further elaborated in Section 6.2.3, where the triangulation of theories is presented.

The findings from each study were introduced and discussed in Chapters 4 and 5, respectively. Based on this, between-methods triangulation was carried out and is reported in Section 6.2.1.2 to compare, contrast, and synthesise the findings (Guba & Lincoln, 1994).

6.2.1 Within-methods triangulation

Within-methods triangulation usually refers to the diversification of methods within the same research paradigm (Bryman, 2009). Denzin (1978a) referred to this approach as a way to cross-check the research results for better internal consistency and credibility. As presented in Chapter 4, the quantitative study utilised two LMW surveys, namely the learner survey and the progression survey, to investigate the digital divide phenomenon and its influencing factors among the participants. Therefore, within-methods triangulation was carried out based on findings from these two surveys with reference to existing literature.

The research questions for the quantitative study (see Section 4.2) were reflected upon throughout the triangulation process. In other words, findings from the two surveys were triangulated based on the following aspects that illustrate the 'landscape' of the digital divide among the participants:

1) the indicators from the digital divide framework that describe the extent of the digital divide
2) the engagement in informal learning
3) the attitudinal and motivational factors that influenced the digital divide

These aspects organise the presentation of the results of triangulation below.

It is worth noting that the scope of the two surveys used in the quantitative study overlapped with some measures (e.g., access and skills) but not the entire set of questions (see Figure 4-1). It was mainly because of their different purposes: the learner survey was used to understand the participants' pre-learning digital engagement. The progression survey was used to understand their post-learning digital use. Meanwhile, there were some discrepancies in the questions between these two surveys. For example, the use of smartphones was measured in the learner survey but was missing from the progression survey (see Section 4.8 for limitations of the quantitative study). These aspects had implications on the report of results below. For example, the use of smartphones was classified as complementarity in results due to missing data in the progression survey.

6.2.1.1 Convergence of results

Most of the results from these two surveys were mutually confirmed and are discussed below by the indicators of the digital divide and the participants' learning experience. As explained in the above paragraphs, there were discrepancies between the two surveys. It resulted in a lack of sufficient data in assessing the convergence of results in some measures, such as the indicator of the third-level digital divide. It is reported in Section 6.2.1.2 instead.

First-level digital divide in access. Results from the learner survey suggested a digital divide in access still existed amongst the older survey participants despite the pervasiveness of digital devices in UK society. This was confirmed in the progression survey. Access in both surveys was defined as the physical access to an Internet-enabled device at the location where the participants lived. Both surveys revealed that, although some of the participants owned multiple types of devices (i.e., desktop, laptop, or tablet), at least 10% of the participants had none of these. It also appeared that a laptop was the most popular device, while desktop computers and tablets were also widely adopted by the participants. In this regard, both surveys demonstrated the diversity of participants' computer ownership.

Second-level digital divide in skills. The learner survey revealed gaps in older participants' digital skills and how they perceive their levels of skills. More than half of the older participants could do one or two simple things online independently, such as emailing. While some participants had more online skills, some participants had none. Regardless of their actual levels of digital skills, most participants considered their ability to perform online tasks as 'fair'. All these findings were corroborated in the progression survey.

Second-level digital divide in use. Both surveys exposed a digital divide concerning the use or non-use of the Internet among older participants. There were, however, more users than non-users. Both surveys confirmed that more than 60% of the participants used the Internet daily, compared to others who used the Internet intermittently (weekly for around 30% of the participants in each survey). Moreover, the Internet users had very different online footprints, with some of them regularly visiting new websites and some others only using those they were familiar with. Overall, both surveys confirmed that, in addition to a use/non-use digital divide, there existed digital disparities in online engagement among the users in terms of frequency and breadth of Internet use.

Third-level digital divide in outcomes. The learner survey captured an incomplete picture of older people's outcomes from learning and going online. This level of the digital divide is thus reported in Section 6.2.1.2 as complementarity of results from the two surveys.

Fourth digital divide in digital (dis)engagement and influencing factors. The surveys reported consistent evidence of a digital divide in sustained use of the Internet among the participants. This was exemplified by the discontinued users who appeared in both surveys.

Both surveys concluded that the following factors associated with a participant being an active or discontinued user of the Internet were statistically significant under the Pearson Chi-square test: *having access to a laptop*, *level of skills*, *self-rated ability* as *good*, *poor*, or *positive* and *negative* in general. Among them, a *poor* self-rated ability was also a significant influencing factor to digital (dis)engagement through binary logistic regression analysis in the progression survey, thus further highlighting the influence of low *self-efficacy* on the participants' sustained Internet use.

Some other factors found significant for sustained Internet use in the learner survey under the Pearson Chi-square test were confirmed by a binary logistic regression in the progression survey. They were the *learning site* (i.e., learn at a centre rather than at home), a *higher level of skills* (i.e., being able to do a few more complicated things online), and the *ownership of a laptop*, or *none of the devices*. Overall, both surveys presented a dynamic digital divide in sustained use influenced by multiple factors such as the level of inclusion in access, skills/competence (including self-efficacy), and attendance on informal learning at a local centre.

Engagement in informal learning. The learner survey reported that the participants accessed the LMW courses at varying sites, including local libraries, community learning centres, other types of UK online centres, other offline settings, or from home. Despite the diversity, most of the older people learned at one of these centres where tutors and additional support were in place. The learner survey also revealed that most participants who did their LMW learning at a centre also attended various other activities to socialise, exercise and do some other informal learning. These findings were confirmed in the progression survey by the diversity of the learner types and by the fact that they continued to attend these other activities even if their LMW courses had finished. Both surveys, thus, added some context to the digital skills learning: the participants seemed to have organised their learning together with other activities, either at home or in their local community.

6.2.1.2 Complementarity of results

As discussed in Section 4.3, the learner survey reflected the participants' level of digital participation before the learning sessions, while the progression survey measured the participants' digital engagement after these sessions. Therefore, the two surveys complemented each other in some of the measures. The discussions on these complementary findings are presented below.

A multi-faceted digital divide in adoption of smartphones. The learner survey revealed a clear digital divide faced by the older survey participants. Compared to the younger age groups, older people aged 65 and over were less likely to adopt smartphones. The adoption of smartphones among the older participants lagged behind other devices with larger screens such as laptops and tablets. In addition, it was found that the older participants made minimal use of a smartphone: they either did not use it to go online or just used it to do simple things such as checking emails. The influencing factors reported include lack of skills, lack of training, the screen being too small, and a preference for other devices. It was missing from the progression survey.

Motivational factors on learning and digital engagement. The learner survey reported a wide variety of motivations that drove the participants to the learning sessions and of ICT use in general. Indigenous drivers such as "to do some informal learning" and "to socialise" and exogenous influences such as loss of proxy Internet user and family/friend recommendation were the main influencing factors. The majority of the older participants were motivated to learn about computers and ICTs for daily activities (e.g., personal interest, online entertainment, communications, and online shopping). Finding health information online, financial management and use of civic services online also caught their interest. It appeared that as digital technologies and the Internet permeate almost every aspect of people's life, older people felt the need to learn how to fit into this trend of digitalisation. It was absent from the progression survey.

Attitudinal factors on Internet use. The learner survey revealed that a majority of the participants held negative attitudes towards putting personal or financial details online as they felt "it is too risky". Some participants believed that being online was "a waste of time", that the Internet was just too complicated, and that the Internet was not for people like them. These perceptions echoed some of the reasons the participants of the progression survey gave for discontinuing Internet use, including spending too much time on it, finding it too difficult to use, and finding it not for people of their age. However, the progression survey included more barriers to sustained use, such as a general sense of "don't have enough time" and losing access to a computer.

Third-level digital divide in outcomes. The learner survey captured an incomplete picture of older people's outcomes from learning and going online. Among the few older people who took a course on using the NHS Choices website, most of them felt more confident in managing health online after the training. The progression survey reported in detail that the participants made fewer calls to the GP or the NHS 111 due to using the Internet to manage their health. However, it appeared that they still preferred a visit to their GP over using the Internet (e.g., NHS website). Many of them also mainly used the Internet for basic information searches, such as finding health-related information and health services. Fewer of them used the Internet to manage GP appointments, order repeat prescriptions, and rate health services. It may be because these online activities required more advanced online literacy than basic information seeking on browsers such as Google. In addition, the progression survey revealed that, in addition to direct health-related outcomes achieved online, the participants gained more benefits through the adoption of a more active and healthier lifestyle (e.g., eating healthily). Furthermore, the participants also achieved outcomes in other life domains, such as financial management, housing management, social relations management, and independent living, although there was a significant difference in the outcomes gained between the active and discontinued users of the Internet. Overall, the progression survey filled the gap concerning the third-level digital divide left in the learner survey. Similar to that of the first- and second- levels of the digital divide, the third level of the digital divide also appeared to be very nuanced and overlapped with the fourth digital divide.

Fourth digital divide in digital (dis)engagement and influencing factors. In addition to the factors on sustained use that were confirmed in both surveys in Section 6.2.1.1.1, the learner survey exposed that the motivational factors (i.e., "someone used to do it for me", "it is nice to be social", "to do some informal learning") were also influential in sustaining older people online.

Factors on engagement in learning. Because whether a participant was still engaged in learning or not was a predictor for the participant's sustained Internet use, factors that influenced the participants' engagement in learning from the progression survey also complemented the understanding of the overall landscape. The factors were found to be related to the participants' personal life (e.g., change of personal circumstances, being too busy, had got all the help needed) and the organisation of the courses (e.g., the course having ended, centres having shut down, centres being too far away).

6.2.1.3 Dissonance of results

More participants rated their abilities to go online as "poor" or "bad" in the learner survey, compared to more participants who rated themselves positively as "excellent" or "good" in the progression survey. It may be related to the influence of the learning process, as the participants from the progression survey had gained more learning experience. It also accords with other research findings indicating that digital skills training helped older people to gain confidence and a sense of support (Morris et al., 2007). Similarly, there was a higher proportion of discontinued users and non-users in the learner survey than in the progression survey.

6.2.2 Between-methods triangulation

According to Downward and Mearman's (2007), between-methods triangulation refers to combining research methods from different paradigms to understand the social phenomenon under study from different perspectives. In this research, methods from both quantitative and qualitative traditions have been utilised to better understand the phenomenon of the digital divide among older people in the daily life context. In other words, it is through taking the various forms of informal learning and the processes of ageing in everyday life into account that the digital inequalities among older people can be better understood. Thus, in both quantitative and qualitative studies, the context was reflected upon during the analysis of the digital divide. The following section presents how these insights were further confirmed or complemented through the triangulation process.

6.2.2.1 Convergence of results

Firstly, the quantitative study results demonstrated that the digital divide among the older participants was multifaceted and dynamic. Rather than shifting from the lower levels of the digital divide, such as *access* and *skills*, to a higher level in the *outcome*, the digital inequalities resided at all levels and changed with the shifts in wider circumstances. The dynamics were exemplified in the surveys by the new manifestations of the digital divide in access, that is, uneven ownership of smartphones and tablets, in addition to that of the traditional Internet-enabled devices, such as desktops and laptops. The devices' features also impacted how the participants used, learned, and gained benefits from using them. Considering the example of the smartphone again, because of its smaller screen, many participants found it difficult to operate and thus made only peripheral use of it, such as not using it to go online or just using it to check emails. It reflected the co-existence and cross-over of different levels of the digital divide. Likewise, in the qualitative study, the digital inequalities that the interviewees experienced were multiple and were constantly changing. Similarly, at the *access* level of the divide, some interviewees claimed that they had to cope with old devices, outdated operating systems, incompatibility of computer peripherals and so on. A similar situation was found when managing diversified and changing barriers in other levels, such as skills and use (e.g., learning how to use the new features of a website or app after an update/upgrade). As a result, most of the participants from each study were active users of the Internet, but how they used the Internet was rather restricted. Both studies thus confirmed that it was a rather complex picture of the digital inequalities that the participants were experiencing. The conceptual framework of a digital divide, therefore, although working to an extent, was not the best representation of the phenomena observed from these two studies. On the one hand, this was not as dualistic as a divide because these inequalities in each level had developed many nuances and were often overlapped and ever-changing. On the other hand, it was not as monolithic as a divide because these inequalities, although challenging and potentially hazardous to continual digital engagement, could be managed at bite-size and addressed if support were in place. As a result, both studies required an extension of the existing frameworks of the digital divide to better account for the nuances reflected in the data and findings.

Secondly, both the quantitative and qualitative studies confirmed the efficacy of informal learning in sustaining the participants' use of ICTs and the Internet. As it emerged from the survey analysis, whether a participant was engaged in a learning session was a predictor for whether the participant was an active or discontinued user of the Internet. This was confirmed by the interview findings, with many participants stating that going to the informal learning sessions kept them online. Both studies revealed that the participants were often driven by multiple motivational factors to attend the learning, including the need to do some informal learning (i.e., to keep their mind active), to socialise, to adapt to the loss of an Internet proxy user (e.g., spouse passing away or grown-up children becoming too busy), and the influence of family or friends. It thus confirmed that older people's digital learning was influenced by contextual factors related to ageing and daily life. Another finding confirmed in both studies was a general lack of available informal learning courses/opportunities experienced by the participants. For example, the surveys revealed that some participants stopped learning because the courses ended or were held too far from where they lived. It was echoed by the interviewees who claimed that the help was like a drop in the ocean. In this regard, both studies reported a discrepancy between the growing needs due to the increasingly nuanced digital divide and a lack of support provision.

Thirdly, the quantitative study exposed that the participants' use of the Internet was primarily interest-driven, life-based and risk-averse. The interviewees' accounts corroborated this. For example, the surveys revealed that the top-ranked activities that the participants performed online were for personal interest and daily needs (e.g., communication and information searching). Similarly, most interviewees stated that they only wanted to use the Internet functions that were relevant to them. Relevance of Internet use to life was highlighted in quite a few interviews, and the comparative examples they gave and aligned with those reported in the surveys. In addition, the quantitative study uncovered the participants' limited use of the Internet for financial purposes, such as online banking and budgeting. A negative view of the Internet accompanied it as a place that was too risky for personal and financial details. The results in the qualitative study supported this view. The majority of the interviewees claimed that they were consciously avoiding online banking to avoid possible scams. Similar to the statement in the survey, the interviewees did not trust the Internet for sensitive and personal information. Overall, both studies confirmed that the participants were motivated to use the Internet but were wary and reserved at the same time.

Lastly, the quantitative study reported the influence of psychological factors on the participants' sustained digital engagement, including computer self-efficacy (self-assessed ability), attitudes and beliefs. It was found that the disengaged users tended to have a poor self-appraisal regarding their ability to use the Internet. They also tended to hold negative attitudes and beliefs towards the Internet, such as feeling "the Internet being too complicated", "the Internet is not for me", or that "it seemed like a waste of time". The qualitative study confirmed this. The active online interviewees held a common belief in lifelong learning and generally had positive attitudes towards online engagement. In addition, the interviewees who were less active online expressed strong negative comments on the Internet (e.g., "it is dehumanising") with a low self-efficacy. They also held a belief that the Internet was not as crucial as people claimed. Thus, both studies addressed the sustained use of the Internet with psychological factors from the personal domain.

6.2.2.2 Complementarity of results

The qualitative study helped to further explain some findings from the quantitative study. For example, it was uncovered in the surveys that ownership of a laptop or a tablet, compared to a desktop, was influential to a participant's sustained digital engagement. The interview findings may have explained this. The interviewees spoke of two occasions when their Internet use or learning were disrupted. One of them was related to the lifestyle and space in which their activities took place. The lifestyle influenced the scenarios for computer use, while space determined whether this intention to use was easily achievable. It would not be sustainable if, for example, one's lifestyle required using the Internet for entertainment purposes with family in the living room. At the same time, the desktop computer was set in the study upstairs. The other occasion was related to informal learning at a local centre. For those who had desktops, it was not possible to take them to the learning sessions. They then had to learn with the computers provided at the centre, which might have been very different from the desktop at home. In contrast, the interviewees could easily bring their tablets or laptops to the courses. Both scenarios are prone to digital disengagement and could be attributed to a lack of portability or mobility of the devices. It can be extrapolated to many other use scenarios where issues such as portability, mobility, connectivity, and compatibility hindered a sustained use of a desktop computer.

