The Influence of Values on the Adoption of Educational Technology

Submitted in accordance with the requirements for the degree of Doctorate of Philosophy

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The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others

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Abstract

This thesis investigated the influence of values, culture and context on technology adoption behaviour. This thesis aimed to theoretically develop and validate the *Values-Enhanced Technology Adoption* (VETA) model, integrating Schwartz's Theory of Human Values with the Unified Theory of the Acceptance and Use of Technology (UTAUT2). The VETA model was validated through survey data in four research organisations based in East Africa (Kenya and Uganda), The Gambia and the United Kingdom. Contextual differences in adoption factors were explored through interviews with e-learners. Workers were surveyed during their participation in a professional e-learning course and interviewed six weeks after their e-learning experience. Survey analysis was completed using Partial-Least-Squares Structural-Equation-Modelling (PLS-SEM); interview data was analysed through computer aided thematic analysis.

The VETA model was partially confirmed in the context with performance expectancy, price value, and habit predicting learner intention to use e-learning. Values interacted with the VETA model as predictors of adoption factors. The value of achievement was most important in predicting intention to use e-learning. Learners prioritising achievement as an important aspect of their worldview perceived e-learning to be important in their social context and worthwhile in terms of cost and benefit. The type and source of social influence differed in the African contexts from the UK: peer, champion, and manager influence were informational for African learners. The lack of facilitating conditions in the African environment was a perceived barrier to e-learning use for African learners that could be overcome with special endeavours which were not needed in the UK environment.

This thesis demonstrated the integration of values and technology adoption literature in the development and validation of the VETA model, and expanded the constructs of social influence, price value, performance expectancy and facilitating conditions in sub-Saharan Africa and the UK. Despite contextual differences, the VETA model applied consistently across the East African, West African and UK contexts.

Abbreviations

AC – Value: Achievement

AVE – Average Variance Extracted

BI – UTAUT2 Dependent Variable: Behavioural Intention

CO – Value: Conformity

CR – Composite Reliability

DoI – Diffusion of Innovation Theory

EE – UTAUT Independent Variable: Effort Expectancy

FC – UTAUT Independent Variable: Facilitating Conditions

GDP – Gross Domestic Product

HAB - UTAUT2 Independent Variable: Habit

HE – Value: Hedonism

HM – UTAUT2 Independent Variable: Hedonic Motivation

ICT – Information and Communication Technology

IDV – Cultural Dimension: Individualism vs Collectivism

LTO - Hofstede's Cultural Dimension: Long Term Orientation vs Short Term Orientation

MAS – Hofstede's Cultural Dimension: Masculinity vs Femininity

MCPU – Model of Personal Computing Utilisation

MM – Motivational Model

MOOC – Massive Open Online Course

MRC – Medical Research Council, UK

PC – Personal Computer

PD – Hofstede's Cultural Dimension: Power Distance

PE – UTAUT Independent Variable: Performance Expectancy

PEoU – TAM Independent Variable: Perceived Ease of Use

PLS – Partial Least Squares

PO – Value: Power

PU – TAM Independent Variable: Perceived Usefulness

PV – UTAUT2 Independent Variable: Price Value

PVQ – Schwartz's Portrait Value Questionnaire

SCT – Social Cognitive Theory

SEM – Structural Equation Modelling

SE – Value: Security

SI – Social Influence

SN – Subjective Norm

SVS – Schwartz Values Survey

TAM – Technology Acceptance Model

TAM2 – Technology Acceptance Model version 2

TAM3 – Technology Acceptance Model version 3

TPB – Theory of Planned Behaviour

TR – Value: Tradition

TRA – Theory of Reasoned Action

UAI - Hofstede's Cultural Dimension: Uncertainty Avoidance

USD – United States Dollars, Currency

UTAUT – Unified Theory of Acceptance and Use of Technology

UTAUT2 - Unified Theory of Acceptance and Use of Technology version 2

VETA - Values-Enhanced Technology Adoption Model

VLE – Virtual Learning Environment

VSM – Hofstede's Value Survey Module

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1. Introduction

Using technology in education can facilitate a paradigm shift from a teacher-centric, didactic approach to a personalised, learner-centric constructivist approach utilising static and mobile technologies (Smyth, 2011). Through this paradigm shift responsibility for decision-making is transferred to learners, who choose the nature and extent of their interaction with educational content. The success of any educational technology depends on learners making decisions that can result in the acceptance and subsequent use of that technology.

Technology acceptance is an established field of multidisciplinary research linking information systems and psychology. Information systems research focusses towards system attributes whereas psychology research focusses towards decision-making processes that predict variation in user behaviour. Depending on the nature and application of technology, the knowledge base of additional disciplines can help to understand the determinants of user behaviour in relation to a system. Learner attitudes towards e-learning in different contexts are likely to depend on perceptions of: technology attributes (such as utility and ease of use); contextual factors (such as beliefs, values, social norms, culture and infrastructural support) and individual factors (such as intrinsic motivation, habit, cost/benefit views, self-efficacy and anxiety) (Venkatesh et al., 2012).

This study seeks to research learner behaviour in contexts that differ in culture and values, and where there is a gap in the literature. This introduction will provide the study context (section 1.1), the reasons why this research is important (section 1.2), why there is a research gap to be investigated (section 1.3), and outline the structure of the thesis that follows (section 1.4).

1.1. Study Context

This study examines worker cohorts in distinct organisational and geographical environments (UK, West Africa, East Africa) undergoing professional training via e-learning. These cohorts differ in geography, faith, ethnicity, economic environment and

technology availability, and therefore can be expected to differ in context, culture and values (Table 1). Table 1 shows that the countries chosen for this study across East Africa, West Africa and the UK differ in terms of economic development (World Bank Classification, GDP and Poverty) as well as in their readiness to develop, maintain and capitalise on technology innovation (in terms of network, infrastructure and skills readiness).

Table 1: Readiness and Economic Indicators of the Four Countries in this Study

Indicator	**The Gambia**	**Uganda**	**Kenya**	**UK**
World Bank Classification *	Low Income	Low Income	Lower Middle Income	High Income
Population (million) *	1.9	37.8	44.9	64.5
GDP (billion USD) *	0.9	27.0	60.9	2990
Poverty (% of population at poverty line) *	48.4	19.5	45.9	0
Networked Readiness †	108	116	86	8
Infrastructure readiness †	125	112	94	15
Skills readiness †	122	126	100	31

* 2013 or most recent data (World Bank, accessed 29/02/2016)

† World Economic Forum rank (out of 143 countries) (Dutta and Geiger, 2015). Readiness is a measure of ability to use information and communication technologies.

The context of this study involves medical research in sub-Saharan Africa, where fieldwork is ‘outsourced’ to dedicated professional fieldworkers who work with communities to ensure consent for medical and demographic research, to gather samples and data, and promote good health and hygiene practices. Fieldworkers are typically recruited with a secondary school level of education and require intensive and costly training to develop the required competence for their work. Health research organisations may reduce costs and provide maximum pedagogical benefit through a blend of technology-assisted learning and offline methods of teaching. However, introducing e-learning to workers may only realise the expected benefits if the

technology is accepted by the users. Acceptance depends on many factors which may vary for workers in different contexts.

Although there are numerous health research organisations in sub-Saharan Africa, the organisations taking part in this study were all in a position of funding and infrastructure (power, internet, computer facilities, managerial support) to allow professional e-learning to be applied in broadly the same manner. Organisations that did not have funding or infrastructure in place were not invited to participate. In each sub-Saharan African organisation fieldworkers are local natives, employed on temporary contracts with a minimum standard of secondary school education and trained in field skills by their employer. The UK organisation employed workers to collect geological data in the United Kingdom and had an operational requirement to support professional e-learning during the time-scale of this study.

The three contexts of this study are: a UK-funded public-sector research institute located in The Gambia (Medical Research Council Unit, The Gambia); a UK-funded private sector research institute located in Kenya (Kenya Medical Research Institute-Wellcome Trust Research Programme); a UK-funded public-sector research institute located in the UK (Natural Environment Research Council-British Geological Survey).

1.2. Why is this Research Important?

Educational technology is a rapidly growing industry, forecast to be worth $252bn by 2020, including software, hardware and services in basic, higher and business education, government and healthcare applications, which may potentially be a small portion of the potential digital education market worldwide (Global and Capital, 2016). The impact of online education is not restricted merely to potential market growth: changes in the perceived cost and use of digital information revolutionise the way that education is delivered, allowing online educational products to be marketed, delivered and utilised as a consumer commodity (Chau, 2010).

Delivering education online removes traditional physical and temporal constraints on classroom teaching, allowing learners to access on-demand learning opportunities, in a flexible manner that facilitates asynchronous collaboration and interaction between learners, teachers and content (Anderson, 2003); and encourages pedagogical innovation (Capper, 2001; Bouhnik and Marcus, 2006; Jammu, 2013). These benefits also come with challenges for both educators and industry: as physical distance between teacher and student becomes increasingly irrelevant, identity verification, examination and certification models used in the past potentially lose relevance, and new methods must be sought to identify and engage students; assess knowledge and understanding; and appropriately reward a learner (Henno et al., 2014).

Disseminating information digitally has an inherent benefit of scalability, which allows almost unlimited numbers of learners to access the same digital asset with close-to-zero marginal cost. Organisations can exploit this benefit to reduce training overheads and use e-learning to improve productivity and performance by integrating cost effective technologies with operational strategy (Pantazis, 2002). An example of this benefit in the educational technology industry is the creation and availability of MOOCs (Massive Open Online Courses) that can be accessed by adult learners for free, further reducing the organizational cost of ensuring a competent front-line (Wulf et al., 2014). However, due to the often significant cost of developing and implementing e-learning products, a professional training initiative integrating bespoke and publicly available digital products with offline pedagogies might only provide a return on investment through repeated use over a prolonged period (Njenga and Fourie, 2010), which requires a decision by users to accept and continue using any new technology that is employed.

This thesis focuses not on *what* is learned or *how* it is learned, but *who* is learning and *how* they decide to engage with learning materials presented with technology (Carroll, 1998). Such decisions may be made by learners based on a variety of factors, including culture, values and context, which is the focus of this thesis. In summary, the educational technology market is very large, and developing learning initiatives is costly, with great potential for wasted investment, therefore, understanding why workers adopt new initiatives is of vital importance for organisations implementing innovation, especially where innovation is implemented in geographical areas where

there has been little research. User attitudes towards technological products and the technological environment determine acceptance, non-acceptance, discontinuance or rejection behaviours. Technology that is poorly accepted or rejected by users will neither yield expected performance benefits (Keil, 1995) nor contribute to the competitive advantage of an organization (Barney, 1991). In the industry of educational technology, many types of technologies are employed across different workplaces to enhance performance and competitive advantage, from didactic e-learning, YouTube videos, and MOOCs, to bespoke augmented and virtual reality simulations. The higher end of the market is used in relatively specialist applications: many organisations utilising technology in workplace training rely on simpler online education courses or software, either publicly available or generated in-house, to incrementally improve workplace training.