The qualitative study provided a more in-depth understanding of the processes and characteristics of the digital divide. For instance, some unclear points were left in the quantitative study when a participant selected “another reason” instead of choosing from the list of articulated reasons. These were shed some light upon by the qualitative findings. For example, it was revealed that motivation for learning could also be “to prove it to the family that I am capable”, “to know what is going on or what is new/I don’t know what I don’t know”, “to get the issues fixed”, “to get out of the house”, and “to bond with my grandchildren”. More reasons were also disclosed concerning a non-participation in learning or the use of the Internet, such as to do it as a protest against the digitalisation that took away the old culture and position themselves against the others who were learning under this “I am not like them” mindset. Similarly, the qualitative findings also enriched and complemented the user/non-user typologies developed from the surveys.

The qualitative study revealed additional information that complemented the general understanding established in the quantitative study with its unique perspective. For example, based on the survey results, findings from the interviews further revealed an integrated online-offline approach for daily tasks. It was found that many interviewees tended to first search for information, such as store location, opening time, or contact information online to save time and unnecessary travel. They would then either go to the store or phone to check further details before going, rather than online shopping. In addition, the qualitative study revealed more influencing factors of a sustained digital engagement, such as technological factors, social factors, cultural factors, past experience, and the ageing process. Some of these factors were associated with negative impacts from digital engagement (e.g., addiction, built-up frustration), which were underexplored in the surveys. Moreover, the interviews identified forms of group learning (e.g., a tablet group or a laptop group) at the learning centres, to which the interviewees showed a high level of commitment, not to mention the diversity in the interviewees’ age (i.e., the 60s, 70s, and 80s), comparing to a single group of older people aged 65 and over in the surveys. Overall, the qualitative study provided a more nuanced understanding that complemented the survey findings.

6.2.2.3 Dissonance of results

There were some discrepancies between the two studies concerning health-related online activities and outcomes. The quantitative study revealed that finding health information online was one of the participants' top online activities. The participants gained various outcomes from managing health online, such as fewer visits to the GP and adopting a healthier lifestyle. The overall findings from the quantitative study agree with studies that have shown a positive impact on health and wellbeing from Internet use (Gracia & Herrero, 2009; Lee, Kim, & Sharratt, 2018). However, the qualitative study gave more mixed results. In general, few interviewees stated that they used the Internet for health-related information searches. Those who did look up health information online often did so for their family and friends rather than for themselves and general information, such as diets, rather than information on health conditions. The interviewees also would rather call or visit their GP to book an appointment than do it online. Moreover, some interviewees spoke of negative impacts on their wellbeing from Internet use, such as being less active.

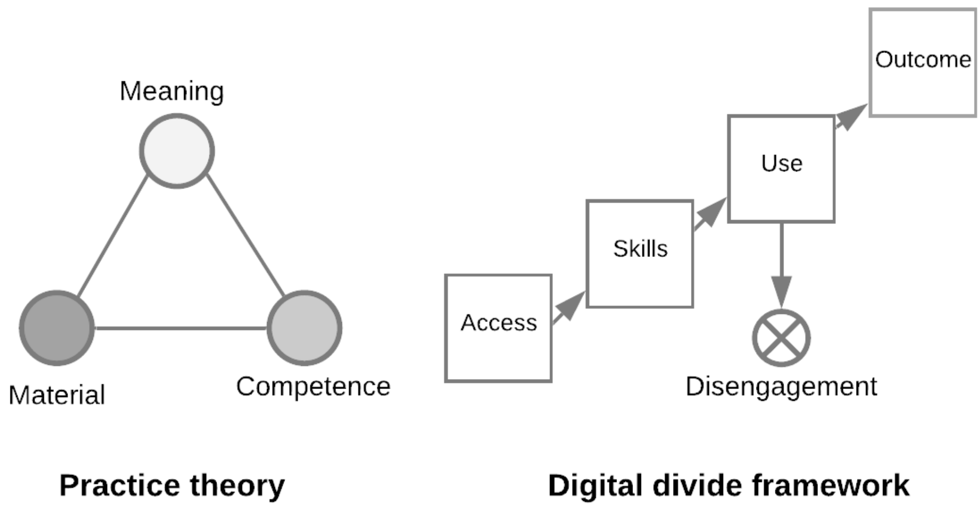
The inconsistent results may be because the older people who participated in the surveys were at a later stage in life or were housebound. They, therefore, preferred to avoid unnecessary travel and seemed to enjoy the benefits of managing their health online. In comparison, regardless of their actual age, the respondents to the interviews were still very active and preferred exercise and human contact instead of sitting in front of a computer.

6.2.3 Theoretical triangulation

Theoretical triangulation refers to using more than one theoretical perspective to analyse the research problem (Denzin, 1989). It usually involves making references to different disciplinary traditions and positions; it is also known as multi-disciplinary triangulation (Downward & Mearman, 2007). In this research, the digital divide framework was used as the primary theoretical framework in the quantitative study. In contrast, the practice theory was used as the main theoretical framework for interpreting the interview data.

As shown in Figure 6-1, although originated from different research traditions, there are some similarities between these two frameworks. The similarities between social practice theory and the digital divide framework are reflected in their respective elements. For example, the *material* in the former corresponds to the *access* in the latter, the *competence* in the former corresponds to the *skill* in the latter, the *meaning* in the former reflects in the latter's *outcome* (and *motivation*). In addition, the production of practice by linking its constitutive elements in the former echoes the *use* in the latter, while the disappearance of a practice by breaking the links in its elements in the former echoes the *disengagement* in the latter. These similarities ensured consistency in data interpretation between the quantitative study and the qualitative study despite the use of different theoretical frameworks. In other words, associating these elements formed a foundation for the researcher to compare the findings from these two different studies.

Figure 6-1 Constitutive elements of practice theory (Shove et al., 2012) and digital divide framework that is inclusive of first- (Van Dijk, 2005), second- (Hargittai, 2002), and third- (Van Deursen & Helsper, 2015b; Wei et al., 2011) levels of the digital divide in access, skills and use, and outcome respectively, and a fourth digital divide in disengagement/sustained use (Olphert & Damodaran, 2013).



Meanwhile, despite the similarities, the internal logic, and the underlying assumptions about the social phenomenon (e.g., the digital divide) between these two theoretical frameworks are entirely different. It was through contrasting these differences that new insights were gained. For example, practice theory focuses on the *practice* itself and places people who enact these practices (the 'carriers') in the background. The social phenomena of the digital divide, informal learning for digital inclusion, and older people's everyday life and ageing, seen through the lens of practice theory, are considered practices (i.e., sets of doings and sayings organised by material, competence and meaning). Therefore, the practice theory was used to discover the contextual factors that influenced digital use and informal learning practices, the process of change (e.g., disengagement) and the mechanisms that enabled these changes. In comparison, the digital divide framework puts people at the core. It presents the digital disparities by dividing people into different groups based on the digital divide indicators. The digital divide framework was thus used to assess the factors associated with individual participants who were types of active or discontinued Internet users. Overall, the application of these two different theoretical perspectives separately in the quantitative and qualitative studies enabled the researcher to refer to compatible theories from the same disciplinary traditions. Meanwhile, the similarities between these two approaches ensured an integrated view of both of the studies. This level of 'integration' is also supported by the underpinning critical realism philosophical stance (see discussions in Section 3.2).

6.2.3.1 The digital divide framework and UTAUT2

The digital divide framework has been commonly adopted as an additive model with three distinguished levels of barriers to digital inclusion (Lutz, 2019; Scheerder et al., 2017). While the digital divide phenomenon in terms of disengagement has also gained some attention, it has been mainly treated as a subset of the broader use/non-use debate (Helsper & Reisdorf, 2013). As explained in Sections 1.1 and 2.5.1, this research adopted Olphert and Damodaran's (2013) notion of a fourth digital divide in disengagement found highly relevant to the older population. Thus, the quantitative study was based on an integrated digital divide framework, as shown in Figure 6-1.

Compared to practice theory that puts people in the background, the 'elements' in the digital divide framework are commonly used as the indicators of inequalities that divide people into contrasting groups of the advantaged and the disadvantaged. The digital divide framework, thus, is not merely a conceptual tool to model the social phenomenon of digital inequalities but also a hierarchical classification method. Correspondingly, it first enabled discovering various levels of digital inequalities co-existing among the older participants in the quantitative study. Then, by dividing the participants into active and discontinued Internet users, the factors associated with this user typology were identified. In this vein, the analysis was undertaken under the digital divide framework in the quantitative study for individual behaviour and behaviour change (i.e., sustained use or not) aligned with the technology adoption and use theories such as the UTAUT2 (discussed in Chapter 4).

The UTAUT2 consists of seven constructs (i.e., *performance expectancy*, *effort expectancy*, *social influence*, *facilitating conditions*, *hedonic motivation*, *price value* and *habit*) that influence *behavioural intention*. Behavioural intention, together with facilitating conditions and habits, determines *use behaviour*. These paths of influence are moderated by *age*, *gender*, and *experience* (Venkatesh et al., 2012). As explained in Section 4.3.3, these constructs were fitted to the available survey data. Due to limitations in the data, the associations between the UTAUT2 constructs could not be assessed precisely as described above. The model was simplified to assess whether these constructs were associated with the sustained Internet *use behaviour*, which was operationalised as ‘active’ or ‘discontinued’ Internet users.

Performance expectancy was mapped to a set of binary measures on the online activities that the participants intended to perform, including “for online shopping”, “saving money”, “online banking and budgeting”, “finding health information online”, “work-related learning”, “using government or council services online” and “another reason”. There was no significant association between these measures and the sustained Internet use behaviour except for “another reason”. It suggested that performance expectancy was potentially associated with sustained Internet use, but this association cannot be finalised due to a lack of data.

Effort expectancy was mapped to a binary measure of “It was too difficult to use”. Three participants indicated that they discontinued Internet use for this reason. However, the sample size was too small to carry out further statistical analyses to test the associations. Thus, qualitatively, it could be taken that effort expectancy might affect sustained use, but further research would be required to verify this.

Social influence was mapped to dichotomous variables of “learning to keep in touch with friends and family” and “A friend or family member recommended it”. The test results for the associations were not significant. Thus, it was not supported that social influence, as the measures found in the survey, was a factor associated with sustained use of the Internet.

Facilitating conditions were mapped against a set of binary variables for the support that the participants received, such as “socialising and meeting with other people”. Results suggested a significant association between socialising as a facilitating condition and the sustained use of the Internet.

Hedonic motivation was mapped to binary variables of “learning for personal interest”, and “learning for online entertainment”. The test results for the associations were not significant. Thus, it was not supported that hedonic motivation, as the measures found in the survey, was a factor associated with sustained use of the Internet.

Price value was mapped to the binary variable of “It was too expensive”. None of the participants subscribed to this statement. Thus, price value was not found as a factor associated with sustain Internet use.

Habit was mapped to binary variables “I don’t have enough time” and “I was spending too much time on it”. There was not a lack of enough sample size for statistical tests on associations. Thus, it can be taken as a qualitative insight that habit may be potentially associated with sustained use.

In summary, the technology adoption and use model UTAUT2 compatible with the digital divide framework was adapted. It was used to gain insights on influencing factors on the sustained use of the Internet from the survey data. It was found that *facilitating conditions* (i.e., socialising and meeting with people) and *performance expectancy* was associated with sustained use. *Effort expectancy* and *habit* may be influencing factors, but this could not be confirmed due to the limited data.

6.2.3.2 The social theories of practice

As discussed in Chapter 2, the social theory of practice is not a single theory but rather an assembly of diverse theories and thoughts for social practices. The practice theory shown in Figure 6-1 is a contemporary variation developed by Shove et al. (2012). It was adopted in the qualitative study as the main theoretical framework to analyse a rich template of themes that emerged from interview data. Under this framework, other theories or concepts concerning *practice* were also referred to. These included Bourdieu's (1984, 1990, 2005) concepts of *habitus* and *capital*, Lave and Wenger's (1991) concept of *situated learning*, Wenger's (1998) theory of *communities of practice,* Schatzki's (2002) concept of *site*, and Blue's (2019) notion of *temporal rhythms*. It is worth noting that each of these concepts is seminal theoretical frameworks on varying aspects of social practices themselves, and there are divisions among them on how a practice is theorised.

Nevertheless, they share the belief that social life and the social world are constitutive of practices. This shared belief creates the condition to place them within the overall framework of practice theory. Among them, Bourdieu's (1984, 1990, 2005) notions of *capital* and *habitus* were primarily applied in digital divide studies to understand the interrelationships between digital inequalities and social inequalities (Friemel, 2016; Helsper, 2008; Katz & Gonzalez, 2016; Tan & Chan, 2018), while Wenger's theory of *communities of practice* and Schatzki's (2002) theorisation of practice were referred to in management and information studies (Cox, 2005, 2012; Cox & Brewster, 2018; Gherardi, 2010). The intention was not to go deep into each of these concepts but instead to use them within the framework of Shove et al.'s (2012) *practice theory* to better describe or explain the themes that emerged from the qualitative study. In addition, through the iterative process of data analysis and interpretation that these established concepts emerged as suitable theoretical candidates to explain the practices' features were uncovered. It, in a way, was exercised as an embedded theoretical triangulation within the qualitative study.

More specifically, *habitus* and *capital* were used to explain how the "historical and cultural factors" from theme 1 "Personal circumstances and perceptions" affected the *meaning* of the practice of using the Internet, which was represented mainly by theme 6 "Ageing in the digital society". They also helped to associate themes 4 "Embeddedness of digital in daily life" and 5 "Experiential knowledge of digital use and learning" to the structure of everyday practices that the interviewees revealed. *Situated learning* and the *communities of practice* were used to better describe the bundle of practices (i.e., the practice of informal digital skills learning and practice of socialising) reflected in the integrative theme "Coping with the changes" from the qualitative study, as well as the "facilitating conditions" identified in Section 6.2.2.1. *Site*, then helped explain how these bundles of practices were formed based on space and material arrangements in which these practices transpire. *Temporal rhythms*, as a novel development on the temporality of practice (e.g., practice of going online takes place in time and consumes time), was used to explain better how the social and technical/technological factors from themes 2 "Social network and support" and 3 "Features of digital devices and the Internet" had an impact on the sustainability of the practice of going online. The insights they generated are discussed in detail below concerning the research questions.

6.2.3.3 Proposing an ecological framework for sustained online practices

Based on the triangulation discussed in the above Sections 6.2.3.1 and 6.2.3.2, a comparison of existing theories and models on modelling the factors for sustained digital engagement was carried out. The results are displayed in Table 6-1.

Table 6-1 A comparison of theories in modelling the factors that influence sustained digital engagement

	UTAUT2	**Digital divide framework**	**Social theories of practice**	**Element-based practice theory**
Constructs/elements	Facilitating conditions	Access	Site	Material
		n.a.	Situated learning	n.a.
		n.a.	Communities of practice	n.a.
	Performance expectancy	Motivation	n.a.	Meaning
	Effort expectancy	Skills	n.a.	Competence
	Habit	n.a.	Habitus	Meaning
	n.a.	n.a.	Temporal rhythms	n.a.
	n.a.	n.a.	Capital	Material

As discussed in Section 6.2.3.1, four constructs [25] from the UTAUT2 model were aligned with the influencing factors on the sustained use of the Internet from the quantitative study. It suggests that the model could be adapted for predicting the sustained use of digital technologies for quantitative studies. However, this model could not accommodate the rich findings from a qualitative approach. As shown in Table 6-1, the *facilitating conditions* is a rather broad notion. It is not explanatory of the concepts, such as *situated learning* or *communities of practices* representing the themes that emerged from the qualitative data. In addition, the UTAUT2 model does not model for the *change* of 'use behaviours', which is essential for better modelling the concept of 'sustained use'.