Learner behaviour is vital to educational technology success. Learner interaction is a fundamental mechanism of distance and online education, deconstructed as non-social interactions with content and information systems; and social interactions with instructors and peers (Moore, 1989; Bouhnik and Marcus, 2006). According to the theoretical social constructivist paradigm learners use available technologies as an extension to better understand their environments (Woo and Reeves, 2007). By interacting with information, learners construct understanding at their own pace determined by individual factors such as attitude, motivation, aptitude and preference. Self-reported individual preference for pedagogy (Coffield et al., 2004a; Coffield et al., 2004b) can be ascertained through conceptual models and corresponding learning style inventories (Dunn and Dunn, 1978; Kolb, 1984; Honey and Mumford, 1986). Knowing such preferences can help to design courses tailored to those preferences, potentially increasing learner engagement with e-learning, but this may not necessarily result in a superior learning outcome (Young et al., 2003; Pashler et al., 2009). Aside from personal preference, learners who are flexible in learning strategy can take advantage of pedagogically diverse learning technologies (Pask, 1988; Smith and Hardaker, 2000; Davies and Graff, 2005). Individual engagement often depends on contextual factors, such as effective support capacity (Ally and Fahy, 2002).

Technology can be conceptualised as the tools that humankind makes to interact with their physical environment (Mesthene, 1971; Kaptelinin, 1996). Technology is also

integral to interactions between actors in the social environment that help to shape institutions, communities, norms and identities (Lamb and Kling, 2003). Vygotsky posits that there is a specific social nature to learning, therefore cognition can vary with social interaction (Vygotsky, 1978a; Kozulin et al., 2003), through which variation in learner behaviour can arise (Bonk and Cunningham, 1998). The social environment can influence how learners regulate their interactions with information, and their self-efficacy with learning technologies (Bandura, 1991; Bandura, 2002). Understanding the complexities of social influence upon learners in different cultures can help inform educational practices in professional training and are therefore valuable topics of research (Pring, 2004).

1.3. Why is this Study Novel?

The study adds to the technology acceptance literature by extending the Unified Theory of the Acceptance and Use of Technology (UTAUT2) with values to answer the research question: *how do values influence e-learning adoption*? In answering this question, this study develops the *Values-Enhanced Technology Adoption (VETA) model*, validates the model using survey data from East Africa, West Africa and the UK. To support the survey data and investigate contextual similarities and differences between the contexts where the VETA model is validated, interview data is gathered in each context. The development and validation of the VETA model across all contexts is novel, the deconstruction of adoption factors in each context is novel, as is the study of e-learning adoption in professional groups in sub-Saharan Africa.

There are a limited number of studies investigating general ICT adoption in Sub-Saharan Africa, mainly within university or internet café settings (Touray and Salminen, 2013; Touray et al., 2015; Udo and Bagchi, 2011; Attuquayefio and Addo, 2014; Oye et al., 2011). The integration of culture into technology acceptance models has been attempted in a western context (Srite, 2000; Srite and Karahanna, 2006; Oshlyansky et al., 2007; Oshlyansky, 2007; Tams et al., 2012; Hoehle et al., 2015) with generally available ICT (such as personal computers and internet) and mixed results (Leidner and Kayworth, 2006). Investigation of culture in the adoption of educational technology has been examined in a European and Middle-Eastern context with workers and

students (Nistor et al., 2014; Tarhini et al., 2016). Investigation into the adoption of e-learning with front-line workers in sub-Saharan Africa has not been studied.

To address some of these gaps in the literature this study applies educational technology in the form of e-learning to the training of front-line workers in Africa and the UK within a workplace syllabus, and measures values (as the measurable core of culture) and adoption using validated instruments. This study integrates values and adoption models to yield the *Values-Enhanced Technology Adoption (VETA) model*, which integrates values with technology acceptance models. This study is novel because of this integration, the cultural contexts that are compared (African and Western), the application of e-learning for frontline medical fieldworkers, and because of comparisons with non-fieldworker organisational groups.

1.4. Thesis Structure

The structure of this thesis links the literature of information systems adoption and culture in the context of educational technology, proposes an extended adoption model (the *VETA (Values-Enhanced Technology Adoption) model*) and validates the model in the context of UK and sub-Saharan African research organisations. Firstly, the literature review will present the factors that predict user adoption of technology, including relevant literature to educational technology (chapter 2). Secondly, the literature review will present the literature stance on culture, values and how these concepts relate to behaviour (chapter 3). This structure clarifies the research gap that remains in placing culture and values in the decision-making processes that determine a learner's intention to use educational technology. Following the literature review, the *VETA (Values-Enhanced Technology Adoption) model* is developed to integrate values and adoption literature, and a design and method will be detailed to validate the model in the context of sub-Saharan Africa and the UK (chapter 4). The remainder of the thesis will present empirical results from the mixed method validation of the *VETA (Values-Enhanced Technology Adoption) model* (chapters 5 and 6) and discussion of the influence of values on learner adoption of e-learning (chapter 7).

2. Literature review: Technology Adoption

Acceptance models aim to explain both the initial decision-making process and the determinants of user decision-making. Acceptance is the user decision to re-use a technology following initial use (Hernandez et al., 2009). The acceptance of information technology has been well researched since 1989 (Davis, 1989; Davis et al., 1989). During this time, the majority of research into the determinants of user decision-making has focussed on three streams: validating the original technology acceptance model (TAM) (user perceptions of technology attributes); extending the model with non-technology attributes such as contextual factors (for example, social or infrastructural pressures) or consumer choice factors (for example, trust, perceived quality, and price value); and integrating other theoretical models with the original model (for example, information system satisfaction, culture or learning styles). The newest adoption model, the Unified Theory of Acceptance and Use of Technology (UTAUT) has consolidated this research area, and the latest version of UTAUT includes consumer factors such as cost-benefit decisions (UTAUT2). This chapter presents the history of technology acceptance literature models across diverse technologies and the applicability of said literature models to educational technology (section 2.1), and outlines the relevant factors for learner acceptance of educational technology (section 2.2).

2.1. The Road to UTAUT

2.1.1. The Theory of Reasoned Action (TRA)

The theoretical foundation for technology acceptance research comes from the Theory of Reasoned Action (TRA) (Figure 1) where a behaviour is defined as an action with a defined target in a certain context at a point in time (Ajzen and Fishbein, 1977). In subsequent adoption research, intention towards the use of an information system is assumed as the strongest predictor of that behaviour (Venkatesh et al., 2003; Davis, 1989), and is influenced by numerous independent factors that represent: individuals and groups; the innovation to be adopted; consequences of action; and the environment. The subsequent models of behaviour described in this section follow this basic structure, altering the theoretical framework to better explain learner intention.

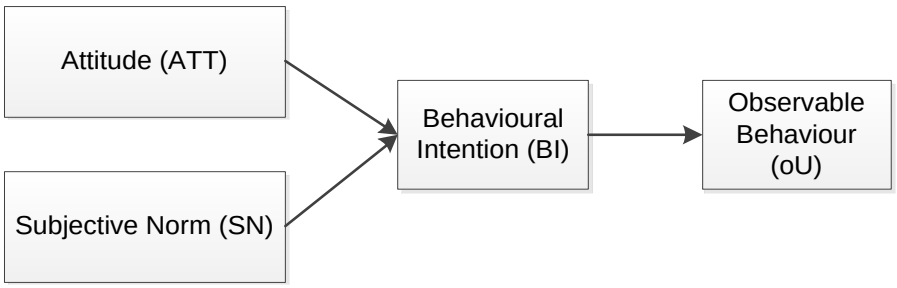


Figure 1: Theory of Reasoned Action (Fishbein and Ajzen, 1975b)

TRA posits that *behavioural intention* is influenced by operationalised components of individual opinion towards performing a specified behaviour (*Attitude*) and group influence on that specified behaviour (*Subjective Norm*). TRA treats beliefs as an individual's judgement based on their experiences, observations and worldview that can be an antecedent to attitude formation ('belief' is not included in Figure 1) (Fishbein and Ajzen, 1975b).

2.1.2. Technology Acceptance Model (TAM)

The dominant framework explaining factors that determine user adoption of information systems is the Technology Acceptance Model (TAM) (Figure 2) (Davis, 1989), which extends the applicability of TRA to information systems (Davis et al., 1989). TAM focusses on extrinsic motivational influences of user attitude, excluding the complex influences of subjective norm. TAM posits that *attitude* is influenced by *perceived usefulness* (PU) and *perceived ease of use* (PEoU) and is the antecedent of observable or self-reported action. *Perceived usefulness* is the extent to which a person believes that a system will help improve his work performance and for e-learning includes the usefulness of both the VLE and content in the learning process (Šumak, Heričko, Pušnik, et al., 2011). *Perceived ease of use* is the degree to which a person believes that system use is effort-free (Davis, 1989), and for e-learning includes ease of accessibility and design (Volery and Lord, 2000; Park, 2009).

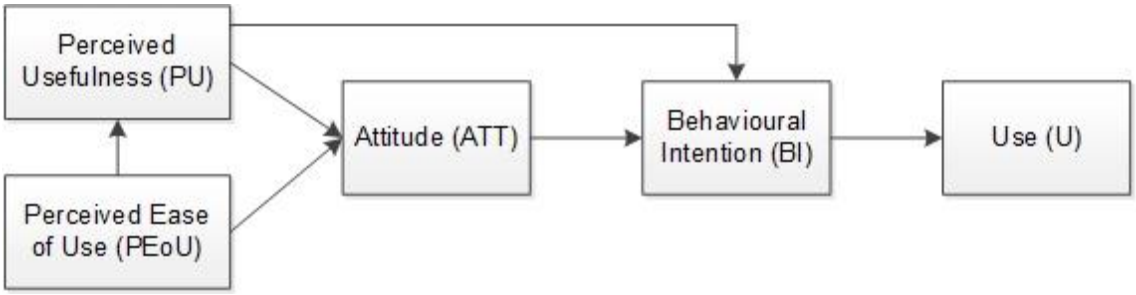


Figure 2: Technology Acceptance Model (Davis, 1989; Davis et al., 1989)

Perceived usefulness exerts a strong direct influence on *behavioural intention*, as well as an indirect influence mediated by *attitude* (Davis, 1993). The influence of *perceived usefulness* on *behavioural intention* in the TAM becomes more important with experience because adoption beliefs are based on perceptions that are susceptible to change through system use (Hernandez et al., 2009). *Perceived ease of use* has a comparatively weaker direct influence on *behavioural intention* as well as an indirect influence mediated by *perceived usefulness*: in a case of two systems with identical utility where one is easy to use and one is not, a user would find the system that is easier to use more useful in enhancing his performance, yet no amount of ease of use will compensate for a system that is not useful (Davis, 1993). The mediated effect of *perceived ease of use* implies users reflect on the costs and benefits of using a technology before making a decision to adopt, providing a link between *perceived ease of use* in TAM, *facilitating conditions* in UTAUT (see section 2.1.4), and *price value* in UTAUT2 (see section 2.1.5). The influence of *perceived ease of use* on *behavioural intention* is weaker for continued or prolonged system use, as the self-efficacy brought by experience diminishes the importance of ease of use (Davis, 1989; Hernandez et al., 2009). The effect of *attitude* on *behavioural intention* remains strong for adoption, acceptance and continued use (Hernandez et al., 2009).