The concepts from a wide range of social theories of practice represented most of the themes (hence corresponding factors) that emerged from the qualitative study. However, many of these concepts are themselves established theories. For example, Schatzki's (2002) theory of *site* represents a worldview/ontological stance on social phenomena and society. Thus, it is difficult to unify them into a model for sustained online engagement without causing confusion or misrepresentation.

Meanwhile, the digital divide framework and the practice theory developed by Shove et al.'s (2012) have their unique advantages in describing (see Section 4.7) and explaining (see Section 5.7) the sustainability of digital participation/online engagement. However, they are both too simple (see Figure 6-1) to present a comprehensive view of a wide range of factors identified from both studies (see Table 7-1).

As a result, a new ecological framework of the factors that influence the sustainability of digital engagement (hence online practices [26]) was developed. It is shown in Figure 6-2.

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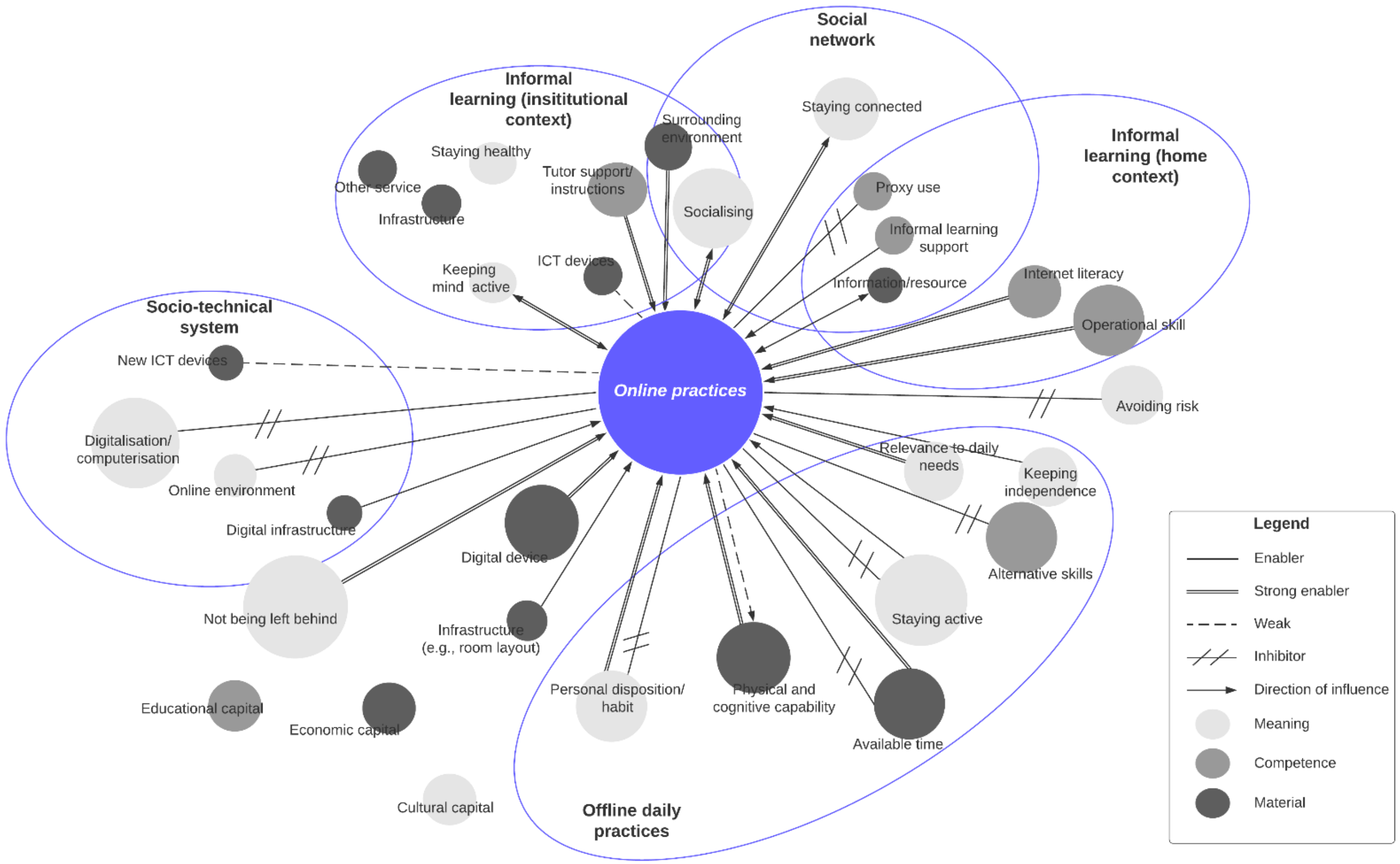
[25] Other constructs in the UTAUT2 model such as *effort expectancy*, *hedonic motivation*, *price value*, and moderating factors like *age*, and *experience* correspond with themes from the qualitative study. The model, however, was mainly designed for quantitative study. The context (e.g., facilitating condition) is overly simplified in this model; this can be seen from Table 6-1. Moreover, this model has conflated the concept of 'use' and 'sustained use' in the construct of *use behaviour*. This makes it less effective in modelling the factors that influence sustained use of ICTs and the Internet.

[26] For brevity, online practices here refer to the everyday practices that involve the use of ICTs and the Internet. In other words, this notion stands for ICTs-, Internet-, or digital-related daily practices.

Figure 6-2 An ecological framework of the influencing factors for sustained everyday online practices



An ecological framework of the influecing factors for everyday online practices

As shown in Figure 6-2, the framework is based on Shove et al.'s (2012) practice theory with the three elements (i.e., meaning, competence and material) as the atoms in the ecosystem that form and change social practices, including the online practices (i.e., the purple circle in the figure). It has also drawn upon the concepts from social theories of practice, as discussed in Section 6.2.3.2. The purple ovals in the figure represent the *site* of various practices. The *site*, here, based on Schatzki's (2002) theorisation, has a material foundation but transcends the materiality. Schatzki's (2002) explained it as a concept akin to the *time-space* within which the practices transpire. In plain words, the site is an assembly of the place where the practices occur and the overall environment of that place. Thus, this ecosystem is a site where all the practices take place, within which each purple oval is a site where specific practices are produced. The oval titled "Informal learning at institutional context" stands for the community learning centres and libraries and the enabling environment that helps sustain older people's online practices.

These atom-like elements represent the factors that influence older people's online practices. These elements are from multiple systems and spread across the ecosystem when they are not used (e.g., the floating elements such as "economic capital") or linked up in a practice. Some of the elements inhibit the production of online practices, while others enable the formation and persistence of the practices (represented by different lines). A primary source of the elements is older people's everyday life (see the oval "offline daily practices" and elements not included in ovals such as 'digital devices' [27]). They correspond to the individual factors in Table 7-1. Other ovals represented the factors from social, technological, and informal learning-related domains (see Table 7-1).

It can be seen from Figure 6-2 that most elements from the domain of "daily offline practices" both enable and inhibit online practices. For example, when offline practices accord with online practices, they share the available time to go online. When offline activities are at odds with going online, they compete over time and inhibit online practices. Similarly, the meaning of staying active has a mixed relationship with online

[27] Because the online practices are performed (by linking up the elements to form a practice) by older people. The ecosystem of online practices, thus, largely overlaps with older people's range of daily life. In Figure 6-2, the oval for "offline daily practices" is related to elements and practices enacted offline. This is why element such as "digital divide" is outside this oval.

practices. Such a relationship represented the limited and mixed/hybrid use of the Internet discussed in Section 5.6.5.

The overlapping between informal learning in the institutional context and the social network represent the findings in Section 5.6.8: socialising is often a primary drive for older people to attend informal learning sessions. Some participants disclosed that they often go with friends from their social network, thereby extending their normal social to the site of informal learning. The dynamics of these elements link, form various practices (including online practices), and bundle practices were modelled and discussed in Section 5.7 (i.e., Figures 5-12 to 5-15).

Overall, this ecological framework drew upon various concepts of social theory and was based on Shove et al.'s (2012) practice theory. It overcame the shortcomings of existing theories, models, and concepts (shown in Table 6-1) in comprehensively representing a rich volume of factors that influence sustained online engagement among older people. In addition, it also showed the dynamics of these influencing factors and thus better accounted for the changes in the practices. Inherited from the practice theory, this framework moved away from ascribing a lack of online participation to older people. Instead, it focused on the online practices themselves and regarded older people as the carriers of these practices. The persistence or disappearance of the online practices, as shown in Figure 6-2, is determined by the dynamics within the whole ecosystem.

The purpose of this section is to introduce, explain and justify this framework. The way these factors influenced older people's sustained online engagement is discussed in detail in the following Section 6.3.

6.3 DISCUSSION

Overall, the digital inequalities among older people who participated in this research were very diversified, fragmented, and dynamic. Examined through the lens of existing frameworks of the digital divide, it was found that there were great differences between the participants who were active online and those who discontinued the Internet in their access to devices, level of skills, use patterns, outcomes and also engagement in informal digital skills learning. Findings from the qualitative study revealed that these differences also widely existed within the group of active Internet users. A wide range of underlying factors that influence the breadth and continuity of Internet use was uncovered (see Figure 6-2 and Table 7-1). Informal digital skills learning turned out to be an essential part of older people's daily lives that sustained their online engagement.

6.3.1 Informal learning and sustained digital engagement

Informal learning, either with tutors, peers, or family, was pivotal to sustained use of the Internet among older people. It echoed with the construct of *facilitating conditions* from the UTAUT2. The way it enabled older people to continue going online was not simply through the acquisition of knowledge and skills (Betts et al., 2017) but also through forming bundles of daily practices such as socialising, using the Internet for certain purposes, and active ageing (e.g., getting out of the house or keeping the mind active) that were mutually sustaining. For example, it was revealed in the quantitative study that most of the participants attended the courses not only for learning how to use computers but also for meeting other people and attending courses, such as photography or exercise. In the extant literature, the focus of learning was primarily placed on formal training. The value of these training courses was thus primarily in enhancing digital literacy among older people from an educational point of view (Zaidman & Tinker, 2016b). In addition, gathering and socialising has been recognised as a motivational factor for older people to join a learning programme at its face value (Morris et al., 2007; Tsai et al., 2017). Turning to the theories of social practice, this research treated 'socialising' as a practice of its own right that is constitutive of older people's daily life rather than a beneficial 'feature' of the digital skills training, or the invisible 'conditions' that facilitate the use of the Internet. It paved the way for further exploration of how these daily practices weaved together in the fabrics of daily life.

The *site* where these bundles of practices were arranged and produced appeared to be a joint that enabled the bundling. *Site* was not just about the physical space where the digital skills learning and socialising activities took place, but also about the meanings gained from the performance of activities in that particular space at a specific time. In other words, it was the location, the physical layout of the learning/socialising space, and the satisfaction and value gained (e.g., not being left behind in the digital society) from learning and socialising that hung these bundles of practices together. Placed in Shove et al.'s (2012) practice theory, the bundles were anchored explicitly on *material* and implicitly on *meaning*. This accords with the finding from Section 6.2.2.1 that performance expectancy, which is closely related to the concept of meaning, and facilitating conditions related to the notion of material were associated with sustained digital engagement.

Learning about how to use computers and the Internet at these sites further developed into communities of practice (see Cox, 2005). The novice learned through following more advanced peers or tutors. While the site has brought older people together and created a facilitating environment for them to learn and socialise at the same time, the communities of practice, represented by the laptop groups, iPad groups and so on emerged from the interviews, helped to glue them together and strengthen these formed bundles of practices. Participants in this research demonstrated that home, although being a more convenient site for learning, was less effective in sustaining their digital participation compared to an institutional informal learning context. This was mainly because their family members, in particular the younger generation, tended to be inpatient at demonstrating and step-by-step teaching. This then turned out to be either 'too fast' for older people to comprehend or 'already done' before they could participate and learn. In contrast, most of the tutors, volunteers and peers at the learning centres were patient and supported a 'trial and error' approach in a situated learning environment.

This in-person, situated, participatory learning experience was crucial for older people's digital skills learning. Van Deursen et al. (2016) summarised four types of digital skills that are essential for gaining benefits from Internet use: 1) operational skills, the elementary operations on the digital devices that are also called "button knowledge", 2) information navigation skills, the ability to search and assess information, 3) social skills, the ability to use the Internet for socialising and gaining social capital, and 4) creative skills, the ability to use the Web 2.0 features, such as creating online contents. They did not consider the embodied skills included in the element of competence in practice theory. Simply learning operational skills as a form of cognitive knowledge is not enough. Older people need to learn by doing and gaining practical know-how. Cox (2013) used an example of practitioner paramedics to explain this notion of 'knowing' as the unneglectable bodily knowledge to enable the treatment. There were frustrating and ineffective examples of participants' learning through phone calls. One participant recalled, "I don't know which button to press, he can't see my screen".

Many participants had developed trust in their tutors. It turned into a double-edged sword. On the one hand, their learning was sustained and routinised because of this bond. On the other hand, these participants became very reliant on their tutors, especially if there was no immediate support at home. In addition, some of these informal learning sessions were organised in drop-in digital clinics where older people could bring their problems to and get assistance. This had an interesting impact, as many participants regarded these sessions as a sanctuary where they were protected from potential digital hazards. This 'sanctuary' addressed the well-reported psychological barriers that older people faced, such as a lack of confidence (Vaportzis et al., 2017), computer anxiety (Di Giacomo et al., 2019) and fear of making a mistake that would cause severe consequences for them (Holttum, 2016; Nimrod, 2018; Shirahada et al., 2019). The participants, as they claimed, felt more confident and encouraged to experiment with ICTs and the Internet. It was also proved in Tsai et al.'s (Tsai et al., 2017) study.

This notion of 'sanctuary' for digital use provided explanations on why some participants were active users of the Internet but went online less frequently or used the Internet in more restricted ways (thus partially addressing research questions concerning "*why does the digital divide take place among older people*?" and "*how do older people sustain their use of ICTs and the Internet through informal learning*") in addition to widely reported reasons such as 'a lack of skills' (Hodge et al., 2016). As the participants revealed, these sessions were mostly held once a week. They tended to use the Internet with caution in between the sessions to avoid potential problems. When encountering one, they would pose the question at the next available learning/drop-in session. For some of them, these sessions became their 'office hours' to use computers and the Internet for the week where support was right at hand when needed. From a theoretical perspective, this was explained by Blue's (2019) conceptualisation of the *temporal rhythms* in the patterning of practices in social life. Social practices of ICT and Internet use consist of organised sets of activities such as going to the computer, turning on the computer, navigating the operating systems and folders, and browsing on a website/an app. Thus, by performing and ordering/organising these activities, social practices gained a temporal feature and individual rhythms. What appeared as an intermittent and assisted use pattern of the Internet among the participants was the need to synchronise the rhythm (e.g., frequency) of their Internet use with the rhythms of the learning sessions and other daily practices that compete for the resource of time.