TAM has been validated in developed- and emerging-market contexts across a variety of industries and technologies, with such proliferation that there are a number of meta-analysis and review papers on the application of TAM (Legris et al., 2003; Ma and Liu, 2004; King and He, 2006; Yousafzai et al., 2007; Sharp, 2007). These studies have supported the overall TAM model: that the primary predictor of *behavioural intention* is a user's perception of technology usefulness, and that user perception of ease of use

influences intention indirectly through *perceived usefulness*. Studies specific to e-learning have supported the balance of explanatory power between *perceived usefulness* and *perceived ease of use* and the indirect effect of *perceived ease of use* on *behavioural intention* (Ong et al., 2004; Roca and Gagné, 2008; Abbasi et al., 2011). The explanatory power of TAM was expanded by numerous studies exploring the addition of predictors: *self-efficacy* (Grandon et al., 2005), *anxiety* (Nistor et al., 2013; Agudo-Peregrina et al., 2014), and *fun* (Šumak, Heričko and Pušnik, 2011). TAM explains approximately 40% of system use (Legris et al., 2003; Venkatesh et al., 2003), but expanding the model to include moderators improves the explanatory power of the model (Sun and Zhang, 2006).

Validating TAM in an African context has been less successful. As early as 2002, Brown's research on web-based learning in South Africa indicated that *perceived ease of use* was primarily responsible for intention to use e-learning in South Africa, and *perceived usefulness* was non-significant (Brown, 2002). This idea arose from the unavoidable truth that the supporting infrastructure in the African diaspora lacks the ICT readiness that is taken for granted in developed nations (Ifinedo, 2005; Battista et al., 2015). The role of unstable infrastructure in technology acceptance models remains a complex issue in the African context (Musa, 2006; Tarus et al., 2015). Lin's study of e-government adoption in The Gambia similarly demonstrates the non-significant influence of *perceived usefulness* compared to *perceived ease of use* in a developing context, finding that poor internet speeds and unstable electricity supply provide a sometimes insurmountable barrier to adoption (Lin et al., 2011). Lule *et al.*'s study of mobile commerce adoption yielded similar findings in Kenya, proposing that a lack of participant awareness about the usefulness of m-banking may have rendered the construct non-significant (Lule et al., 2012). In 2015, Kumar's research in a private university in India (for the wealthy elite in a resource constrained context, outside of but arguably analogous to the African context) supported the claim that *perceived ease of use* was more important than *perceived usefulness* in Moodle adoption (Kumar and Samalia, 2015). Few studies have found that *perceived usefulness* is more important than *effort expectancy* in resource constrained environments: for example, Njuguna *et al.'s* study of m-banking in Nairobi, Kenya, supported TAM as known in a western context, without describing infrastructural context (Njuguna et al., 2012).

The implication of these studies is that effort is linked to the availability of stable physical and digital infrastructure: if the infrastructure meets some minimum criteria of support, neither *perceived ease of use* nor *facilitating conditions* are strong predictors of *intention*. However, if there are infrastructural difficulties, then these factors may become relevant. The literature indicates that the main components of the physical infrastructure for e-learning that differ between a developing context and developed contexts are: ICT infrastructure, governance, device availability and adequate, affordable bandwidth (Dada, 2006; Uziak, 2009; Tarus et al., 2015; Isabalija and Kituyi, 2017). Defining effort as a finite resource that can be exhausted suggests it might be better conceptualised within *facilitating conditions*, like power or network coverage, as an available entity that must be present for usage to occur: a belief that the user has access to resources in a stable and appropriate quantity. This has implications for the validity of TAM in developing contexts, indicating that a later adoption model that includes explicit consideration of the available infrastructure is needed.

Social context is important in Africa, in contrast to the exclusion of social norms and environmental factors from the original TAM (Davis, 1989). Gyau *et al.* published a quantitative TAM study of collective action in the Kola industry in Cameroon, demonstrating that *perceived usefulness* had no influence on *behavioural intention*, rather, *perceived ease of use* was the only strong and significant predictor of *behavioural intention* with a total of 45% variance in *behavioural intention* explained by the model. The explanation afforded by Gyau *et al.* was that there were difficulties in the mechanisms of collective action that outweighed the potential benefits, therefore while potentially useful, farmers were dissuaded from participating in the initiative due to practical difficulties posed by the context, making *perceived ease of use* a more important construct in the explanatory model (Gyau et al., 2012). Investigating computer users in Nigeria, Anandarajan *et al.* found that *social factors* were the strongest determinants of system usage, *perceived ease of use* was also significant, while *perceived usefulness* had no significant influence on usage. While no explanation was offered, culture was implicated in the strength of *social influence* in West African contexts (Anandarajan et al., 2002).

These studies together illustrate that TAM, because it does not include any consideration of context, may not be the appropriate model for use in African studies,

even possibly in any collectivist or societally-focussed culture. Instead, models like TAM2, UTAUT and UTAUT2 that explicitly consider social factors could be more useful in non-western contexts where it can be reasonably argued that there are social aspects to decision-making. Studies that have focussed on a cultural perspective of social norms are discussed in 3.3.2.

TAM has been both criticised and praised for parsimony. While the model is parsimonious, to gain explanatory power many studies have needed to extend the model with additional constructs, leading to an extended family of over 40 variables predicting aspects of the basic model (Bagozzi, 2007). Criticisms of technology adoption studies are that self-reported use may not predict actual use; and that adoption studies are rarely followed up over time to gauge the integration of use into user routines and habits (Bagozzi, 2007).

2.1.2.1. Extended TAM

TAM was extended twice, firstly to deconstruct *perceived usefulness* giving TAM2, and subsequently to deconstruct *perceived ease of use* to give TAM3: the extended model is shown in Figure 3. TAM2 proposes that group influence on an individual deciding to adopt technology includes *subjective norm* (imported from TRA as a direct predictor of *behavioural* intention, *perceived usefulness* and image), *voluntariness* (as a moderator of *subjective norm*) and *image* (as a direct predictor of *perceived usefulness*). *Subjective norm* in TAM2 has both a direct effect on *behavioural intention* as an individual complies with the perceived wishes of referent others in their social context, and an indirect effect as an individual incorporates referent beliefs about technology attributes in the individual's own belief structure. *Subjective norm* is moderated by *voluntariness* (usage intention varies with perceived control over adoption) and *experience* (users rely less on the opinion of others and more on their own perception once they have experienced a system) (Venkatesh and Davis, 2000).

TAM2 also includes three additional predictors explaining up to 60% of the variance in *perceived usefulness*: *job relevance*, *output quality*, and *result demonstrability*. Individuals regulate their behaviours to pursue decisions that are both compatible with

their values and profitable for their goals, which means that the ability of a technology to provide a profitable yield of high quality, tangible and relevant output is likely to determine the perception of utility that influences attitude (Venkatesh and Davis, 2000).

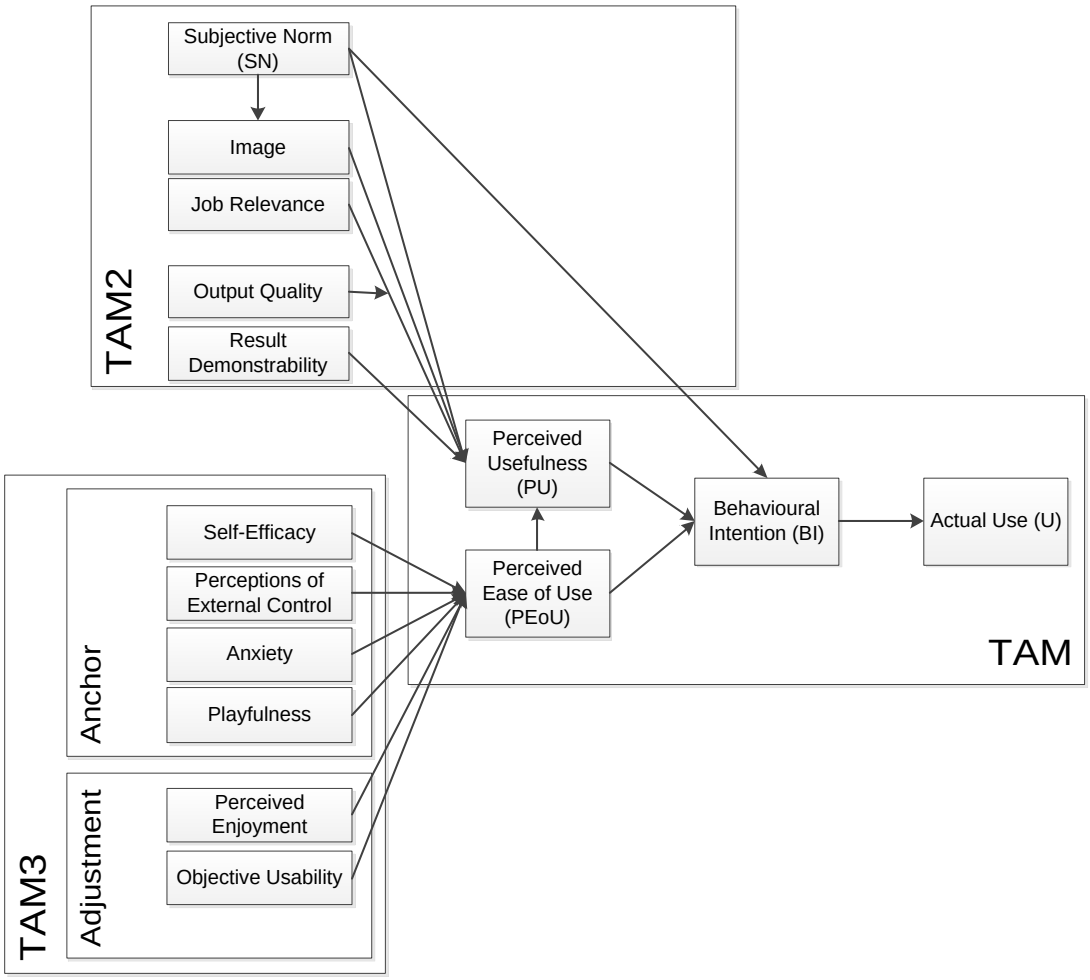


Figure 3: Extended Technology Acceptance Model (Venkatesh and Bala, 2008)

TAM3 integrated the determinants of *perceived ease of use* and their interaction with the determinants of *perceived usefulness* (Venkatesh and Bala, 2008). The determinants of *perceived ease of use* were theorised by Venkatesh to be both beliefs about computer usage in a general sense (termed *anchors*) and specific beliefs about the target technology (termed *adjustments*). The anchors proposed in TAM3 were: *perceived behavioural control* (PBC) from TPB (described below); *self-efficacy* or *internal control*; emotion or *anxiety*; and intrinsic motivation or *playfulness*. As users

experience a system the actual effort experienced helps form a belief about ease of use and play, operationalised as *objective usability* and *perceived enjoyment*.