6.3.2 Influences from the socio-technical system

Of course, other aspects interplayed with the synchronisation of the rhythms of practices, such as the arrangement of materials. For example, some older people were reliant on the computers or the Internet connections at the learning sessions, so they had to turn up to the schedules of the sessions to gain access to the devices. Following the thread of temporality further down, the materials constitutive of the digital-related practices also reflected the rhythms of larger-scale socio-technical practices. These socio-technical practices can be conceptualised as the group of social and technical activities organised under a set of rules and resources[28] for developing a digital society. Examples of the practices are the development of digital technologies practised by companies such as Microsoft, the development of online media and social networks practised by institutions such as Facebook, and the development of Internet infrastructure practised by the government and organisations. Accordingly, they have their rhythms: the frequency at which the devices and the operating systems are updated, the alteration of the socially popular apps and online culture, and the replacement of old communication channels. To what extent, older people were synchronised with these rhythms in their daily practices of using the Internet, explained why digital inequalities took hold among them (for further examples, see Section 5.6.8 where the integrative theme *Coping with the changes* was described). The digital inequalities developed in the areas where the individual and the

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[28] This conceptualisation was inspired by Blue's (2019) work on institutional rhythms and followed Giddens' (1984) theorisation of a practice that differed from later theories in terms of what organised a practice. For example, the most heavily cited contemporary theory of practice developed by Shove et al. (2012) attributed the 'organisation' to a set of competence, meaning and materials.

large-scale rhythms were arrhythmic. For example, when participants continued using their old computer that ran on an outdated operating system, they talked more about malware, computer crashing and other operational hazards. It was warned by Van Deursen and Van Dijk (2019) as a new form of the first-level digital divide since disparities started to grow in the access to a variety of hardware and software materials. Then, as explained in the above discussion, one way older people addressed these digital disadvantages was to use support from various informal learning contexts to put the rhythms eurhythmic again (i.e., sustained use).

As the understanding of how the ‘digital divide’ developed among older people deepened through the application of social theories of practice, the conceptualisation of the digital divide based on existing theories (i.e., the first-, second-, and third- levels of digital divide in access, skills, use and outcome, as well as the fourth digital divide in sustained use) struggled to represent the complexities in, and the background (i.e., daily life) to, the digital inequalities. The notion of a *digital minefield*, representing the fragmented and dynamic features of the digital inequalities found in the participants, was hence developed.

6.3.3 Recognising a digital minefield

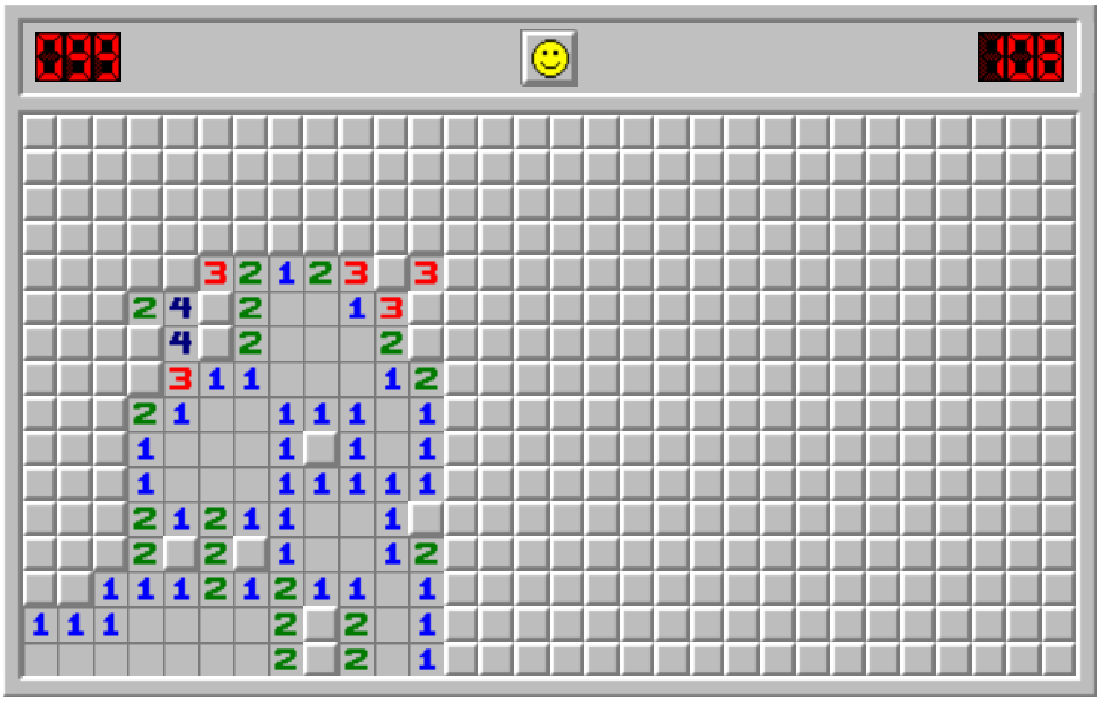
This research first found evidence of a multifaceted digital divide among the participants. While the digital divide has become more about the disparities in gaining beneficial outcomes rather than a lack of access or skills for the general population, it remained a challenge in all regards for most older people who participated in this research.

In addition, the participants were found by no means to be homogenous but rather were diverse. As the results demonstrated, some participants never used the Internet while others managed to go online, marking the widely recognised distinction between non-users and users (Morris et al., 2007). In the latter cohort, some discontinued the Internet gradually for various reasons such as lack of interest. In contrast, others remained active online, signalling the risk of digital disengagement, also known as the fourth digital divide (Olphert & Damodaran, 2013). Even within the group of active Internet users, how the participants used the Internet for everyday activities varied: some used it daily while some used it less frequently than once a month, some only used the Internet to find basic information, such as train times, while others used the Internet more extensively, some only used at home while some others used the Internet when travelling, to name a few examples. However, few participants in this research who were active online fell into these extreme ends, either sporadic users (Brandtzæg, Heim, & Karahasanović, 2011) or privileged silver surfers (Helsper, 2009). It accords with findings from Olsson and Viscovi's (2020) study that silver surfers constitute only a small fraction of the older population. What clearly emerged from both studies in this research was a prevalence of active but confined Internet users that characterised the vast majority of the participants in the middle of the user/non-user spectrum. It may be because many of these participants had resorted to informal learning and support to sustain their Internet use. In comparison, the few sporadic Internet users were those who had difficulties in finding support. Through the theoretical lens of practice theory, a unique bundle of social practices of going online and learning was found as a main pillar for sustained digital engagement among the participants. This was a novel finding from this research and will be discussed in detail in the following sections. Here, the fact that most of participants, although being active Internet users, were also most vulnerable to digital disengagement, suggested that the fourth digital divide in disengagement has broadened. This further complicates the landscape of the digital divide: it is not only multifaceted (i.e., co-existence of the first-, second- and third- levels of the digital divide), but it is also dynamic (i.e., sustained use challenged by personal, material, and social changes).

Using the frameworks from existing literature certainly helped to position this research in the field of the digital divide debate and facilitated comparison across studies. They were, however, less effective in capturing the peculiarity of the terrain of digital participation among the participants. It appeared that what one of the interview participants described as his digital experience may better account for the reality: "*It is like walking through a minefield*" (Fred). Fred was an active user closer to the silver surfer side of the Internet user spectrum and had routinely attended informal learning sessions. However, even for Fred, the day-to-day use of the Internet was not entirely enjoyable and carefree. He feared online scams, subscriptions, complicated online forms, disinformation, online banking, computers not working and so on. These problems or barriers were not as uniform or monolithic as what 'divides', 'gaps', or 'chasms' stood for, but were rather fragmented, diversified, and scattered across the field of Internet use. Most participants appeared to be reactive, other than proactive, in dealing with the hazards. For example, many stated that they would avoid online banking as long as they could.

This interesting metaphor (of the digital minefield) successfully encapsulated many other participants' views on and their experiences of Internet use. It was found that participants were very vigilant on the known unknowns. These were the online hazards they knew of, such as scams (Grimes, Hough, Mazur, & Signorella, 2010) and identity theft (Gatto & Tak, 2008). The participants were more willing to manage and maintain the known knowns that already formed a part of their daily routines, such as sending an email. Moreover, the participants were often struck by the unknown unknowns, that is, the unexpected problems. These were usually caused by a lack of digital skills and understanding of the Internet design or the error-inducing dark patterns, such as pop-up subscription alerts (Bösch et al., 2016; Human & Cech, 2021; Lutz & Hoffmann, 2017). Figure 6-3 uses a classic Windows game called 'Minesweeper" to illustrate the patterns mentioned above and the digital life in general mentioned by the participants. The explored areas on the left represent older people's confined day-to-day use of the Internet that circled identified or cleared mines. In contrast, the unexplored areas on the right represent the new features of the Internet with hidden mines.

Figure 6-3 An illustration of the digital minefield journey that the participants experienced
(This is a screenshot taken from the game "Minesweeper")



Adopting the notion of a digital minefield has a theoretical implication rather than just being a good metaphor. While a binary view on the digital inequalities is being replaced by a gradation view (Reisdorf & Groselj, 2017; Tsatsou, 2021), upholding this notion of a *digital minefield* further calls for a new perspective on the digital inequalities as an addition to these existing models. As discussed in Chapter 2, a digital divide came to the attention of scholars in the early 90s when the diffusion of personal computers started. The divide was observed between those who had the devices and those who did not. For such a simple scenario, the then binary view worked well for developing policies to build a more inclusive digital infrastructure. As the diffusion of computers proceeded, attention was shifted to disparities in skills and use and now in outcomes. The framework of the digital divide was therefore developed accordingly to account for these technological and societal changes. The ways ICTs and the Internet are used in this digital society now is entirely different from what it was like in the 1990s or even ten years ago. Digital inequalities are becoming more diversified and nuanced in every aspect of daily life (Kania-Lundholm, 2019; Van Deursen et al., 2015). Investigating the daily context in which the digital-related activities take place becomes essential for gaining a better understanding of the digital inequalities. The existing models built to abstract and conceptualise the 'divides' thus become less effective in addressing the increasingly fragmented inequalities in the digital society. Within the minefield model, the indicators of the 'divides' such as access, skills, use, and outcomes are no longer viewed as gaps or chasms but rather as fragments of hazards that constituted a digital minefield. As society continues to develop and digitalise, the minefield expands and becomes increasingly incorporated into older people's lifestyles through digitalised daily practices/activities. The minefield becomes more complex and more challenging to negotiate. Nevertheless, it creates an opportunity to understand and explain the digital disparities among older people in the context of everyday life.

Admittedly, the rhetoric of a 'minefield' itself risks diminishing older people as if they are fragile and vulnerable. It may reinforce the prejudicial stereotypes and discrimination that are associated with ageism. However, if we review the now widely used and well accepted concept of the 'digital divide', the phrasing of a 'divide' is not entirely neutral, certainly not positive towards the disadvantaged groups that are deemed at the 'wrong' end of the divide (see Section 2.3 to review the inception of this concept). Following the promotion of acknowledging a 'digital divide' in the society, the derived notions of 'haves' and 'have-nots' based on the ownership of devices were also controversial labels that assigned to the already disadvantaged or marginalised social groups. Therefore, just like when the term ‘digital divide’ was first coined to draw scholarly and political attention to the observed social phenomena of inequality derived from the dissemination of computers, the concept of a ‘digital minefield’ now should go out to the public as an emerging social phenomenon concerning the older population and the society as a whole. Putting new forms of digital inequalities represented by the ‘digital minefield’ on the table for discussion should be prioritised over the concerns of its potential negative impacts. From another perspective, controversies and discussions will in turn help to start the conversation of how appropriate this term is and how to address the issues surrounding this fragmented, less visible (compare to the noted ‘divide’ or ‘gap’), but lasting ‘digital minefield’ that older people encounter on their day-to-day living. Not to mention that this concept originally came from one participant of this study, who described his life in this digital society as walking in a minefield. Therefore, this metaphor of ‘minefield’ shall be emphasised and the new concept of a ‘digital minefield’ as a capture of new forms of digital inequality among older people shall be promoted.

6.3.4 Everyday life, digital engagement, and ageing

With the phenomenon of a digital minefield and the veins through which informal learning supported the participants’ continual digital engagement became clearer, this research further reflected on the dominant assumptions (e.g., using digital technologies and the Internet is beneficial to active and healthy ageing) and expectations (e.g., the ‘divides’ should be closed with older people not only being able to get online and but also thrive online) in the digital divide research that was underpinned by technological determinism (Damodaran et al., 2015; Gatti et al., 2017; Peacock et al., 2007; Van Deursen & Van Dijk, 2015). This research echoed the voices that challenged this dominant view on older people’s digital inclusion and triangulated with discourses from ageing-related research (see Kania-Lundholm, 2019; Tsatsou, 2021). Findings from this research suggested that, although according to all measurements from the digital divide framework, most of the participants were on the wrong sides of the ‘divides’ and considered as being digitally disadvantaged, not all of them were willing to be transformed into a more capable Internet user since these current bundles of practices were most beneficial to their goals for ageing well. Most participants were satisfied with their level of digital use and the benefits they gained (e.g., online information). In other words, investing more time and effort in learning about more aspects of the Internet were deemed harmful to them because it meant that there was less time to do other things to stay active and less contact with people in real life to stay socially connected. Kania-Lundholm's (2019) finding on how older people perceive the value of 'time' as a limited resource in their later life may have offered a reason. As evidenced in both studies of this research, some participants complained about how going online made more manageable tasks complicated and ended up wasting their time. Others mentioned that they started to cut their Internet use when they were easily distracted by online content (e.g., Facebook) and became very addicted. Meanwhile, Tsatsou's (2021) interpretation of older people's limited digital engagement through a *selection and optimisation* theoretical lens from ageing-related studies also shed light on what she observed, and what was demonstrated by the participants in this research, a 'tailored lifestyle' for a multi-dimensional successful ageing (Young, Frick, & Phelan, 2009). Placed within the current theoretical framework of practice theory, this selectiveness of participation in daily activities was rationalised by the *meaning* of each daily practice, based on its relevance to better ageing on the one hand and the availability of *material/resources* in terms of time on the other. It addressed the differences in Internet use and different bundles of practices between the younger and the older interviewees: the different life stages assigned different meanings and materials to their daily life practices. These findings partially addressed the research questions concerning "*how does informal learning and the digital divide relate to active and healthy ageing*?". The discussions that follow continue to resolve this puzzle of the perception of ageing (mixed with cohort and period effect) as both a direct influencing factor on digital-related practices and a contextual factor that affected older people's digital engagement through the mediation of other daily practices.

The bundles of practices reflected older people's lifestyle that was moulded by their journey through life. As a result, whether an Internet-based practice can be sustained is related to whether itself, the bundle of practices that it is a part of, and other competing everyday practices persist, change, or perish under the influence of the past and the ever-changing present. The main influencing factors from the past were older people's acquired *habitus*, which was represented by older people's preferences in online activities, and *experience*, which affected their knowledge of and attitudes towards Internet use. The influence of habitus on the use of computers by older people was also discussed in Tan and Chan's (Tan & Chan, 2018) research. They mainly cited two important concepts of Bourdieu: 1) Habitus consists of "*dispositions*" and "*strategy*", 2) Habitus is developed through different types of *capital*. They found that the digital inequality among older people was formed by accumulating different degrees of capital as they grew old. As discussed in Section 5.6.2, older people born pre-war (i.e., birth cohort before 1939) were much more financially cautious and risk-averse; this affected their dispositions towards adopting computers and using online banking services. Thus, there was a cohort effect in play.

Disposition mainly explained the inequality that had formed, while strategy explained the inequality that was being formed. It was also reflected in this research. For example, due to time limitations, many participants did not accumulate enough digital capital. It demarcates a period effect; that is, the inequalities are related to the specific period in the society. In this case, it was the 1990s when the diffusion of personal computers started and accelerated. It directly led to their lack of skills necessary to use computers and the Internet. At the same time, because of different strategies for organising later life demonstrated by the participants, this inequality continued to develop. For example, many participants were only willing to learn about and use the Internet features relevant to them. They admitted that they would avoid learning or using more of the Internet, such as online banking, as long as possible. This sense of finding a balance in the embeddedness of digital technologies in their life and retaining control was pervasive among the participants in both studies. As a result, computers and the Internet took a peripheral role in many of the participants' daily lives.

In addition to cohort and period effects playing a part, the process of ageing also influences the stability and sustainability of the practice of digital engagement and other daily practices. The main influencing factors underway are within-person (e.g., a decline in physical and cognitive ability, accidents such as having a fall) and between-person ageing (e.g., social relationship, the position of self in the digital society). Within-person ageing changes the elements of *material* and *competence* in the practices. As stated by the interview participants, declining memory made it rather challenging to learn and remember new techniques. They had to practice and repeat, which consumed their time, sank their confidence, and accumulated frustration. Some, thus, became more dependent on the informal learning sessions.

Similarly, the changes in hand dexterity and poor/declining eyesight may restrict the materials they can use to reproduce their practice. Between-person ageing brings challenges to the meaning of going online. As explained by some participants in their 80s, they did not find social media, such as Facebook, useful because many of their acquaintances had already died. Likewise, it was also meaningless to learn while socialising because of their decreasing social network as their friends died or moved into care homes. Between-person ageing also affected older people's position in society. Many participants actively engaged in volunteering and other community events to re-negotiate their positions in society after retirement. It provided additional meaning (e.g., to connect with other volunteers) to stay online. There were also negative impacts from within-person ageing that hampered sustained Internet use, such as the feeling of becoming left behind. Many participants mentioned that the old and familiar culture was taken away by digital technologies. What they called the new normal, in which the boundaries between online and offline life became blurred, and 'changes' (e.g., software and hardware updates) has replaced 'fixed' (e.g., appliances like a washing machine that do not change once purchased), became increasingly estranged. The participants expressed critical views of people's non-stop use of smartphones on the buses, in the stores, and everywhere: it is like living in bubbles. In this sense, the participants were reluctant to become one of these carriers of practices because of a clash in the meaning of ageing actively and the meaning of a high level of digital inclusion (if it meant living in bubbles).

6.3.5 A new approach towards digital inclusion

Based on the above discussion, it appeared more important to help older people achieve a dynamic balance between ageing and digital inclusion than marching on to 'fix' all divides. Therefore, it is helpful to shift the mindset from a 'digital divide' to a 'digital minefield', that is, to tolerate the existence of the fragmented digital inequalities in older people's daily life and accept that these digital inequalities are ever-changing. Promoting digital inclusion, thus, is not about closing the gaps, but rather about how to skillfully help older people manage and sustain their digital participation that is in harmony with their process of ageing, their life experiences up to this point and the developments in the socio-technical environment.

There is no quick fix nor a one-size-fits-all solution to address the digital minefield. As this research has revealed, the factors that influence older people's sustained digital participation are manifold, including psychological, physical, historical, and habitual factors from the personal domain and social, technical, and cultural factors from the context. It is meaningless to address only the personal factors or the contextual factors as they both shape and change older people’s daily practices. This research has shown the importance of informal learning in sustaining older people digital inclusion.

6.4 CONCLUSION

In this chapter, the findings from both quantitative and qualitative studies were triangulated by method and by theory for a comprehensive and critical understanding on the research problem. It was found that older people’s digital engagement was rather context-dependent, lifestyle-driven, and constantly evolving with the ageing process. Informal learning was found to be pivotal for sustaining older people’s digital engagement by forming bundles of practices with Internet use and socialising. The triangulation process also yielded a new insight and led to an extension of the concept of a digital minefield based on the existing digital divide framework. This concept should be promoted as a new approach towards digital inclusion that is coordinated with older people’s identity changes brought about by the ageing process. The next chapter will conclude this thesis with a summary of the contributions and limitations of the study, as well as the implications of this work for practice and policy, and suggestions for further research.

CHAPTER 7 CONCLUSION

7.1 INTRODUCTION

The research presented in this thesis aims to better understand the factors that influence a sustained digital inclusion among older people for their active and healthy ageing. As noted in Section 2.3.1, digital inclusion denotes the policies that address the digital divide (i.e., the phenomena) by promoting digital skills learning (i.e., the practice). Therefore, this research anchored itself on the intersection of theory (i.e., the digital divide framework that accounts for the phenomenon) and practice. Despite the existence of a plethora of studies on the digital divide, digital literacy, and active and healthy ageing among older people, they were primarily undertaken in isolation from each other. They thus overlooked the fact that digital engagement, digital skills learning, and the ageing process are interwoven in the fabric of daily life. In addressing this gap, the overarching research question was established in Chapter 1 as:

Why does the digital divide take place and develop among older people and how do older people sustain their use of ICTs and the Internet through informal learning for an active and healthy later life?

By applying quantitative and qualitative approaches and triangulating the findings interpreted from different theoretical perspectives, this research contributed to a more comprehensive understanding of digital inclusion among older people in context. The purpose of this chapter is to draw conclusions based on the findings from these two approaches that were presented in Chapters 4 and 5, respectively. The following section (Section 7.2) is dedicated to answering the sub-questions derived from the overarching research question presented above. Section 7.3 summarises the contributions to existing knowledge in the field of digital divide research and implications on theory. Section 7.4 presents the recommendations for practice and policy, while Section 7.5 discusses the limitations of this study and directions for future research. Section 7.6 brings a conclusion to this chapter and this thesis.

7.2 RESEARCH QUESTIONS

The overarching research question, re-stated in section 7.1, was divided into three sub-questions in Chapter 1. To draw firm conclusions, the three sub-questions are answered below with reflections on the main question.

1. What is the landscape of the digital divide among older people engaged in the informal learning of digital skills?

Through the theoretical lens of the digital divide framework, three levels of the digital divide in *access*, *skills* and *use*, and *outcome* were found to have co-existed and overlapped with the fourth digital divide of *digital disengagement* among older people. Sustaining digital engagement for older people, thus, was not merely about addressing a lack of access to digital devices, insufficient skills/use of the Internet, or a lack of beneficial outcomes gained from the Internet, but rather about all these aspects considered together. Findings from both quantitative and qualitative studies have shown that these barriers to a sustained digital engagement were not as uniform or monolithic as what 'divides', 'gaps', or 'chasms' stand for, but were rather fragmented, diversified, and scattered across the notion of day-to-day Internet use. Thus, this research extended the current digital divide framework to identify a *digital minefield* across which older people walk as they manage and maintain their digital participation (see the detailed discussion in Section 6.3.3).

The factors that influenced older people's sustained use of the Internet, hence the landscape of the digital minefield, are summarised in Table 7-1 according to different dimensions, organised in terms of sources of influence, individual, technological, and social factors, and the engagement in informal learning. The quantitative study confirmed that learning status had a statistically significant impact on older people's sustained use of the Internet. No statistically significant associations were found between individual socio-demographic characteristics and sustained use of the Internet (see Sections 4.5.3 and 4.6.4). However, it emerged from the qualitative study that older people's age (exerted both an age effect and a cohort effect), their personal history of technology use and the learning opportunities they had (thus a period effect, see Section 2.6.3 for explanations), as well as their socioeconomic status were all related to their digital engagement (see Section 5.6.2). They are thus reflected in Table 7-1.

Table 7-1 An overview of the factors that influence the sustained digital engagement

	Material	Competence	Meaning
Individual factors	**Facilitator** - ICT devices - Infrastructure (e.g., WIFI at home. - Available time	**Facilitator** - Physical and cognitive capability - Digital literacy - Operational skills	**Motivation/facilitator** - Not being left behind - Relevance to daily needs - Convenience of use - Keeping independence - Personal disposition/habit - Staying active through online communication - Past positive experience/outcomes
	Inhibitor - Alternative skills for offline activities - Lack of available time	**Inhibitor** - Ageing related deterioration in memory, sight, cognition, dexterity, and mobility - A lack of digital literacy to troubleshoot - Fear of breaking things - Technology anxiety	**Inhibitor** - Staying active through person contact - Avoiding risk - Personal disposition/habit - Low self-efficacy (lack of confidence) - Feeling diminished - Past negative experience/outcomes - Cohort/period effect - Feeling too old
Technological factors	**Facilitator** - Digital infrastructure - Age-friendly design features	**Facilitator** - Instructions/manuals/ support - Hassle-free system updates	**Facilitator** - Keeping abreast with the times
	Inhibitor - Online environment (e.g., scams, subscriptions) - New ICT devices - Cost	**Inhibitor** - System updates and upgrades (lack of familiarity) - Technical jargons	**Inhibitor** - Digitalisation/being pushed online - A lack of trust of the online environment - Privacy concerns - Misinformation, disinformation, and non-relevant information
Social factors	**Facilitator** - Facilitating environment - Information, resource, device	**Facilitator** - Informal learning support	**Facilitator** - Staying connected - Socialising - Familial encouragement
	Inhibitor - Outdated device	**Inhibitor** - Proxy use	**Inhibitor** - Familial discouragement
Informal learning-related factors	**Facilitator** - Infrastructure - ICT devices - Surrounding environment	**Facilitator** - Perseverance - Tutor support/instructions - Handout/note taking	**Facilitator** - keeping mind active - Staying healthy - Socialising - Keeping updated
	Inhibitor - Loss of family support - Centre/libraries shutting down	**Inhibitor** - Tutor/volunteer's lack of knowledge - Rote learning	**Inhibitor** - Stigmatisation - Ageism - Self-esteem

In Table 7-1, the factors are also organised by the three essential elements that constitute a practice (as discussed in Section 5.6). It provides a different perspective on the landscape of the digital minefield: the ‘mines’ were created by a lack of ingredients in material, competence or meaning. They then were managed/coped with according to the availability of these ingredients. It highlighted that the process of sustaining older people’s digital participation is complex, dynamic, and multi-dimensional.

As shown in Table 7-1, one of the main influencing factors was the development and proliferation of digital technologies (see Section 5.6.4). For example, the digital inequalities associated with *material* (i.e., *access*) have moved beyond the disparities in the ownership of a computer to the accessibility of materials such as hardware components (e.g., smartphone, tablet, keyboard), software components (e.g., up-to-date software systems, apps, etc.), online media and contents (e.g., online government and council services), and even resources and support for technology maintenance (e.g., informal digital skills learning classes). Likewise, older people were more prone to become disadvantaged in *competence* and *meaning* (i.e., *skills*, *use,* and *outcomes*) due to changing social norms and cultures that define what counts as being digitally included (see Section 5.6.5). For instance, a lack of skills to use communication apps such as WhatsApp, as the participants disclosed, excluded them from their social networking because everyone else was using it; and non-use of online banking services was increasingly becoming a disadvantage for older people as they found more and more branches were closing.

Addressing these diversified and fragmented barriers in a digital minefield requires a corresponding strategy different from that for closing a gap. Compared with the need for a large amount of concentrated investment to close the gap, this current landscape of digital inequities requires a lasting, flexible, and timely support system to help older people identify, avoid, disable or manage the potential ‘mines’. At the same time, because of the fragmentation of potential hazards to digital inclusion and the heterogeneity among older people (see Sections 4.6.4 and 5.6.2), there is no one-size-fits-all solution. Thus, informal digital skills learning sessions that are learner-directed appear to be more suitable to address these inequalities. This is discussed in more detail, with reference to the influencing factors from the social domain and informal learning, under the second research question.

2. How does the informal learning of digital skills address the digital divide among older people?

Results from this research showed that informal learning had played a pivotal role in sustaining older people's digital engagement. Learning within an institutional setting, such as local community centres, in general, seemed to help older people to stay online better than in a home setting (see Table 4-21 and Section 5.6.8.2). It was due to multiple reasons.

First, in addition to teaching older people digital literacy, the way informal learning sessions sustained older people's digital engagement was through fostering the bundling of the practices of *learning*, *going online* and *socialising*. In other words, these practices were 'glued' together at the site of learning in such a way that the performance of one practice naturally drove another. As disclosed from both quantitative and qualitative studies, older people mainly attended the informal learning sessions for socialising, getting out of the house (i.e., staying physically active), and keeping their minds active (see Sections 4.5.3 and 5.6.3.2). These informal learning sessions became primarily social events for those older people who had gained the digital skills they needed. Situated within an informal learning session environment, these social interactions mainly revolved around learning about digital devices, surfing the Internet, and sharing their own experiences. In doing so, the practices of socialising and learning drove forward the practice of going online among older people. In comparison, informal learning in home settings was loosely bonded with the practices of going online, getting out of the house and socialising without the same facilitating environment.

Second, the informal learning sessions fostered communities of practice among older people. Older people's family members, in particular the younger generation, tended to be impatient in teaching/explaining and thus preferred to directly 'fixed' things for them. In comparison, the tutors, volunteers and peer learners at local community centres or libraries encouraged a trial-and-error learning approach and facilitated a situated learning environment (see Section 2.6.3). The former learning approach addressed the barriers to older people's technology adoption and use, such as technophobia (e.g., a fear of breaking things), low self-efficacy, stigmatisation, and ageism (see individual factors and informal learning-related factors in Table 7-1). In comparison, the latter enabled older people to learn and practise digital skills through empirical involvement in various use scenarios.

The novice learners were able to participate in smaller clusters of learning communities formed within site (e.g., the library), such as iPad groups based on the type of device or social groups formed through overlapping social circles (e.g., grandchildren going to the same school) (see Section 5.6.8.2). Learning, in this regard, was not merely about taking in the conceptual knowledge or gaining embodied skills but was also about sharing experiences and negotiating the meanings and strategies of going online. Using the Internet for certain daily activities was given corresponding socio-cultural meaning and shared values within this community. In most cases, situated learning sustained older people's online participation as they shared knowledge and best practices within the group (e.g., demonstrating how to use WhatsApp for communication). Although, in some cases, this form of learning inhibited their use of the Internet when frustration and fear towards activities, such as online banking and financial management, spread and 'infected' members of the group.

Third, some older people developed trust in, and dependence on, their tutors from the informal learning sessions. As became clear in response to research question 1, the experience of going online was like walking through a minefield for many older people. Informal learning sessions thus became a 'sanctuary' for them, where they felt safe to explore the online space (i.e., the minefield) with support at hand and where they could bring the questions saved up in between the sessions for assistance. While informal learning at home implied easier access to support without the constraints of class schedule, this did not always automatically translate into learning opportunities. In addition, there pervaded a learning philosophy among older people that they did not want to be advanced and learn everything except just the basics and those skills that were relevant to their daily practices. Older people's learning was thus primarily community-based and interest-, activity-oriented. Although being reliant on support from their tutors or peers to deal with the unexpected 'mines' they came across, going into the learning centres or libraries gave them a sense of independence and control, without the feeling of constantly needing someone's assistance. This did not apply to everyone, depending on the family dynamics, but it appeared as an experience shared by many participants in this research. Attending these informal learning sessions at their local community also enabled older people to repeat and consolidate their digital literacy, practise, and reinforce their embodied skills and adapt to the changes such as those from system updates (in particular for those who acquired skills through rote learning). It was essential to them as their memory, cognitive and hand dexterity declined due to ageing.

In summary, informal learning went beyond teaching digital literacy. It made (learning about) going online a part of older people's social life and community living, as well as a practice that fitted into their agenda of staying active and independent. Apart from facilitating digital engagement to become a 'habit', it also helped older people manage this acquired habit by countering the hazardous changes. Thus, it did not close the digital divide among older people but rather sustained their online participation by helping them be more confident in facing the digital minefield and more able to identify, avoid, or clear the hazards along the way.

3. Does sustaining digital inclusion contribute to active and healthy ageing for older people? If yes, how? If not, why?

Driving forward the digital inclusion initiative appeared to have a two-sided effect on older people's active and healthy ageing. On the one hand, results from this research demonstrated that older people gained beneficial outcomes from going online (see Sections 4.5.2.5, 4.6.2.4 and 5.6.6.3), such as being enabled, empowered, included, and independent. Access to rich online information and online media content helped them to save time and travel (e.g., checking stock availability in local stores before paying a visit), adopt a healthier lifestyle (e.g., following diabetic diet plans), as well as make better-informed decisions (e.g., looking up train times and weather to arrange travel). Communication software/apps and social media also better connected them to their social network. Moreover, online entertainment and gaming helped to address their loneliness and helped them keep their brain active and hands nimble. It was particularly important for older people who were disabled and more housebound. The participants widely acknowledged the role of digital participation in keeping them active and independent.