2.1.3. Alternative Models to TAM

Predicting intention to use a technology has been attempted using other theoretical models: The Theory of Planned Behaviour (TPB) (Ajzen, 1985; Ajzen, 1991); Taylor & Todd's combined TAM and TPB model (Taylor and Todd, 1995a); Rogers' Diffusion of Innovations (Rogers, 1995; Moore and Benbasat, 1991); The Model of PC Utilisation (Thompson et al., 1991); Compeau's adaptation of Bandura's Social Cognitive Theory (Bandura, 1991; Compeau et al., 1999) and Davis' Motivational Model (Davis et al., 1992). These models are summarised in Table 2, with reference to model descriptions within this thesis. When analysed comparatively, each of these models explained up to 40% of the variance in behavioural intention to use professional information systems (Venkatesh et al., 2003). These models form the basis for the Unified Theory of Acceptance and Use of Technology (UTAUT) and will be briefly described below.

Table 2: Summary of Antecedent Models to UTAUT

Model	**Purpose**	**Reference in thesis**
TRA, TPB	Underlying Theory explaining the factors that predict intention to commit a behaviour	2.1.1, 2.1.3.1
TAM, TAM2, TAM3	Adaptation of TRA to explain user intention with an information system. Iterations expand main constructs	2.1.2
DoI	Explains the propagation of an innovation through a social system such as an organisation	2.1.3.2
MCPU	Model explaining use of personal computers	2.1.3.3
SCT	Adaptation of Social Cognitive Theory	2.1.3.4
MM	Inclusion of intrinsic or hedonic motivation in information systems acceptance literature	2.1.3.5

2.1.3.1. The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Figure 4) (Ajzen, 1985; Ajzen, 1991) is a formal adaptation of TRA that accounts for volition, via the independent variable of *perceived behavioural control*, which represents barriers to performing an action, such as lack of resources, lack of opportunity and efficacy expectancy.

Although not explicitly directed at information systems, TPB underpins much of the technology acceptance literature via the concept of *perceived behavioural control* which is instrumental to the use of technology through the physical, technological and organisational infrastructure through which information systems and educational technology is manifest in an organisational context (Mathieson, 1991; Venkatesh et al., 2003; Venkatesh and Zhang, 2010; Venkatesh et al., 2012).

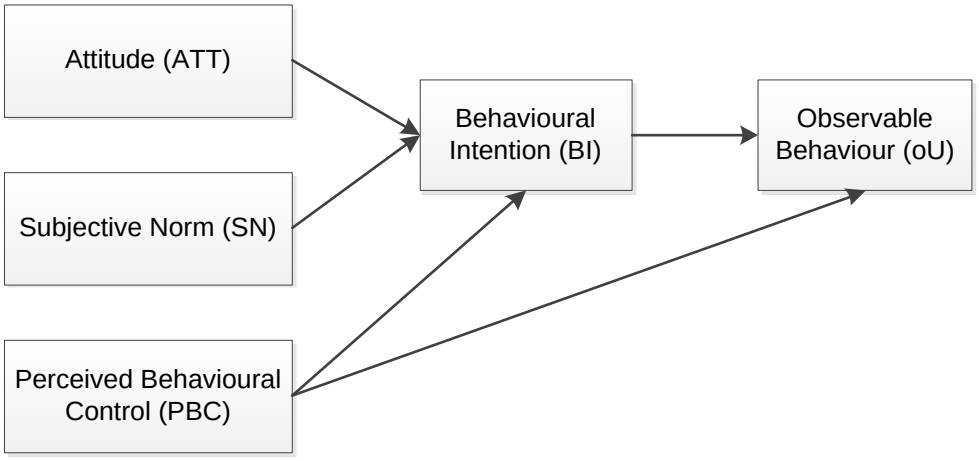


Figure 4: Theory of Planned Behaviour (Ajzen, 1985)

TPB has been decomposed to include specific beliefs that influence intention towards technology: *attitude* (relative advantage, complexity, compatibility), *subjective norm* (peer influence, superior's influence) and *perceived behavioural control* (self-efficacy, resource facilitating conditions, technology facilitating conditions), providing a more detailed model with practical application (Taylor and Todd, 1995c; Taylor and Todd, 1995b). Taylor and Todd formally included perceived usefulness and perceived ease of use as predictors of attitude in the TPB, resulting in the combined TAM-TPB model (Taylor and Todd, 1995c). The Combined-TAM-TPB model has been decomposed on

the variable attitude to include predictors such as *perceived playfulness, perceived risk, trust, compatibility, perceived self-efficacy* and *interpersonal influence* (Taylor and Todd, 1995c) resulting in significant overlap with the Diffusion of Innovation model (Rogers, 1995).

2.1.3.2. Diffusion of Innovation Model (DoI)

Rogers' (1983) contribution to adoption research focused on determinants of the rate of adoption measured as a number of individuals using a technology per unit time. In the DoI model, rate of adoption is governed by: attributes of the innovation; decision type; communications used during diffusion; the nature of the social system; and efforts of change agents.

Rogers' proposed innovation attributes include: *relative advantage* (the quality difference between the innovation and precursor); *compatibility* (with the values and needs of users); c*omplexity* (ease of understanding and using an innovation); *observability* (the demonstrability of performance results); *trialability* (limited user testing). Additional attributes were identified by Tornatzky and Klein through meta-analysis (Tornatzky and Klein, 1982): *social approval* (status gained through innovation adoption), *cost, profitability* (cost/benefit consideration), *divisibility* (small scale user testing) and *communicability* (ease of communicating aspects of the innovation to others) (Tornatzky and Klein, 1982).

A key difference between Rogers' approach and that of TRA-based models is that Rogers examines user perceptions of an innovation: TRA examines attitudes towards a behaviour (for example, using an object) rather than attitudes towards an object. These attributes were operationalised to give reliable and validated scales for behaviours to allow this stream of research to be used in a similar manner to TAM-based models (Moore and Benbasat, 1991). DoI has been used to investigate technology use in teaching environments (lecturer and teacher use of internet and computers) without specific focus on the diffusion of e-learning (Sahin, 2006). DoI was applied the diffusion of tablet PCs and smartphones in Taiwan, finding that fashion and preference for foreign products were important predictors of adoption intention, but the effects of

hedonic motivation in consumer choice of technology varied with demography, prior experience and attributes of the technology (Li, 2014).

2.1.3.3. Model of Personal Computing Utilisation (MCPU)

A less widely cited theory of behaviour was proposed by Triandis (1977). Triandis argued that beliefs at the point of action and beliefs determined by future consequences are separate. Triandis proposed that social norms, roles and values; self-image; affect; and both the perception and value of consequences of a behaviour can influence individual decisions. Based on Triandis' theory of behaviour Thompson *et al.* (1991) proposed an adoption model separating the affective and cognitive components of attitude. Affect refers to feelings of like or dislike associated with an act and is distinct in this model from belief components of the model (perceived consequences). MCPU proposes that intention is predicted by social factors, affect and perceived consequences. Together, intention and facilitating conditions predict behaviour which, in turn, helps form habit. Perceived consequences of behaviour include short- and long-term consequences of use and the fit of PC utilisation to job tasks. This model has a relatively narrow range of application and has mainly been cited as part of the historical account of technology adoption theory rather than used in empirical research.

2.1.3.4. Social Cognitive Theory (SCT)

Bandura's Social Cognitive Theory (SCT) (Bandura, 1977; Bandura, 1991) was applied to technology adoption by Compeau *et al.* (Compeau et al., 1999). SCT posits that people direct themselves to regulate their actions based on internal values and external influences (Bandura, 1991). SCT contrasts from TAM in that it considers beliefs that influence behaviour but do not depend on perceived outcome, such as perceived self-efficacy. SCT allows for two-way interactions between environment, perception and behaviour, for example: self-efficacy leads to technology use, successful technology use increases self-efficacy. Computer self-efficacy influences adoption through motivation, affect, anxiety and use (Bandura, 1994), and explains up to 18% of the variance in computer usage (Compeau et al., 1999). Compeau *et al.* also posed that perceived status gains resulting from technology utility were unlikely to lead to reward as technology diffused within an organisation becoming the operational norm. This

meant that individuals who expected any kind of reward, such as salary, bonus or promotion, from using technology and did not receive said reward became disillusioned with technology over time, and therefore were less likely to use it after initial adoption. This implies that status and prestige effects from technology use are most likely to be realised for early adopters in an organisation, raising the importance of self-efficacy and training in the implementation of workplace educational programmes (Lim and Morris, 2006).

2.1.3.5. Motivation Model (MM)

Although TAM focussed on extrinsic motivational factors, Davis *et al.* (1992) also proposed that enjoyment would influence intention, finding that extrinsic and intrinsic motivators interacted and together explained over 60% of the variance in self-reported intention to use technology.

2.1.4. The Unified Theory of the Acceptance and Use of Technology (UTAUT)

Venkatesh *et al.* (2003) evolved TAM (Davis, 1989; Davis et al., 1989) in combination with other models described in this section: TRA (2.1.1) (Fishbein and Ajzen, 1975a), TPB (2.1.3.1) (Ajzen, 1985; Ajzen, 1991), DoI (2.1.3.2) (Rogers, 1995), Model of PC Utilisation (2.1.3.3) (Thompson et al., 1991), Motivation Model (2.1.3.5) (Davis et al., 1992), Combined-TAM-TPB (2.1.3.1) (Taylor and Todd, 1995a) and Social Cognitive Theory (2.1.3.4) (Compeau et al., 1999). Venkatesh *et al.* consolidated predictor variables that provided a direct, significant effect on intention to yield the Unified Theory of Acceptance and Use of Technology (UTAUT) (Figure 5) (Venkatesh et al., 2003), a model which could explain over 70% of the variance in user intention. UTAUT includes four predictors of intention: *performance expectancy* (PE) and e*ffort expectancy* (EE); *social influence* (SI); and *facilitating conditions* (FC).