However, on the other hand, digital inclusion also negatively impacted older people's physical and mental wellbeing (see Sections 5.6.6 and 5.6.7). Both quantitative and qualitative studies revealed older people's concern over their time spent online due to addiction (e.g., watch Facebook videos for hours), distraction (e.g., push notifications and personalised recommendations) and disorientation (e.g., overwhelmed by rich online information but could not find the information they needed). Therefore, some older people decreased their use of the Internet to prioritise the practical and everyday life experiences that kept them physically active instead of staying in the house or sitting in front of a screen, and that fostered personal contact and community socialising rather than online communication and interaction.

Indeed, results from this research showed that digital technologies and the Internet played an important but relatively small, if not marginal, role in older people's day-to-day living. Although more and more facets of society have turned to 'digital by default', this pace of digitalisation was asynchronous with the rhythm of daily living that many older people maintained:

- while digitalisation moved more services and support online, older people valued offline experiences, such as going to the local shops and talking to a real person, as a way of active ageing;
- while universal access to information online broke spatial and temporal constraints, older people appreciated less this notion of staying connected anytime and anywhere because, as they put it, they had other more important things in life to attend to;
- while digitalisation accelerated, 'changes' overtook 'fixed' as the new normal, and the boundary of online and offline life blurred, many older people expressed concerns over how this trend increasingly divided people into their information silos, or digital bubbles, rather than enhancing social inclusion or social connectedness.

An implication of this misalignment was that older people found fewer offline alternatives and more expectations on them to widen their online participation. In this regard, the meaning of 'better' digital inclusion was at odds with staying active and healthy from the older people's perspective.

As the participants disclosed, they felt that their old and familiar cultures were being taken away by digitalisation. They were being forced into it out of a fear of being left behind or being marginalised by society. This attempt of becoming digitally included (and thus socially included) sometimes happened at the expense of their mental and physical wellbeing (e.g., they became worried about online safety, less human assistance and in-person experience), as if they were being pushed to go into the digital minefield more and more frequently. Some participants referred to the movie *I, Daniel Blake* and similar real-life examples to illustrate this dilemma they faced.

What constituted a digital minefield differed between those who were younger (e.g., aged between 65 and 75) and those who were older (e.g., aged over 75) was due to an apparent cohort effect, in that those who were born in the pre-war period (i.e., before 1939) were much more financially cautious and risk-averse, and an apparent period effect, due to the life stage they were in when the diffusion of personal computers and the Internet started. As a group, they faced challenges towards better digital inclusion due to the effects of within-person ageing (e.g., declining health) and between-person ageing (e.g., going through retirement). Hence, the juxtaposition of digital inclusion and active and healthy ageing appeared to be a common problem among older people. Evident in the results from this research was that the participants, regardless of their individual backgrounds, had semi moved with the times and developed a limited, assisted, selective pattern of online participation that a hybrid/mixed model of online-offline practice accompanied. For example, because of a fear of making transactions online, some participants would first look up product and stock information online and then move offline to buy the products in the local stores. These patterns of online participation and embeddedness of the digital element in daily practices were not fixed. However, they were adaptive to the changes to help the older people maintain a fine line between digital inclusion and active and healthy ageing.

This raised a question over the dominant voices in digital divide research that hail the benefits of digital inclusion for older people and endeavour in closing the digital divide. This research argues for a shift in mindset in addressing the digital inequalities among older people: instead of viewing the limited digital participation as the exceptional, it is more appropriate to accept that this is the norm among older people as they renegotiate their identities in society after retirement and balance between online and offline practices to stay active and healthy. Thus, echoing the answer to the first and second research questions, informal learning sessions/opportunities should be made available to older people in helping them to manage their journey through the digital minefield rather than closing the gaps as if these issues can be fixed once and for all. This research thus offered a new approach to address the sustainability of digital inclusion among older people: rather than focusing on changing older people's individual choices, attitudes, and behaviours; research should expand their horizon to take into account the daily life context and the whole ecosystem (see Section 6.3.5) that enabled the older people to perform certain online activities or, conversely, disabled them from doing so. The theoretical lens of practice theory proved useful in analysing how digital engagement takes forms, persists, and changes in the messy, rich, and complex context of daily life.

This shift in the perspective towards the relationship between digital inclusion initiative and social agenda on facilitating an active and healthy ageing also reflects the nature of the relationship between digital inequality and social inequality among older people. Digital inequality has been commonly viewed as a derivative of entrenched social inequality. Although in recent years the interactions between these two types of inequalities have been recognised (e.g., digital inequalities originate from social inequalities and then in turn reinforce and/or complicate social inequalities and potentially create new ones), this common view still underscores an approach of addressing digital disparities through fixing the social inequalities (see Section 2.6 and Figure 2-5). Findings from this research presented a more complex relationship between these two types of inequalities as digital inequalities began to increasingly gain their own power through the growing importance of materiality (e.g., tablets, smartphones, smart technologies, sensors) in shaping day-to-day social practices. For example, some interview participants who were socially active and included, could be deemed as digitally excluded because of a certain lifestyle they adopted (e.g., do not like the idea of going online). In this case, the digital inequality could not be directly linked to any existing type of social inequality that is identifiable from the participant's life circumstances. However, it has a potential delayed effect on the social inclusivity and equality for the participants. For example, participants from both survey and interviews revealed that sudden life events put them in a difficult position in the adoption of digital technologies. Sudden changes in life such as bereavement and declining health are not uncommon among older people. This type of digitally disadvantaged but socially included older people exemplified in this research points to a new avenue to visit for both academics and practitioners.

For those who experienced social inequalities before the time of/or the emergence of digital inequality, the existing inequalities indeed led the participants to an unfavourable situation in the digital society (see Section 5.6.2). The experiences of inequalities among this type of participants conform to the common view on the interrelated and recursive relationship between digital and social inequalities. However, findings from this research also prove that the entrenched social inequalities are much more difficult to address than the coupled digital disparities. As discussed in Section 5.6.2.4, this is because social inequalities can be associated with a lack of social, cultural, financial, and other types of capital that an individual can inherit and accumulate through lifetime, whereas digital inequalities are linked to a lack of digital capitals. While digital capitals can be gained through transformation or consumption of social (e.g., through social network support), cultural (e.g., through learning) and financial capitals (e.g., through purchasing devices), it is difficult for older people who do not already in possess of these capitals to accumulate in later life because of their marginalised position in the society (e.g., retirement, and ageing). In this vein, it's hard to address the digital inequalities by starting with fixing the social inequalities.

As a result, the question of how to balance the impacts of promoting digital inclusion and active and healthy ageing on older people's life is essentially how we come to evaluate and address the compounded digital and social inequalities that older people face in their life. We may begin to ask what aspects in our lives are purely digital, what are purely social? Findings from the qualitative study gave a very blurred line between these two as the digital domain is increasingly overlapping with the social domain. The material-competence-meaning model and the ecological framework (see Figure 6-2) based on the daily practices provide a good alternative to the digital-social inequalities debates by shifting the focus to older people's daily practices, which were revealed to a large extent a hybrid of online and offline activities.

7.3 SUMMARY OF CONTRIBUTIONS TO KNOWLEDGE

This research made contributions to the existing body of knowledge on the digital divide research and older people's digital inclusion in four ways. Firstly, although there was a plethora of research on the digital divide among older people, most of them focused on only one layer of the digital divide, particularly in the layer of *skills and use*. The research in this thesis considered a more comprehensive view of the digital divide phenomenon among older people and discovered that older people faced digital inequalities across many layers. This research then made a theoretical contribution by extending the current digital divide framework to recognise a *digital minefield* faced by older people.

Secondly, studies on the factors that influence older people's digital inclusion focused on older people's personal characteristics and their attitudes. A significant volume of literature also looked at the design features of the technologies. However, little attention has been paid to the contextual factors from older people's daily life. This research identified how daily practices for active and healthy ageing affected the adoption and use of digital devices and the Internet. It was a further novel contribution from the current research. Moreover, this research is located at the intersection of conceptual and empirical research, which made it possible to develop a more inclusive and comprehensive framework that can be understood and adopted by both researchers and practitioners. This current research thus proposed an *ecological framework* to better understand how older people's online practices were formed and changed under the influence of multiple entities within the ecosystem (see Section 6.3.5 and Table 7-1).

Thirdly, the extant literature on older people's digital skills learning has largely examined formal, short-term digital literacy training courses/classes, leaving the day-to-day informal learning underexplored. This current research took a novel approach to understand how informal learning supported and sustained older people's digital inclusion. Adding to the body of knowledge, such as that made by Zeidman and Tinker (2016a), this research made a novel contribution in identifying the way informal learning sustained older people's digital inclusion.

Finally, this research has contributed to the field of digital divide research by bringing a perspective from social theories of practice. Specifically, comparisons between the digital divide framework and contemporary theoretical framework for practice theory based on their constitutive elements were made. As a novel approach, this research contributed to the knowledge in applying and combining theoretical frameworks. It was demonstrated that practice theory could be used to better account for the context to digital use that is often missing or overly simplified in the digital divide research, especially in models such as the UTAUT2, as discussed in Sections 6.3.4 and 6.3.5. Introducing practice theory can thus help embrace and tackle the messiness and richness of the daily life context to digital inclusion.

7.4 RECOMMENDATIONS FOR PRACTICE AND POLICY

This research has identified several recommendations for practices and policies on promoting digital inclusion among older people. First, at a policy level, there is a need to shift the mindset from closing the *digital divide* to managing a *digital minefield* among the older population and, further, to treat this as being normal instead of being exceptional. Accordingly, the guidance on practices to address the digital inequalities should be focused on developing a long-term support system rather than measures that aim for a quick or complete fix. Resources and strategies that previously aimed for addressing different layers of the digital divide should be coordinated.

Second, it is recommended to acknowledge the informal learning sessions (including drop-in sessions) as a *new infrastructure* for building a digital society. This research has demonstrated the importance of such informal learning sessions in helping older people manage the unexpected problems in the digital minefield, thus achieving sustainability and resilience in their digital engagement. Thus, it is as important as the Internet infrastructure. Meanwhile, such informal learning sessions also proved to play an important role in maintaining older people's community participation and active and healthy ageing. Therefore, it is equally important as the infrastructure for age-friendly communities like transportation or outdoor spaces. At a policy level, digital inclusion and age-friendly communities should be planned together instead of separately. As a new infrastructure, it should be made easily accessible both in terms of time and space: it should be provided more frequently than at present (which might be only once each week) and the uneven distribution of resources based on geographical locations should be addressed (e.g., in deprived or rural communities). As an infrastructure, a standard of service/support provision should be established. It addresses the issues associated with differing levels of digital literacy or capability of the tutors that emerged from the interviews. At the practice level, this does not need to be an overhaul. The current UK Online Centres are an extensive network of community-based resources; they can be used as a basis for this new infrastructure. The overly-reliance of volunteers at these centres should be addressed, as pointed out earlier, to maintain a good standard of the support and services provided. A solution could be providing a shared database, essential training, and examples of best practices. As the results from this research suggested, local community centres and libraries should be supported as they appeared to be among the most frequently visited places by older people for learning digital literacy.

Third, there is a need to build an 'ecosystem' that facilitates digital participation better among older people. Building an infrastructure of informal learning is part of what this ecosystem necessitates. Policymakers should develop strategies to address cultural issues such as ageism, assumptions that based on stereotypes of older people being digitally inadequate, or on the contrary, and assumptions that neglect older people's needs (e.g., from technological companies). A solution to this could be, as practice theory argues, encouraging research and practice that focuses on the practices rather than the individuals for making improvements. It helps avoid blaming older people for not being online because of their attitude or behaviour, thus falling into the loop of being stigmatised, discouraged, and blamed. Instead, the focus for policy and practice should be placed on understanding the key elements for the practices to be carried out by older people and how to create better conditions to facilitate the production and reproduction of these desirable practices (see Sections 5.7 and 6.3.5). In a way, this requires attention to the context of digital-related practices.

7.5 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The limitations of the quantitative study concerning the use of secondary data and analysis based on two cross-sectional surveys have already been discussed in detail in Section 4.8. Limitations of the qualitative study have been briefly discussed through reflections on the sampling and recruitment process in Section 5.3. In addition, in the qualitative study, there was a lack of representation of 'non-users' or discontinued

Internet users. According to the statistics, these types of users still broadly exist among the older population. However, they could not be approached during the recruitment process despite the use of different sampling techniques. This lack of representation of the most marginalised groups in society was related to the research process at large. Firstly, the quantitative study utilised the LMW survey dataset. The unspoken requirements for one to be able to learn through the LMW either online or offline by joining one of those community organisations from the Online Centres Network ruled out the most digitally and socially disadvantaged group of older people. The requirements include being able to get online and get started with the LMW website if learning online; being able to personally visit one of the centres at scheduled sessions if learning offline; being able to speak English; being physically healthy, to be able to read from the screens, to use peripherals such as keyboard and mouse; being literate and have cognitive competence to be able to comprehend the learning materials and make progress; being mentally well to be able to commit to the learning process; and let alone being able to afford the costs (e.g., time, financial) associated with learning and using the Internet. For those most marginalised in society, these unspoken and often overlooked hurdles to access support of this kind would be hard to cross as they often tend to be those who are housebound, in poor health, lack traditional literacy or English literacy and those who are socially disadvantaged (thus could not afford or are not motivated to learn). In this regard, the LMW survey lacks a representation of the most marginalised groups by design. Secondly, as explained in Section 5.3.3, the qualitative study was built on a purposive sampling strategy. One of the inclusion criteria was to recruit community dwelling older people. It thus excluded the group of older people from care homes, who are more likely to be digitally disadvantaged. In addition, during the participant recruitment process, the researcher was only able to visit the sites and conduct the interviews where the public transport could reach. In the rare case where one interview was taken in a village, the researcher was picked up by the participant at the train station. This again confirmed that the sample from the qualitative study is biased towards those who were more active, healthy, community dwelled, and socially active and engaged. Future research could endeavour to include the voices and the experience of such most marginalised individuals in society that this research could not reach.

It is worth mentioning that two interview participants, who self-identified as ‘non-users’, actually turned out to be active users of the Internet. One of them claimed to be a non-user on purpose and as a protest against unmet learning/supporting needs in the ‘digital by default’ movement. The other appeared to have misunderstood the concept of the Internet, indicating a lack of digital literacy of understanding that using Google was, in fact, going online. Future research needs to be taken to understand whether these cases were isolated examples or are more widespread. It could have an implication on the design of related questions in a survey.

Another limitation of the qualitative study was that the understanding of the daily life context and digital engagement depended on the narratives of older people themselves. Some participants provided much detail, while others only touched the surface regarding this topic. It has the potential implication of silencing some different perspectives. In addition, the overall information on how their day-to-day life was carried out, as well as the dynamics of the learning sessions, were limited. Future research could adopt an ethnographic approach to observe different learning sessions and how/when older people used digital devices and the Internet when carrying out their daily routines.

On the whole, while the quantitative study used the LMW (Learn My Way) sessions[29] to represent informal learning among older people, the informal learning in the qualitative study was more discursive and casual. It was considered as a limitation of this research. It was because few older LMW learners were met during the recruitment. Future research on informal learning among older people could reconcile this discrepancy by conducting a survey to collect data first-hand. In addition, future studies should be carried out to include the perspectives of tutors and other stakeholders to better understand how to facilitate older people’s digital engagement.

7.6 CONCLUSION

This chapter has addressed the research questions set out in Chapter 1 with a summary of the key findings from both studies. The contributions to knowledge and implications on theory, practice and policy were also discussed. Reflections were made in terms of the

[29] The LMW platform has structured contents, although how to use these learning materials was entirely dependent on the learner’s own interest and need, hence the learning process was still informal.

limitations of each study and the research as a whole, based on which directions for future research were presented.

Thus, this chapter concluded this thesis with a more nuanced understanding of digital inclusion among older people gained from this research, that is, there exists a digital minefield among older people that could be addressed by supporting their long-term informal learning. Influencing factors should not be addressed in isolation but handled comprehensively in their specific context. To this end, the ecological framework developed in this research shall be used to base future research on older people's daily practices, while older people's limited digital engagement in the digital minefield should be considered normal instead of an exceptional part of their daily living.

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APPENDICES

APPENDIX 1 LITERATURE REVIEW SEARCH TERM

ID	*Theme*	*Search query*
1	Age group	Older people, old people, older adults, old adults, elderly, elders, seniors, pensioners, retired, senior citizens
2	Ageing/aging	Active ageing, healthy ageing, successful ageing, ageing in place, age-friendly
3	Digital technology	Digital technology, Internet, web, ICT, IT, computer, desktop computer, laptop computer, tablet, phone, mobile, smartphone, WIFI, social network
4	Digital inclusion	Digital inclusion, digital divide, digital exclusion, digital inequality, digital (dis)empowerment, digital gap, digital capital, digital society, everyday life, daily life
5	Use pattern	Online activity, online services, information, health information, entertainment, leisure, communication, email, social network, shopping, banking
6	Sustained use	Technology maintenance, sustained use, sustaining, continue, continuous, change, learning, training, courseds
7	Outcome	Offline outcome, beneficial outcomes, benefits, wellbeing, independence, autonomy, health, welfare, satisfaction
8	Factors	Barriers, hurdles, inhibitors, enablers, facilitators, age, health, mobility, cognitive, gender, experience, attitude, belief, habit, anxiety, technophobia, access, competence, skills, support, proxy, content, socio-economic
9	Theoretical lens	Model, theory, TAM, UTAUT, digital divide, practice, social theories, SCT, communities of practice, situated learning

APPENDIX 2 QUANTITATIVE STUDY – ETHICS APPROVAL

The University Of Sheffield.

Downloaded: 15/09/2020
Approved: 15/11/2017

Yuhua Wang
Registration number: 160105155
Information School
Programme: PhD

Dear Yuhua

PROJECT TITLE: Developing a better understanding of the factors that influence digital inclusion for active and healthy ageing among older people
APPLICATION: Reference Number 016365

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 15/11/2017 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 016365 (form submission date: 24/10/2017); (expected project end date: 30/09/2020).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Daniel Rose
Ethics Administrator
Faculty of Social Sciences

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy: https://www.sheffield.ac.uk/rs/ethicsandintegrity/ethicspolicy/approval-procedure
- The project must abide by the University's Good Research & Innovation Practices Policy: https://www.sheffield.ac.uk/polopoly_fs/1.671066!/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

APPENDIX 3 QUALITATIVE STUDY – ETHICS APPROVAL

The
University
Of
Sheffield.

Downloaded: 15/09/2020
Approved: 05/02/2019

Yuhua Wang
Registration number: 160105155
Information School
Programme: PhD

Dear Yuhua

PROJECT TITLE: Developing a better understanding of the factors that influence digital inclusion for active and healthy ageing among older people
APPLICATION: Reference Number 023000

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 05/02/2019 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 023000 (form submission date: 21/01/2019); (expected project end date: 15/04/2019).
- Participant information sheet 1053301 version 3 (10/01/2019).
- Participant consent form 1053302 version 3 (10/01/2019).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Daniel Rose
Ethics Administrator
Faculty of Social Sciences

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy: https://www.sheffield.ac.uk/rs/ethicsandintegrity/ethicspolicy/approval-procedure
- The project must abide by the University's Good Research & Innovation Practices Policy: https://www.sheffield.ac.uk/polopoly_fs/1.671066!/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

APPENDIX 4 QUALITATIVE STUDY – ETHICS AMENDMENT APPROVAL

Approval for amendment 1

Information School Research Ethics <ischool_ethics@sheffield.ac.uk> (sent by daniel.rose@sheffield.ac.... Thu, 7 Mar 2019, 15:35
to me, Peter, Laura

Dear Yuhua,

You amendment has been approved by Paul Reilly.

Many thanks, Daniel

...

--
Ethics Team
Information School
University of Sheffield
Regent Court,
211 Portobello
Sheffield
S1 4DP

www.sheffield.ac.uk/is
@InfoSchoolSheff

Approval for amendment 2

Information School Research Ethics <ischool_ethics@sheffield.ac.uk> (sent by daniel.rose@sheffield.ac.uk) Tue, 9 Apr 2019, 14:44
to me, Peter, Laura

Dear Yuhua,

Your amendment request has been approved by Paul Reilly.

The details of your amendment request will be recorded on your online ethics application form.

Many thanks, Daniel

...

--
Ethics Team
Information School
University of Sheffield
Regent Court,
211 Portobello
Sheffield

APPENDIX 5 QUALITATIVE STUDY – INFORMATION SHEET AND CONSENT FORM

The University of Sheffield Information School	Developing a better understanding of the factors that influence digital inclusion for active and healthy ageing among older people

Information Sheet for Interview Participants

Researchers

The lead researcher of this study is Yuhua Wang (ywang271@sheffield.ac.uk), a third-year PhD student in the Health Informatics Research Group, Information School, University of Sheffield. The study is supervised by Prof. Peter Bath (p.a.bath@sheffield.ac.uk) and Dr. Laura Sbaffi (l.sbaffi@sheffield.ac.uk), who are Professor and Lecturer of Health Informatics in the School respectively.

Further information about the researchers can be found here:
Yuhua Wang: https://www.sheffield.ac.uk/is/pgr/students/wangy
Prof. Peter Bath: https://www.sheffield.ac.uk/is/staff/bath
Dr. Laura Sbaffi: https://www.sheffield.ac.uk/is/staff/sbaffi

Purpose of the research

The overall aim of this study is to develop a better understanding of whether and how mature adults, especially after learning about computers and the Internet through either formal or informal sessions, use computers (including laptops, tablets and smartphones) to go online and to assess whether they gain benefits from this.

Who will be participating?

We are inviting older people (age 65 and over) who have attended, or are still attending introduction or troubleshooting sessions on computers and the Internet. These sessions may be provided by staff and volunteers from your local charities, libraries, community learning centres, cafes and so on.

We would also like to hear your views and experience if you do not use or are just not interested in computers and the Internet.

Participants must speak English and live in the UK.

What will you be asked to do?

If you are interested in taking part in the study, we would like to talk with you about your experience in using or not using the Internet after attending the training courses and how this experience has affected your day-to-day life. We will ask you to complete a brief demographics questionnaire (your age, gender etc.) so that we have a profile of our participant group. After that, we will conduct an interview lasting around 60 minutes, but varying from case to case. Interviews will be conducted in person by the lead researcher, Yuhua. She is based in Sheffield, and this would be the preferred interview location, but she is willing to travel to interview you. Reasonable travel expenses will be reimbursed from within the UK. If you think you might incur into travel expenses to participate in the study, please let the lead researcher know before the interview.

You have the right to refuse to participate in the study as well as to refuse to answer any of the questions. You also have the right to withdraw from the research at any time without having to give a reason. These rights, however, cannot be extended after the data has been anonymised, analysed, or published.

What are the potential risks of participating?

The risks of participating are the same as those experienced in everyday life.

What data will I collect?

I (Yuhua, the lead researcher) will audio record the interviews, and take notes on paper to help me when analysing the interviews. After collecting demographic information such as age, gender and education level, I will first ask you questions about the skills you developed in the training, and how you have used these for using the Internet since you did the training. I will then follow up on any changes (e.g., usage, attitude) mentioned during the interview and ask you what the reasons for such changes might be. This will help me to better understand your Internet using experience and journey after the trainings. You **may** be contacted again **within a week** following the interview if clarification for some points discussed during the interview is needed.

What will I do with the data?

In accordance with the university policies, the data will be stored in a password-protected system. The data will be stored in a secure research data server and in the researcher's University of Sheffield Google Drive account. The data also will be encrypted, and it will be accessed only by the lead researcher and her supervisors (Yuhua Wang, Prof. Peter Bath and Dr. Laura Sbaffi). The data will be thematically analysed by the lead researcher to give a rich description of the collected data.

The use of paper copies will be avoided unless essential and will be kept in a locked storage in the Information School. The papers will be destroyed as soon as they are no longer needed. If you give us permission, we would like to retain the transcriptions after the completion of the project for use in future by the research team. The anonymised data will be passed to the supervisors to either keep it stored in the same secured research data server or transfer it to another secure drive (within the university policies) so it can be used for future research.

Your completed consent form will be held in securely locked storage in the Information School and will be confidentially destroyed at the end of the project.

A transcription service might be used to transcribe the interviews. The data will be anonymised, and a confidentiality agreement will be signed by the transcriber prior to any data transfer to ensure the confidentiality of the data.

Will your participation be confidential?

The privacy and data confidentiality of all participants are very important for the research team. All information you give us will be carefully anonymised when the interviews are transcribed, and names and any details that could identify you or other people will be removed. In the write-up of our findings, we will give you a pseudonym and any names that you have mentioned (e.g. tutor names, place names) will be anonymised.

What will happen to the results of the research project?

The anonymised data will be used in the lead researcher's PhD thesis, which will be publicly available, and in future research publications. It is also possible that the anonymised findings will be presented at conferences and/ or referenced by the Online Centres Network and its partners such as the Good Things Foundation.

A summary of the results will be sent to the participants. After completion of the studies (which is anticipated to be around March 2020), the Ph.D. thesis will be published in the White Rose System [http://etheses.whiterose.ac.uk].

What is the legal basis for processing your personal data?

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly. In order to collect and use your personal information as part of this research project, we must have a basis in law to do so. The basis that we are using is that the research is 'a task in the public interest'.

Declaration of consent

- I confirm that I have read and understand the description of the research project, and that I have had an opportunity to ask questions about the project.
- I understand that my participation is voluntary and that I am free to withdraw **within one month (30 days) following the interview** without any negative consequences.
- I understand that if I withdraw I can request for the data I have already provided to be deleted, however this might not be possible if the data has already been anonymised or findings published.
- I understand that I may decline to answer any particular question or questions, or to do any of the activities.
- I understand that my responses will be kept strictly confidential, that my name or identity will not be linked to any research materials, and that I will not be identified or identifiable in any report or reports that result from the research, unless I have agreed otherwise.
- I give permission for all the research team members to have access to my responses.
- I give permission for the research team to re-use my data for future research as specified above.
- I agree to take part in the research project as described above.

Participant Name (Please print) ____________________ Participant Signature ____________________

Researcher Name (Please print) ____________________ Researcher Signature ____________________

Date

Note: Further information, including details about how and why the University processes your personal information, how we keep your information secure, and your legal rights (including how to complain if you feel that your personal information has not been handled correctly), can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, please contact Dr Paul Reilly, Research Ethics Coordinator, Information School, The University of Sheffield (ischool_ethics@sheffield.ac.uk).

Participant Interview Guide

Thank you for agreeing to talk to me. Before beginning with the interview, I would like to go through a few things with you first.

Introducing the research

- Purpose of interview *Information Sheet*
- Confidentiality
- Right to stop the interview
- Consent to interview (and to record the interview)

Participant Demographic Details

1. **Name_______________**
2. **Age _______________**
3. **Gender**

   ☐Male ☐Female

4. **Area of living** *Densely, intermediate or thinly populated*

   ☐City ☐Towns and suburbs ☐Village/rural areas

5. **Living arrangement**

   ☐Living with family (adult) ☐Living with family (child)

   ☐Living alone at home ☐Living in a nursing house ☐Prefer not to say

6. **Marital status**

   ☐Married ☐Partner ☐Divorced/separated

   ☐Single ☐Widowed ☐Prefer not to say

7. **Level of education** *What is the furthest level of education that you have completed?*

   ☐No schooling completed

   ☐Primary education

   ☐Secondary education (GCSE/O-level)

   ☐Post-Secondary education (College, A-Levels, NVQ3 or below, or similar)

   ☐Vocational qualification (Diploma, Certificate, BTEC, NVQ 4 and above, or similar)

   ☐Undergraduate degree and higher

   ☐Prefer not to say

8. Employment/ Voluntary work

□Retired	□Full-time	□Part-time
□Voluntary work	□Not applicable	□Prefer not to say

Interview Questions (Learner Version)

<table>
<tr><th></th><th>Topic</th><th>Question</th></tr>
<tr><td rowspan="1">1</td><td>Warm-up question</td><td>Can you tell me a bit about the things you’ve learned/ or had help with on the computers from [name of the place or course]?

For how long have you been coming to the session?
What did you know about computers and the Internet before coming here? (what did you use them for?)
Why did you decide to join this session?

Where did you hear it from?
What did you want to learn?
Why did you want to learn about computers? (e.g. Family/ friend recommendation? Do some informal learning? Need to use some services online?)

</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Learning experience and opportunity</td><td>What do you think of the learning experience you had so far?

Has the learning been easy to you?
Have you ever felt frustrated or experienced any difficulties in learning? Can you give me an example?
Have you ever felt very happy about what you’ve learnt and feel motivated to learn more? Can you give me an example?
</td></tr>
<tr><td>Apart from this [weekly] session, do you also learn about computers/ or practice at other places?

Where do you go for the learning?
Do you have any friend, family member or people from your local community and council to help you?
</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Access to devices, and the Internet</td><td>If use own laptop/ tablet:
Do you also have other devices (e.g. desktop computer, laptop computer, tablet, iPad and smartphone) that can connect you to the Internet? What does Internet mean to you? (Can you give me a few examples of using the Internet?)</td></tr>
<tr><td>If using computer/ tablet [from this place]:
Do you have any computer (e.g. desktop computer, laptop computer, tablet such as iPad, and smartphone) that can connect you to the Internet? What does Internet mean to you? (Can you give me a few examples of using the Internet?)</td></tr>
</table>

4	Day-to-day use of devices and the Internet	*If have access to devices:* I am interested to learn about how you use the Internet in your day-to-day life. Can you tell me about it and give a few examples? – (based on the example, how easy do you find to do it? Have you experienced any **unexpected** difficulties in getting online? Did you get any help with it?) Such as… • Communication • Social media • News and weather • Information gathering • Shopping • Life management (financial, housing, public services) • Leisure/entertainment • For personal interest Do you use different devices for different things? What are the things that you like about, or dislike about each of these devices (e.g. keyboard, touchscreen) that make you feel easier or more difficult to going online?
		If have no access from home: Apart from attending this session, do you use computers to go online/ go to the Internet? Where do you use the computers? What do you use it for? Can you give me an example? – (based on the example, how easy do you find to do it? Have you experienced any difficulties? Did you get any help with it?) What are the things that you like or dislike about the computer that you used? Have you thought of learning to use a different device/computer?
5	Use of the Internet to keep healthy	Staying active and healthy is very important for all of us as we age. There are a lot of health-related information and services online, do you use the Internet to manage your health? If not, why? Such as… • Information about health conditions • Search for doctors • Making appointments with GP • NHS online • Other

6	Changes in use overtime	Have you been [able to keep]/[keeping] learning about and using the computers (and the Internet)? ***Regarding discontinuation*** Can you give me an example where you thought about stop it or did stopped using for some time? Why (stopped, and now learning or using again)? • Lack of resource? • Health? • Change in life? • Loss of interest? ***Regarding expansion and development in use*** Can you give me an example where you thought this is fun and you moved on with discovering more about the [device]? Are there other things that helped you to keep it up? • People and support network? • Learning course or style? • Learning environment? ***Regarding future learning and using*** Are you happy with what you can do with computers and the Internet now? Do you have plans to learn more about what the computers can do for you in the future? What are the things you **want** to further learn? What are the things that you do **NOT** want to learn and use the computer for?
7	Experience of maintaining/ longer term of use	Have you come across with any **unexpected** problems during your use of the Internet? Was it related to… • Computers? • Connection (broadband)? • New skill required? • Safety concern? • Time-consuming? Did you manage to find any help to resolve the problem? Or, did you go for other help (e.g. phone up or directly go to a staff member)?
8	Perception and attitudes	Do you feel that you are expected to do more things with the computers/online [examples]? **How do you cope with it, and feel about it?** In general, do you think using the Internet is helpful to manage your daily life, and keep you • Included, Active, Healthy, Independent Can you think of any example where you think it's being helpful, or not?