Performance expectancy in UTAUT consolidates the constructs of *perceived usefulness* (TAM), *extrinsic motivation* (MM), *job-fit* (MCPU), *relative advantage* (DoI) and *outcome expectations* (SCT) from prior research. *Performance expectancy* is the degree to which an individual believes that system use will yield gain in work

performance and is the strongest predictor of intention. *Effort expectancy* is analogous to *perceived ease of use* (TAM) and *complexity* (DoI), and is more important in earlier stages of decision-making, becoming less important with experience. *Social influence* consolidates *subjective norm* (TRA, TPB), social factors (MCPU) and image (TAM2) and is the construct of group influence on an individual's decision. *Facilitating conditions* represents the belief that physical and technical infrastructure supports system use and is analogous to *perceived behavioural control* (TPB) and *compatibility* (DoI).

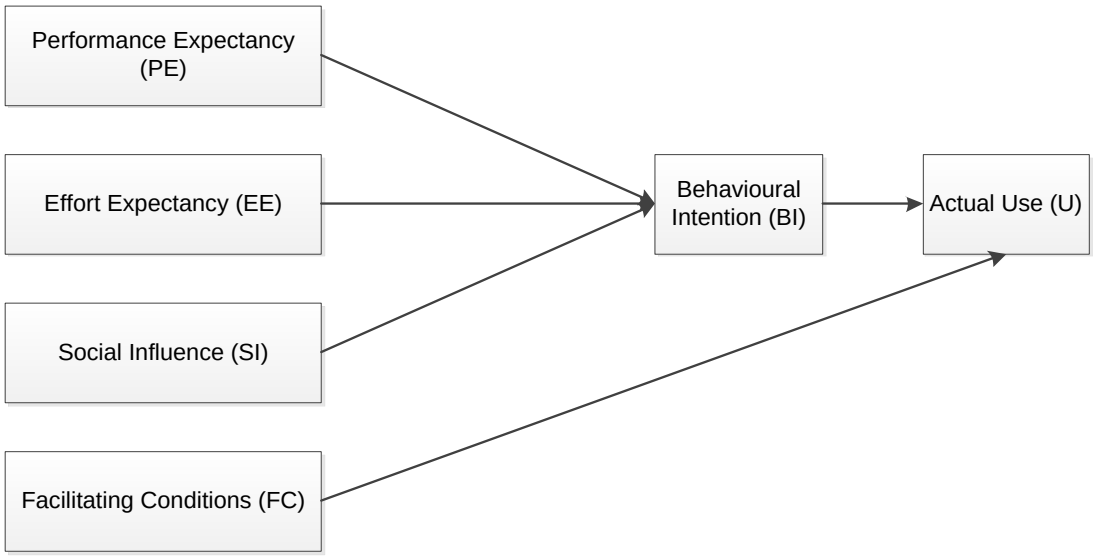


Figure 5: The Unified Theory of the Acceptance and Use of Technology, excluding moderators (Venkatesh et al., 2003)

UTAUT has been validated to some extent (Khechine et al., 2016) including with educational technology (Sumak et al., 2010; Khechine et al., 2014; Masa et al., 2016). Relatively few studies use the model completely, with many studies excluding moderator analysis, or adding additional explanatory variables (Williams et al., 2011). Developing country studies have found that the model does not always behave as expected from developing country research. UTAUT has been validated in the context of ICT use in a university context in Ghana, demonstrating the need for support and facilities (only *effort expectancy* and *facilitating conditions* showed a significant relationship with *behavioural intention*) in a developing country environment (Attuquayefio and Addo, 2014). Gilbert's study of m-Health initiatives in Uganda

presented similar findings without noting an explanation (Gilbert and Namagembe, 2014). Mtebe's study on the use of Open Educational Resources in Tanzanian universities using UTAUT found *effort expectancy* to be the only positive and significant predictor of *intention* (Mtebe and Raisamo, 2014a). At a primary school level, UTAUT has been used to examine the adoption of interactive white boards with teachers in Malaysia, demonstrating the importance of *performance expectancy*, reinforcing the importance of physical infrastructure in a developing country context (Raman, Don, et al., 2014). At a secondary school level, UTAUT has been used to examine the use of Facebook with students in Malaysia, demonstrating the importance of *social influence*, and confirming the importance of *facilitating conditions* (Raman, Sani, et al., 2014). UTAUT has also been applied to online tools such as webinars (Khechine et al., 2014) and Wikis (Yueh et al., 2015): only *effort expectancy* and *social influence* affected *behavioural intention*, in contrast to previous studies. UTAUT has been used to study the adoption of mobile learning in East Africa demonstrating that all four predictors influenced intention, with *performance expectancy* being the strongest predictor and *social influence* being the weakest (Mtebe and Raisamo, 2014b).

2.1.4.1. Moderators in UTAUT

Demographic, individual and socioeconomic determinants of adoption have been studied in western (Venkatesh, Morris and Ackerman, 2000; Burton-Jones and Hubona, 2005), middle-eastern (Al-Ghaith et al., 2010) and Far-Eastern (Ong and Lai, 2006) environments. Overall, these studies have shown that age (Wu, 2003; Wang et al., 2009), gender (Venkatesh, Morris and Ackerman, 2000; Ong and Lai, 2006), income (Al-Ghaith et al., 2010) and education can influence user intention to adopt (Li et al., 2013).

Age yields different attitudes towards technology (Wu, 2003), perceptions of utility (Passyn, 2011) and perceived self-efficacy (Bandura, 1994): older learners tend to actively avoid cognitively demanding situations which may provoke anxiety, such as adopting technology (Davis et al., 1989; Porter & Donthu, 2006). UTAUT studies have found that age moderates the effects of *effort expectancy* and *social influence* (Wang et al., 2009) in mobile learning acceptance.

ICT acceptance processes vary between genders in: the likelihood to try new ICT (Van Slyke et al., 2002); perceived risk (Garbarino and Strahilevitz, 2004); and perceived utility (Hasan, 2010). Women tend to choose to adopt technology by suitability and their perceived control over technology, as well as being affected more by online reviews (Bae and Lee, 2010); men tend to choose based on their attitudes towards technology and technological difficulties (Venkatesh, Morris and Ackerman, 2000; Ong and Lai, 2006). The influence of external sources in forming opinion is strongest for men, whereas women form perceptions of value based on information from closer social sources (Kim and Han, 2009). Psychological gender may be perceived as the cultural dimension of *masculinity vs femininity*, acceptance and use of ICT may vary with this national or organizational cultural dimension (Dutt and Srite, 2005).

2.1.5. UTAUT2

The most recent iteration of UTAUT has been adapted for consumer use (UTAUT2) to include three additional variables: *hedonic motivation* (HM) capturing concepts such as perceived playfulness, enjoyment, fun and reward (Martocchio and Webster, 1992; Agarwal and Karahanna, 2000; Van Der Heijden, 2004; Koivisto and Hamari, 2014); p*rice value* (PV) incorporating perceived cost, benefit, perceived sacrifice and status gains through assumed expensiveness and uniqueness (Zeithaml, 1988; Brown and Venkatesh, 2005; Chen, 2010); and *habit* (HAB), conceptualised as automaticity in behaviour (Limayem et al., 2007; Venkatesh et al., 2012). The UTAUT2 model is shown in Figure 6.

Hedonic motivation comprises the fun, pleasure and enjoyment that arises from the use of an information system and can be important in technology acceptance (Van Der Heijden, 2004; Brown and Venkatesh, 2005) including educational technology use (El-Masri and Tarhini, 2017). *Price value* is the cost/benefit decision that a consumer makes when they bear the cost of a technology, and for education can include learning value (Ain et al., 2016). With e-learning in a workplace scenario, learners can be freed from the constraints of attending a classroom event defined in time and space, and the decision about when to complete training must then be made, balancing other priorities such as travel time and work deadlines, resulting in a consideration of sacrifice versus benefit for professional learners. *Habit* is the extent to which people use an information

system automatically because of learned behaviour, and has antecedents such as behaviour repetition, satisfaction in prior experience, and the stability of the context in which the behaviour is performed (Limayem et al., 2007).

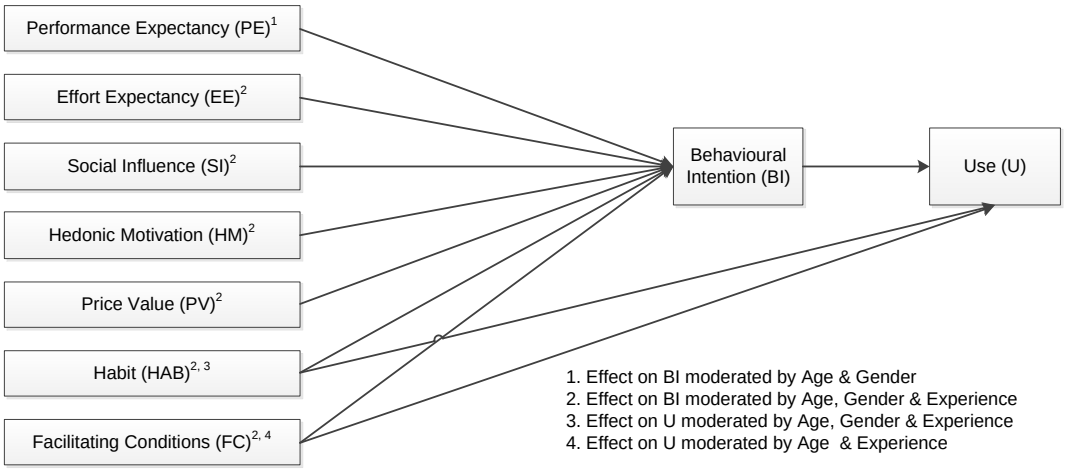


Figure 6: UTAUT2 (Venkatesh et al., 2012)

2.1.5.1. UTAUT2 has not yet been Applied in Similar Contexts

Despite being a relatively new model, UTAUT2 has inspired validation studies (Alazzam et al., 2015) in the fields of e-commerce (Alawan et al., 2013; Slade et al., 2013; Alhammad and Gulliver, 2014) and social gaming (Xu, 2014). In an education context, UTAUT2 has been applied to the adoption of the Moodle VLE with undergraduate teaching students in Malaysia, supporting the model apart from the direct effects of *habit* on use (Raman and Don, 2013). UTAUT2 has been examined in the context of mobile learning using the Blackboard VLE with undergraduate students in China, demonstrating that the influence of *hedonic motivation* can be greater than the influence of *performance expectancy*, and confirming the importance of *social influence* in technology assisted learning. However, *effort expectancy* and *habit* were found to be non-significant, possibly due to the prevalence of mobile technology for social purposes in the target group (Yang, 2013). *Effort expectancy* also showed a non-significant impact in an analogous study of m-learning with undergraduate students in Korea, attributed to the ubiquity of smartphone and Wi-Fi access for participants (Kang et al., 2015). These few studies demonstrate that the adapted UTAUT2 model includes new constructs, particularly *hedonic motivation*, which are relevant in technology-

assisted learning. *Hedonic motivation* has been found to be as important as *performance expectancy* in technology assisted learning through the effect of intrinsic motivation (Yang, 2013; Hanus and Fox, 2015). Although *habit* has been demonstrated to have little effect where technology is ubiquitous, such as smartphone learning in a developed context (Yang, 2013), it is important in other e-learning interactions (Raman and Don, 2013). *Price value* has also been shown to be a significant predictor of mobile learning adoption (Yang, 2013). These few studies also demonstrate a literature gap in the context of professional training in sub-Saharan Africa.

2.2. Bringing the Literature Models Together in the Context of e-Learning Adoption

The literature regarding technology adoption in sub-Saharan Africa is relatively scarce but is usually conducted in three strands: the direct application of TAM/UTAUT in an African context; qualitative exploration of the barriers and levers to technology adoption; and case studies of technology implementation. Some factors that determine adoption intention are contextual, rather than technology-specific, therefore it is pertinent to briefly consider the literature in other technology domains that is relevant to the context of sub-Saharan Africa. Although there are few studies of technology adoption conducted in resource-constrained environments, several have shown *effort expectancy* to be a strong predictor of adoption but are unable to explain much of the variance in the adoption dependent variables (attitude, intention and usage). Many of the studies conducted in resource-constrained environments offer little explanation for the pattern of results where it opposes the findings of studies in resource-abundant environments.

The adoption of educational technologies has been widely investigated. TAM and UTAUT have been applied to numerous educational technologies, including: web-based e-learning (Liu et al., 2009; Saadé and Kira, 2009; Paechter et al., 2010; Eke, 2011; Islam, 2012; Zhang et al., 2012; Gombachika and Khangamwa, 2013; Tarhini et al., 2013b; Tarhini et al., 2013a; Persico et al., 2014; Umrani-Khan and Sridhar, 2015; Mohammadi, 2015); mobile learning (Wang et al., 2009; Thomas et al., 2013; Poong et al., 2016); online classes (Grandon et al., 2005); interactive whiteboards (Wong et al., 2012; Raman, Don, et al., 2014; Tosunta et al., 2015); learner management systems

and virtual learning environments (van Raaij and Schepers, 2008; Pynoo et al., 2011; Escobar-Rodriguez and Monge-Lozano, 2012; Yeou, 2016); electronic testing (Juinn and Tan, 2013); and MOOCs (Hone et al., 2016). The subject of e-learning acceptance has been so widely studied that meta-analyses and reviews have been completed on the relevant TAM literature (Šumak, Heričko and Pušnik, 2011; Abdullah and Ward, 2016).

The main findings from the literature are that the acceptance paradigm holds across technologies: *perceived usefulness* predicts learner *intention*; *perceived ease of use* influences *intention* partially mediated by perceived usefulness; numerous other factors, such as *subjective norm*, *self-efficacy* and *intrinsic motivation* have second-order effects on the adoption of educational technology via *perceived usefulness* and *perceived ease of use* (Šumak, Heričko, Pušnik, et al., 2011; Abdullah and Ward, 2016). Extending e-learning acceptance beyond TAM to UTAUT indicated that some of the effects of *perceived usefulness* were social in nature, and the comparative strength of the influence of *performance expectancy* was diminished as a result of adding *social influence* to the model (Sumak et al., 2010; Ain et al., 2016; Evans and le Roux, 2016), although the literature has cases where the social influence and other variables have little effect on learner intention (Chen, 2011). The literature will be discussed in terms of technology attributes (2.2.1); contextual attributes (2.2.2); and personal considerations (2.2.3).

2.2.1. Technology Attributes

Most of the TAM and UTAUT literature has been conducted in developed or transitional economies where the infrastructure supports technology use. In a developed country context, the strongest predictor of intention to use a technology is learner perception of the collective of performance attributes of that technology deemed useful in achieving a desired outcome. These attributes are grouped under the attribute '*performance expectancy*' and describe the effective capability of e-learning to deliver useful and meaningful content to the learner.

The role of *effort expectancy* or *ease of use* is unclear in technology acceptance. Both conceptually and empirically it would seem that *effort expectancy* is important in resource constrained environments and depends on the stability of supporting infrastructure. Studies of e-learning in Nigeria describe *perceived ease of use* as more important because of the lack of supporting infrastructure, namely internet, electricity, devices and facilities, organisational support, specific ICT skills, computer literacy, and self-efficacy (Oyadonghan and Eke, 2011; Eke, 2011; Okiki, 2011; Zainab et al., 2015). A systemic lack of ICT training at school level not only leads to a lack of skill, but also causes longer-term technophobia (or anxiety) (Nwabufo et al., 2010). These studies into technology adoption in resource constrained environments demonstrate that TAM and UTAUT models may have low explanatory power compared with analogous western context studies, as low as 12% in one case (attitude towards e-government in The Gambia), suggesting that other factors are important in determining adoption (Lin et al., 2011).

Earlier studies failed to agree on whether *perceived ease of use* was an important predictor to include in the model, whether it was only applicable to novel technology with effects becoming indirect or diminishing over time, or whether it was not significant (Adams et al., 1992; Venkatesh, Morris and Ackerman, 2000; Venkatesh and Davis, 2000). Effort may only became relevant after an initial user decision had been made, a consideration which obscures the place of effort as a definite construct in initial technology acceptance (Gefen and Straub, 2000). The few studies (outside the field of education) that have been conducted with very large sample sizes indicate that the direct effect of *perceived ease of use* on intention may be so small that direct effects might only be reliably detected with large sample sizes and might therefore be trivial in nature[1] (Fu et al., 2006; Hung et al., 2006). These large studies do not agree on

[1] 787 is the minimum sample size (G*Power 3.1) required to detect an effect from one variable in a TAM/UTAUT model, power 80% effect size (f^2) of 0.01, $p<0.05$ in a regression analysis. Modelling two variables, the analogous sample size required is 967. Therefore, a study modelling TAM requires approximately 1000 respondents to have sufficient power to detect a 0.01 effect size from PEoU. However, at this sample size there is a risk of falsely attributing statistical significance to trivial interactions.

whether *perceived ease of use* is an important predictor of either intention or usage (Teo et al., 1999; Lee, 2008) or of lesser importance compared to *perceived usefulness* (Fu et al., 2006; Hung et al., 2006; Venkatesh et al., 2012). Meta-analysis studies by Yousafzai *et al.* and Šumak *et al*. indicate that most technology acceptance studies are conducted on sample sizes of less than 500 (mostly between 100 and 300), therefore, if the effect is small, it is unsurprising that a significant relationship between effort and intention is not always found. In fact, these meta-analysis studies agree that perceived ease of use is less frequently found to significantly predict intention than other factors (Šumak, Heričko and Pušnik, 2011; Rana et al., 2015). These meta-analyses that yield findings consistent with Davis's TAM study, however, demonstrate that most of the corpus of technology acceptance literature is conducted in contexts that have sufficient infrastructure to support the technology under investigation. It may be that a debate on the relevance of *effort expectancy* in technology acceptance is needed, just as the contribution of *attitude* in predicting intention is now considered to be accounted for within other adoption factors (Teo, 2009; Nistor and Heymann, 2010; Ursavaş, 2013).

The change in importance of *effort expectancy* is possibly due to the increasing global ubiquity of a basic level of ICT skill arising from increased standardisation in and market penetration of major operating systems coupled with a general homogenisation of user interfaces in mobile and static computing application. In the early 2000's the distinction between general and application-specific computer self-efficacy as aspects of *perceived ease of use* was explored. While the findings of these studies are relevant in the historical account of technology acceptance, decades later it is pertinent to ask whether it is still appropriate to separate these types of self-efficacy, or whether general computer self-efficacy coupled with the increasing harmonisation of user interfaces makes *effort expectancy* a non-significant as a predictor of adoption (Marakas et al., 1998; Yi and Hwang, 2003). The weak influence of *perceived ease of use* in the model is relatively stable for regular information system users, a finding which may support a potential link with self-efficacy and ICT skill (Davis, 1989; Hernandez et al., 2009).

A final thought on the influence of effort in e-learning acceptance: learning instructional content (conceptually) should be challenging and not effort-free, therefore perceived effort might have little bearing on intention for educational technology (Gee, 2003), but learning to use tools to access instructional content (conceptually) should be easy.

Separating these two aspects of *perceived ease of use* is not attempted in the UTAUT models. Although a detailed examination of *effort expectancy* is not specifically intended within this study, *effort expectancy* is not expected to be a strongly positive and significant predictor of intention in the final model, potentially acting via *performance expectancy* since effort saved can be redeployed, which indicates that *effort expectancy* is conceptually a subset of *performance expectancy* (Davis et al., 1989).

2.2.2. Contextual Factors

2.2.2.1. Physical Infrastructure

Consideration of the physical infrastructure that supports a technology intervention has not been widely explored in the literature. Perception of infrastructure is described in UTAUT as the construct f*acilitating conditions,* described as the user's perception that the required supporting conditions are in place. However, the deconstruction of what constitutes the required supporting conditions considered by a user are likely to differ by context. In African contexts with frequent outages in power and network supply (Tarus et al., 2015), perceptions of infrastructure are likely to include this shortfall. In workplace educational contexts organisational support, including perceptions of manager attitude, leadership endorsement, technical support and device provision are also likely to be considered by learners. New e-learners may consider ICT skill, training or trainer support to be part of the facilitating conditions likely to be needed to support course access.

The constraints felt by learners in Africa exemplify the differences between African infrastructure and the learning environment in a developed context: ICT infrastructure, governance, device availability and adequate, affordable bandwidth are key factors in a developing context (Dada, 2006; Uziak, 2009; Tarus et al., 2015; Isabalija and Kituyi, 2017). Technology readiness on an individual and organisational level influences user attitude towards professional e-learning in a developing context as infrastructural difficulties can result in anxiety and stress, but because of the promise of economic and career progress, users will persevere through such difficulties (Gombachika and Khangamwa, 2013).

2.2.2.2. Social Influence

The influence of the social context that exerts pressure on an individual to use educational technology is incompletely studied. Although various iterations of TAM and UTAUT include measures of *social influence* or *subjective norms*, these forces are defined in terms of the perceived expectation of important others in the individual's reference groups within the social environment ('referents', or 'referent others'). This definition facilitates the use of an operationalised construct of social or normative influence but does not attempt to distinguish between the complexities of context-specific social forces that are inevitably present in any educational or organisational context.