- Are there any other interesting stories about your experience with the [device] that you’d like to share or any questions to go back to?

- Are you happy to be contacted again after the interview, if there’s anything to be clarified?

- Inform the participant what will happen next and leave a few copies of Information Sheet if they’d like to share with friends.

Thank you very much for your time!

APPENDIX 7 QUALITATIVE STUDY – TRANSCRIBER CONFIDENTIALITY AGREEMENT

The University Of Sheffield.

Transcriber Confidentiality Agreement

Interview study of: Developing a better understanding of the factors that influence digital inclusion for active and healthy ageing among older people

University of Sheffield

This research is being undertaken by Yuhua Wang, who is supervised by Prof Peter Bath and Dr Laura Sbaffi in the Information School at the University of Sheffield. The purpose of the research is a PhD study.

As transcribers, we understand that we will be hearing recordings of confidential interviews. The information on these recordings has been revealed by interviewees who agreed to participate in this research on the condition that their interviews would remain strictly confidential. We understand that we have a responsibility to honour this confidentially agreement.

We agree not to share any information on these recordings, about any party, with anyone except the Researchers (named above) and Transcribers working on this project. Any violation of this and the terms detailed below would constitute a serious breach of ethical standards and I confirm that I will adhere to the agreement in full.

I, Kerry Craddock for Business Friend Limited, agree to:

1. Keep all the research information shared with Business Friend Limited confidential by not discussing or sharing the content of the interviews in any form or format (e.g. WAV files, CDs, transcripts) with anyone other than the Researchers and Transcribers for this project.
2. Keep all research information in any form or format (e.g. WAV files, CDs, transcripts) secure while it is in my possession. I confirm that all files relating to interviews will be stored on a password-protected computer within the service provider's private residence or business premises to which no other person, but I will have access.
3. Return the interview transcripts by email as WORD documents **encrypted** using 7 Zip to Yuhua Wang, ywang271@sheffield.ac.uk when I have completed the transcription tasks.
4. After consulting with the Researchers, permanently erase or destroy all research information in any form or format regarding this research project that is not returnable to the Researcher (e.g. CDs,
5. information stored on my computer hard drive, external drives such as an **encrypted** USB).

Transcriber

Kerry Craddock for Business Friend Limited	Kell	11 June 2019
(Print name)	(Signature)	(Date)

Researcher

Yuhua Wang	Yuhua Wang	11/06/2019
(Print name)	(Signature)	(Date)

APPENDIX 8 QUALITATIVE STUDY – TRANSCRIPTION NOTATION SYSTEM

Notation system for transcribing the interviews

Not to transcribe:

1. Practical interruptions e.g. picking up the phone and a brief communication over the phone, indicate as e.g., [answers the phone]
2. Pauses unless longer than approx. 2 seconds

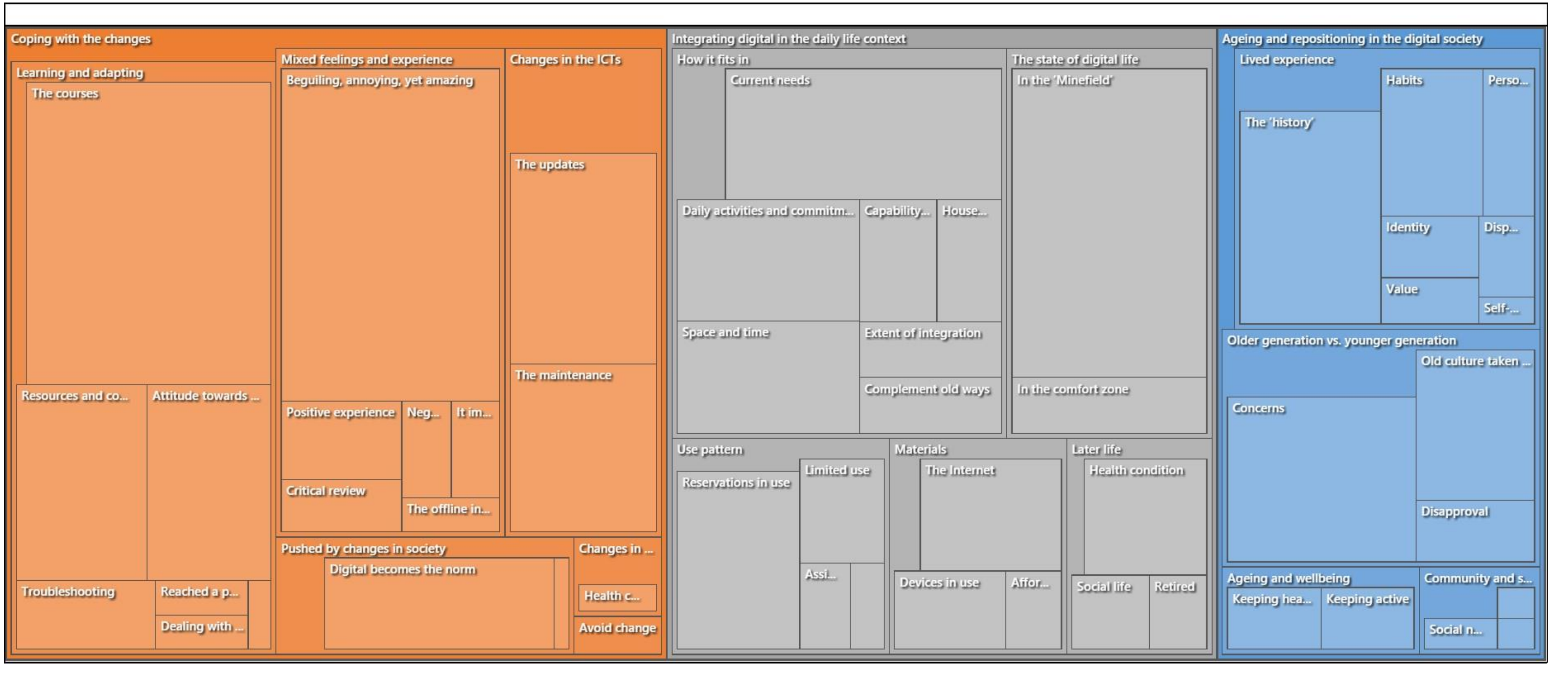
To transcribe:

1. All words, including fillers like 'sort of'. Details refer to BF Transcription Guidelines.
2. [] indicates interviewee sighs, laughs or other action
3. {} indicates prompt from interviewer that doesn't interrupt the flow
4. All sounds made by interviewee e.g. uhm, erm
3. Pauses longer than approx. 2 seconds
5. <> indicates additional notes or comments

- Identity of speaker: remove the names of the interviewer and interviewee and replace with [interviewer] or [pseudonym of interviewee]. Other names mentioned to be replaced with their role or relationship with the speaker [e.g., Tutor, Son] or other title as appropriate
- Indicating turn taking: new line unless is just a filler sound/word either encouraging on the speaker or interrupting / speaking over them, in which case it is indicated in the text by {}
- Laughing, coughing etc: [laughs] indicates the person speaking laughs, [both laugh] indicates both interviewee and interviewer laugh, [coughs] indicates the person speaking coughs. Other actions indicated with the same notation
- Pauses: short pauses indicate by three dots, longer pauses indicate by [pause], refer to BF Transcription Guidelines.
- Abbreviations: only those stated by the speakers are used. If they say the abbreviation in full then it is written in full
- Overlapping speech: only indicated by {}
- Inaudible speech: Refer to BF Transcription Guidelines.
- Non-verbal sounds: spelt phonetically, refer to BF Transcription Guidelines.
- Use of punctuation: tries to reflect the speech, rather than grammatical correctness, refer to BF Transcription Guidelines.
- Cut off speech: indicate by –
- Hesitations/ change in direction/ shutters: indicated by --, refer to BF Transcription Guidelines.
- Emphasis on words: indicate by <u>underlining</u>
- Reported speech/thought: in inverted commas e.g., so I thought "I am not doing that".
- Vernacular usage & mispronunciation: represented phonetically.

APPENDIX 9 QUALITATIVE STUDY – TEMPLATE OF THEMES

A. EARLIER VERSION OF THEMES



B. FINAL TEMPLATE OF THEMES

1. Personal circumstances and perceptions

1.1. Health condition
- 1.1.1. Physical functions
- 1.1.2. Cognitive functions
- 1.1.3. Perceptual functions

1.2. Socioeconomic factors
- 1.2.1. Financial situation
- 1.2.2. Occupational and employment status
- 1.2.3. Education

1.3. Emotional and psychological factors
- 1.3.1. Positive and negative emotions
- 1.3.2. Mixed feelings towards the Internet
  - 1.3.2.1. It improves life, but it disrupts too
  - 1.3.2.2. It is beguiling, annoying, yet amazing
  - 1.3.2.3. It is only good when it is working
  - 1.3.2.4. It is only good if it is relevant
- 1.3.3. Mental factors
  - 1.3.3.1. Motivation
  - 1.3.3.2. Technology anxiety

1.4. Historical and cultural factors
- 1.4.1. Lived experience
  - 1.4.1.1. Generational factor
  - 1.4.1.2. (Lack of) digitalisation in workplace
  - 1.4.1.3. (Lack of) accumulation
- 1.4.2. Habit, disposition, and personality
- 1.4.3. Value, belief, and identity

2. Social network and support

2.1. Family dynamics
- 2.1.1. Living arrangement
  - 2.1.1.1. Partner/ Spouse
  - 2.1.1.2. Intergenerational

2.2. Social life
- 2.2.1. Family and friends
- 2.2.2. Neighbourhood and community
- 2.2.3. Social events and social norms

2.3. Resources and support
- 2.3.1. Facilitator
- 2.3.2. Inhibitor

3. Features of digital devices and the Internet

3.1. Affordability of materials and services

3.2. The digital devices
- 3.2.1. The designs, usability, and compatibility
- 3.2.2. Comparison between devices

3.3. The online platform
- 3.3.1. Online contents
- 3.3.2. Online safety

4. Digital engagement in daily practices

- 4.1. Patterns in use
  - 4.1.1. Online activities
  - 4.1.2. Assisted use of the Internet
  - 4.1.3. Limited use of the Internet
  - 4.1.4. Reservations in use
- 4.2. Push and pull factors
  - 4.2.1. Current needs
    - 4.2.1.1. The 'basics'
    - 4.2.1.2. Information needs
    - 4.2.1.3. Communication needs
  - 4.2.2. Digital literacy
  - 4.2.3. Spatial and temporal influence
    - 4.2.3.1. How it fits the room setting
    - 4.2.3.2. How ready to use the device is
    - 4.2.3.3. How it fits into routines
  - 4.2.4. Compatibility with lifestyle
    - 4.2.4.1. How it complements old ways of doing things
    - 4.2.4.2. Convenience of offline resources and support
    - 4.2.4.3. Daily activities and commitments
    - 4.2.4.4. Family and social life
- 4.3. Extent of integration
  - 4.3.1. Peripheral role

5. Positive and negative experiences

- 5.1. “It's like walking through a minefield”
  - 5.1.1. The dark patterns
    - 5.1.1.1. Scams
    - 5.1.1.2. Subscriptions
    - 5.1.1.3. The updates
    - 5.1.1.4. The HCI interaction
    - 5.1.1.5. The assumptions
  - 5.1.2. The unknowns
  - 5.1.3. Time consuming
  - 5.1.4. Confusion, frustration, fear, and trust
  - 5.1.5. Beyond the technical aspects - information literacy
- 5.2. “It's like driving a car”
  - 5.2.1. Control
  - 5.2.2. The speed - 'it's too fast'
  - 5.2.3. Unexpected problems
  - 5.2.4. Limited troubleshooting skills
- 5.3. The comfort zone
  - 5.3.1. Expectation, confidence, and control
  - 5.3.2. Support network

6. Ageing in the digital society

- 6.1. Active and healthy ageing VS. digital inclusion
  - 6.1.1. Digital as an enabler
    - 6.1.1.1. “It gets me connected”

6.1.1.2. “It gets me out of the house”
6.1.1.3. “It gets me information”
6.1.1.4. “It saves me unnecessary travels and time”
6.1.1.5. “It keeps my mind active”
6.1.1.6. “It keeps me independent and included”
6.1.2. Digital as an inhibitor
6.1.2.1. Time consuming and housebound
6.1.2.2. Addiction
6.1.2.3. Lack of human interaction
6.1.2.4. Builds frustration and fear
6.1.2.5. Causing fewer offline support
6.1.2.6. Increases social isolation
6.1.3. Keeping healthy
6.1.3.1. Mental wellbeing
6.1.3.2. Physical health
6.2. Older generation VS. younger generation
6.2.1. Concerns
6.2.1.1. Addiction and overuse
6.2.1.2. Obsession with new things
6.2.1.3. Living in the 'bubbles'
6.2.1.3.1. Lack of social interaction
6.2.1.4. The daily life glued to the phones
6.2.1.5. Older people being left behind
6.2.2. Old and familiar culture taken away
6.2.2.1. Ways of socialising
6.2.2.2. Means of communication
6.2.2.3. Community and social participation
6.2.2.4. The new normal
6.2.2.4.1. 'Changes' over 'fixed'
6.2.2.4.2. Blurred boundaries between online-offline life

7. Integrative theme: Coping with the changes

- 7.1.1. Changes in the ICTs
  - 7.1.1.1. The updates
  - 7.1.1.2. Malfunction and maintenance
- 7.1.2. Changes in life
  - 7.1.2.1. Accidents, and health decline
  - 7.1.2.2. Loss of proxy or support system
  - 7.1.2.3. Changes in lifestyle
- 7.1.3. Changes in the society
  - 7.1.3.1. Digital becomes the norm
    - 7.1.3.1.1. Compare to the use of offline alternatives
    - 7.1.3.1.2. Changing requirements on digital literacy
  - 7.1.3.2. Reactions to change
    - 7.1.3.2.1. Facilitating or inhibiting conditions
    - 7.1.3.2.2. Passive acceptance
    - 7.1.3.2.3. Frightened by the speed of change
    - 7.1.3.2.4. Fear of getting left behind
  - 7.1.3.3. Renegotiating self-identity and role in society
    - 7.1.3.3.1. Self-esteem and sense of self-value
- 7.1.4. Informal learning and adapting
  - 7.1.4.1. Digital literacy training courses
    - 7.1.4.1.1. Source of information
    - 7.1.4.1.2. The development of the courses
    - 7.1.4.1.3. Values in the courses
    - 7.1.4.1.4. Limitations of the courses
    - 7.1.4.1.5. Desirable features of the courses
  - 7.1.4.2. Other learning attempts
    - 7.1.4.2.1. Books and shops
    - 7.1.4.2.2. Family and friends
  - 7.1.4.3. Beliefs on learning
    - 7.1.4.3.1. Keep the mind active
    - 7.1.4.3.2. Perseverance and continuity
    - 7.1.4.3.3. Repeat, practice and reinforce
    - 7.1.4.3.4. Learning environment
    - 7.1.4.3.5. Relevance
    - 7.1.4.3.6. Relaxed, not afraid of trying
  - 7.1.4.4. Momentum for continuous learning and engagement of the Internet
    - 7.1.4.4.1. Positive experience
    - 7.1.4.4.2. Achievement and progression
    - 7.1.4.4.3. Emerging needs
    - 7.1.4.4.4. Personal interest and hedonic factors
    - 7.1.4.4.5. Perceived benefits
    - 7.1.4.4.6. Pushed by circumstances