Early research in social psychology focussed primarily on pressure from a majority within a group on an individual that creates a psychological dependency within the individual for peer approval and verification, dependencies which could be satisfied through membership of the majority group. Subsequent research elaborated these ideas to distinguish between normative and informational influence: individuals conform to a norm either to integrate with a majority or to gather information (Deutsch and Gerard, 1955). *Social influence* is directed at a person and produced by an agent (a person, norm or group). The force directed by an agent on an individual has an opposing resistance. In the context of workplace technology acceptance, *social influence* is consensual in that the individual consents to be subject to positive and negative pressures to use a technology within the organisation (French and Raven, 1959).

The most comprehensive attempt to provide an analytical framework for normative influence for the acceptance of technology in a clinical setting comes from hospitals in the United States (Holden, 2012). Holden deconstructed the possible normative influence in a systematic manner aligned with the work of Asch, Festinger and Deutsch and Gerard (Festinger, 1954; Asch, 1951; Deutsch and Gerard, 1955): referent influence can be exerted by one or more individuals, groups or organisations and can be positive or negative; referent influence can be exerted through various mechanisms resulting in varying motivation to comply. In the case of workplace e-learning initiatives, influence is likely driven by a small number of champions who have a vested interest

and can communicate the benefits of the initiative to groups within an organisation, therefore could be classified as both minority influence, and informational influence.

Majority influence prompts a comparison between the individual and group position, resulting in public compliance behaviour but not necessarily yielding attitude change. Minority influence is predominantly informative, and therefore most useful in attitude conversion (Deutsch and Gerard, 1955; Moscovici et al., 1980). The power dynamics of *social influence* are important to understand in terms of agent and target. Holden describes agents as individuals, groups or organisations. Within a workplace context, the directionality and perceived legitimacy of influence will vary in importance with culture: more specifically, with values. Relationships between agents and targets of influence vary with cultures that are more permissive of formal power structures, and coercive and surveillance behaviours. Individuals in developing countries are more likely to permit influence in exchange for explicit reward mechanics (Raven, 2008).

Although included in TRA, TAM specifically excluded the consideration of social context because, at the time, it was difficult to separate the direct influence of subjective norms on user intention from the indirect effects that subjective norms have on an individual's attitude. The exclusion of subjective norm in information system research was only addressed from UTAUT onwards. Within the last 15 years user perception of contextual factors has re-entered the technology acceptance research arena in the form of user perceptions of social context, operationalized as *normative influence*, *social influence*, *subjective norm* and *social factors* as detailed in the models presented in section 2.1.3.

2.2.3. Individual Choices

In the context of UTAUT2, Venkatesh *et al.* (Venkatesh et al., 2012) proposed that there was a consideration of cost where users had to pay for the use of a technology, such as purchasing a phone handset or a personal computing device. However, while there is a cost-benefit balance explicit in the UTAUT2 model, neither cost nor benefit are straightforward concepts, particularly in a workplace, where technology users might not incur the direct financial cost of a technology. The expenditure of any finite

resource can be perceived as a cost, and workers have finite time to spend on multiple priorities. In the context of sub-Saharan Africa, where e-readiness is low (Table 1), workers may have to sacrifice work or personal time to travel to a place where they have access to devices, power and network connectivity. There may be other costs associated with travel and network access that are directly or indirectly perceived by workers. Therefore, the concept of *price value*, while explicitly targeted at consumers in the UTAUT2, could apply to the context of workplace learning, through time, effort and costs that workers associate with accessing e-learning.

2.3. Chapter Summary

This section has presented a history of technology acceptance research and the relevance of acceptance theory to user decisions to adopt, accept and use online information systems including e-learning. The evolution of this branch of information systems research has resulted in many models, exploring many predictors of user intention. From the plethora of literature referenced in this chapter, it is apparent that simply testing TAM or UTAUT with educational technology is no longer novel theory but could be considered as novel application of theory as new educational technology emerges, or as intention is formed in previously untested contexts. The latest acceptance model, UTAUT2, consolidates seven predictor variables from prior literature explaining up to 70% of the variance in intention to use a technology. Technology acceptance research has been conducted primarily in developed and transitional economies, demonstrating that technology attributes (specifically perceived usefulness) is the most important predictor of intention. In developing economies, the importance of context, specifically social and physical infrastructure, may be important in determining the ease of use of a technology. The following chapter will describe available models in cultural research (chapter 3) and how the literature has attempted to integrate culture and technology adoption (section 3.3.2).

3. Literature Review: Culture and Values

There is precedent in the acceptance literature for including an individual's worldview in their decision-making process: social-cognitive theory and the theory of reasoned action, as well as models that are grounded in these theories, indicate that values and values systems are important in decision-making (Fishbein and Ajzen, 1975a; Bandura, 1986). Values are defined in 3.1.1.2. Integrating values into the technology acceptance literature is the focus of this thesis. The literature that proposes quantitative cultural models is slightly more diverse and less clear than that of technology adoption, and therefore requires additional context and background. This chapter explores the link between culture, values and attitude relating to intention and behaviour (section 3.1), describes the dominant culture and values literature (section 3.2) and details the most appropriate choice for this study focus and context (section 3.3 and 3.4).

3.1. Linking Culture and Values to Attitudes and Intention

3.1.1. The Cultural Dependency of Values

3.1.1.1. Defining and Modelling Culture and Values

Culture is a nebulous and dynamic concept with boundaries that are difficult to define in geographic, socioeconomic or political terms (Taras et al., 2009). A culture can be a group of individuals who share descriptive and proscriptive norms and can be characterised by social or professional prototypicity. Cultures form in response to common problems, most commonly through geographical proximity or common purpose, and may have informal organisation, such as status-assigned or ascribed hierarchy. Due to the conceptual complexity of culture, researchers commonly oversimplify their definitions, relying on national or geopolitical boundaries to demarcate cohorts (Hofstede et al., 2010). Cultures arise through the interactions of complex, aggregate value systems across societies, forming social pressures, such as normative influence.

There are over 121 instruments that have been developed to quantitatively measure culture, with numerous parallel, analogous and redundant definitions including "worldview", "culture", "schema", "basic belief" and "value orientation" across the academic disciplines of psychology, sociology, anthropology and management (Koltko-

Rivera, 2004; Taras et al., 2009). Culture has proved difficult to define because there are numerous aspects that are directly and indirectly observable. Societal infrastructure, customs, languages, traditions, practises, protocols, rituals, symbols and artefacts are directly observable manifestations of culture. Values, beliefs, attitudes and assumptions are implicit and less easily altered, and must be observed indirectly (Rokeach, 1968; Fishbein and Ajzen, 1975b). There is also some agreement about the conceptual order of these aspects: culture is likened to a conceptual "onion", with implicit aspects forming the enduring core and externally observable extensions occupying the relatively dynamic outer layers, depicted in Figure 7 (Hofstede et al., 2010). The richness of cross-cultural research resides in the diversity of approach: culture may be examined at almost any ecological level (e.g. national, organizational, community, professional or individual level), and at any conceptual layer of the "onion" (e.g. symbols, artefacts, values, attitudes or behaviour).

Culture's 'values' core has been studied more extensively than the outer layers of the construct. Few researchers have attempted quantitative investigation of 'non-values' layers of culture: Hall proposed dimensions of time (mono-chronicity and poly-chronicity) and communications context (high and low context communications) (Hall, 1966; Hall, 1976; Hall, 1983); Gelfand *et al.* proposed a dimension of the strength of normative influence (Gelfand et al., 2006); Bond *et al.* examined social axioms as a distinct domain of orientation (Bond et al., 2004). Activity theory implies that the interaction between humans and their environment provides a basis for socially constructed value systems (Vygotsky, 1978b; Wertsch and Rupert, 1993; Penuel and Wertsch, 1995; Thompson, 2013). Qualitatively, the human environment can be considered as networks of people and the extensions that they create to interact with the environment, such as language, buildings, tools and machines (Hall, 1976). The links between the values core and the outer layers of cultural tools are relatively unexplored, partially as an unintended consequence of the strength of research focus on values and value systems (section 3.2).

The most widely cited definition of implicit culture is "software of the mind" that reflects the values of a group of individuals, what Hofstede terms the collective mental programming of a group (Hofstede, 1998). Schwartz refers to culture as the underlying normative influence of a society that generates from expectations, constraints and

affordances. Schwartz infers directionality of culture's influence from the environment on the individual (Schwartz and Asia, 2014).

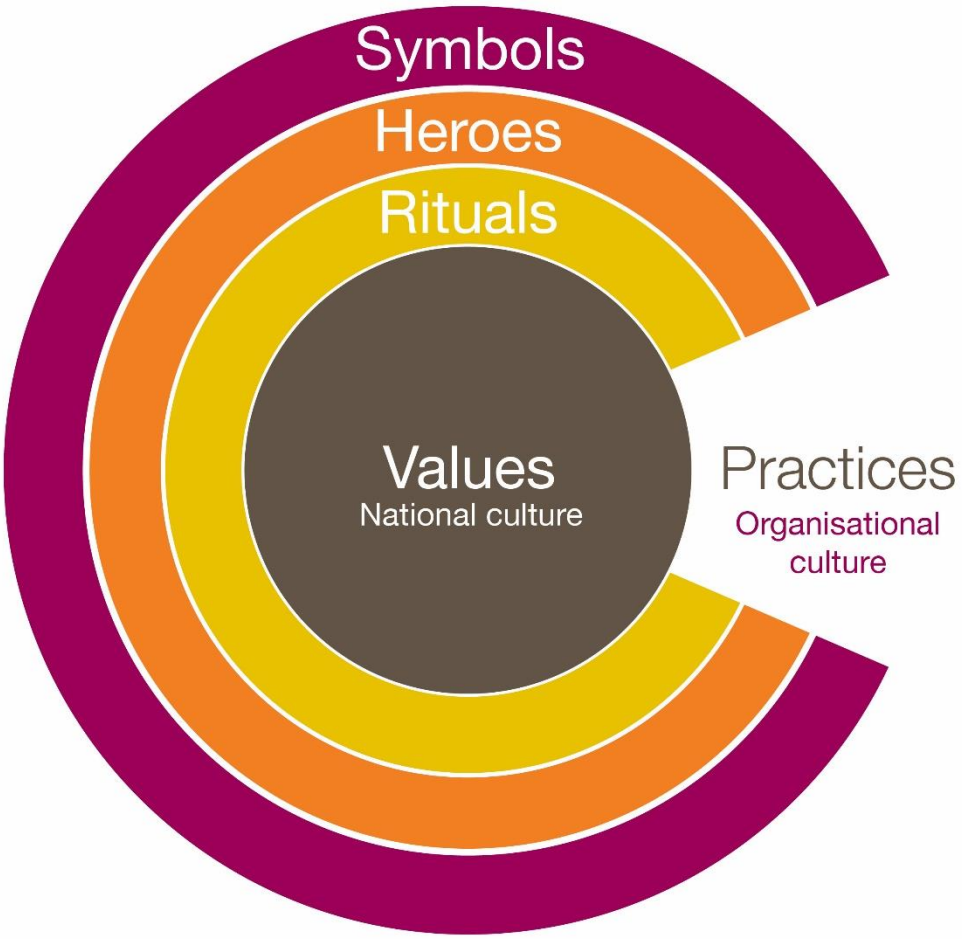


Figure 7: The Conceptual "Onion" of Culture (Hofstede et al., 2010)

The key elements of definition presented by the literature are: culture includes a group values perspective; this perspective is shared between individuals; there are layers beyond the values core; the core is conceptualised by dimensions; humans interact with the environment through extensions; the environment influences humans to generate value systems. For the purposes of this study the definition of culture offered above will suffice, namely: *culture is a multi-layered, multi-dimensional construct that can be approximated to several latent variables representing an aggregate value*

system shared by individuals within a group. This study will use values at the individual level as the phenomenon of interest.

3.1.1.2. The Nature of Values

Values and attitudes are constructs that can be operationalised at an individual level. Values are internally held beliefs about preferred end-states or outcomes that transcend situation and may act as a standard of behaviour. Attitudes are the product of a value system applied to a scenario; norms are, by contrast, group-level, external and consensual guides for behaviour (Rokeach, 1973). At an individual level, values explain the motivational foundation of attitude and behaviour, the prioritisation of value structures at a group level help determine culture (Schwartz, 1994a; Boer and Fischer, 2013). The types of beliefs that are relevant to group influence may not include the most central of existential beliefs but encompass shared beliefs about self-identity and derived beliefs that arise from significant others.

Attitudes are formed towards an object applied in a scenario, and differ as values priorities shift even if the object and scenario are kept constant (Fishbein and Ajzen, 1975c). In the case of an educational technology applied in different contexts, attitudes towards example technology might be determined by not only the micro-context of infrastructure (for example, teachers, classrooms, utilities, device availability and technical support) but also by the macro-context of societal values (for example, the general value of education in a society, perceptions of socioeconomic mobility arising from technology usage, the permissibility of self-enhancement aspirations, the attainment of freedom through education, and conformity to the expectations set by elders or peers).

According to Rokeach, Schwartz and Hofstede, at a national or regional community level, individuals share social identity through cultural, faith, ethnicity, and socioeconomic background, and share values at a societal or systemic level (Rokeach, 1968; Hofstede et al., 2010; Schwartz, 2012). Organisations and organisational subcultures share purpose and geography (both physical and virtual) and have a common social identity, with strongly defined status hierarchies, which formalise power

and reward. Individuals within organisations and organisational subcultures share values and attitudes towards events within their professional or organisational worlds, for example, the introduction of educational technology. Socialisation at community, organisation and professional levels help shape the values systems of the individuals within these groups, which helps to produce normative standards, which ultimately leads to cultural and social influence.

3.1.1.3. Assumptions of Cultural Research

Cross-cultural research relies on aggregating values collected at an individual level that are statistically appropriated group-level approximations based on a geographical location. It is worth noting that there is great conceptual difficulty in generalising the findings of a small group to a national level: Hofstede's study, while widely revered for overall sample size (the initial study had 117,000 participants), some cohorts consisted of less than 100 participants. This posed difficulties in generalising or reproducing those country cultural dimensions at a national level without specific investigation (McSweeney, 2002). Because of the conceptual complexity of culture, many investigations choose the national level of demarcation for parsimony (Schaffer and Riordan, 2003).

Social activity shapes the values systems of people through setting expectations, norms and taboos (Rokeach, 1973; Triandis, 1977; Vygotsky, 1978b). Societies have common institutions (such as economics, politics and education) that exist to satisfy common human needs (such as food, shelter and reproduction) that vary in feasibility and preference based on social and environmental conditions (Kluckhohn and Strodtbeck, 1961; Malinowski, 1961). These conditions and the evaluated feasibility of common solutions gives rise to context-specific behaviour that gives theoretical grounds for attitude to be values-dependent in a way that requires consideration of cultural priority and social context. The remainder of this chapter reviews relevant literature on values dimensions and culture and considers the relevance of values to an attitude-based decision-making model of technology acceptance.

3.1.2. Linking Culture and Values to Attitude and Behaviour

3.1.2.1. Linking Values to Attitude

Attitudes are affinities and aversions that a person holds towards identifiable aspects of their environment, and have cognitive, behavioural and affective roots. These affinities or aversions are the result of a contextually-targeted, enduring organisation of beliefs. Values are special cases of attitudes towards end-states of existence, such as self-fulfilment or honesty. Values are the premises upon which higher order beliefs can be built. Attitudes are values that are targeted towards a behaviour and can therefore lead to a discriminatory response towards that behaviour.

The premise that an attitude leads to a discriminatory response links values and technology acceptance theories. An object or target of a behaviour may be affectively preferential or cognitively evaluated as preferential, thereby altering the basis upon which a behaviour occurs. Although the cognitive evaluation of technology attributes is described in section 2.1, affective evaluation arises from an individual's value system. Rokeach described an individual's belief system as representative of the individual's universe, including their social world, and included values as centrally located beliefs that govern behaviour in an abstract, or context-free, manner (Rokeach, 1968).

Values help an individual to form attitudes in a particular context, when presented with objects that can become the target of those attitudes. Rokeach postulated that situational behaviours are mediated by two types of attitude: object and situational attitudes (Rokeach, 1975). Rokeach's evaluation of attitudes is similar to that of Ajzen & Fishbein's TRA which segregates an individual's object-oriented attitudes from contextual attitudes that are the result of contextual norms (Fishbein and Ajzen, 1975a). This distinction can be seen in the TAM and UTAUT models, separating user perceptions of object (or technology) attributes from user perceptions of contextual attributes (social norms and infrastructural conditions) (section 2.1).

Applying values and attitudes in the context of educational technology adoption: a value is an antecedent of an attitude towards an attribute of e-learning, which, in turn is the antecedent of a behavioural intention, which in turn is the antecedent of an action

towards e-learning. Having linked these concepts which are important in determining the influence of values and attitude on learner intention and behaviour with educational technology, the relevant literature on culture and values will be described next (section 3.2).

3.2. Relevant Literature Models

The major cultural model in the literature is the empirically derived four-dimension model proposed by Hofstede; followed by the theoretically derived model proposed by Schwartz (Taras, 2008). In these models, cultural groups can be compared by the distance between their relative position on a bipolar axis (e.g. between social and personal in Figure 8) that represents a particular value, values dimension or values system (Trompenaars and Hampden-Turner, 1993; Inglehart and Norris, 2003; Steenkamp, 2001; Straub et al., 2002; Hofstede et al., 2010; Schwartz et al., 2012; Gouveia et al., 2014).

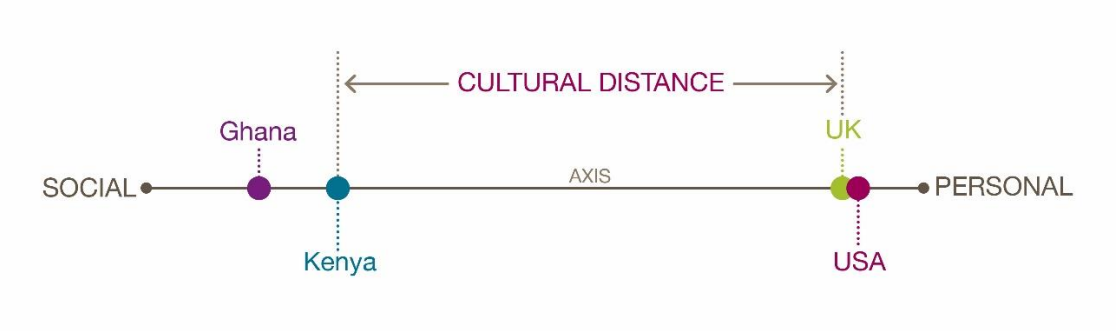


Figure 8: Example illustration of cultural distance on a single bipolar axis from personal to social focus (example values taken from The Hofstede Centre, May 2016). Countries are chosen to illustrate cultural distance.

This system of comparing cultures is demonstrated in Figure 8, where the relative positions of Ghana, Kenya, UK and the USA are plotted on an axis representing the dimension of *social vs personal* focus, using data available online at the Hofstede Centre (Hofstede's terms are *individualist* vs *collectivist,* but this thesis, grounded in Schwartz's theory uses *personal* vs *social* terminology throughout) (3.2.2). Figure 8 demonstrates that UK and USA exhibit cultures that prioritise and individual or *personal*

focus; Ghana and Kenya prioritise a group or *social* focus, and there is a cultural distance between the 'African' and 'Western' nations.

Investigating culture as relative positions on a set of axes can be overly parsimonious and neglect a lot of the qualitatively rich diversity of human existence, but simplification is necessary to reduce the magnitude of data to something that is manageable. Each of the dominant cultural models demarcates their conceptual frameworks with different numbers of dimensional axes, different descriptions of what these dimensions represent, and different arrangements of these axes in statistical space. Although it is tempting to use the relative cultural indices generated by these large scale studies as static representations of culture, it is helpful to perceive cultures as dynamically moving over time from one preferred end of a bipolar dimension to the other, so that a culture's position does not exclude either opposing dimensions nor the possibility of cultural change (Trompenaars and Hampden-Turner, 1993; Inglehart and Welzel, 2005). For the sake of parsimony, the dominant two models in the literature will be described next, followed by a rationale for choosing a cultural model to integrate with the UTAUT2 framework (section 3.3).

3.2.1. Hofstede's Cultural Dimensions

The most widely used and influential model of culture is Hofstede's cultural framework (Hofstede, 2005; Hofstede et al., 2010) which originally comprised four empirically derived bipolar dimensions, extended to six dimensions over 40 years of research and development. Hofstede's work is conceptualised through the anthropology lens inspired by Kluckhohn and proposes characterisation of societal culture.

Hofstede's dimension of *Individualism versus Collectivism* (IDV) indicates the importance of society and group networks: individualist societies prioritise challenges, personal time and freedom at work; collectivist societies prioritise training, skills and working conditions. *Masculinity vs Femininity* (MAS) is the dimension of gender related values: masculine values are those that emphasize achievement, earnings, advancement and ambition, while feminine values prioritise quality of life, social relationships, empathy and intrinsic motivation. *Power Distance* (PD) is the extent to

which unequal hierarchy is accepted, where high PD cultures accept larger differences in status. *Uncertainty Avoidance* (UAI) represents the tolerance for change or difference and provides an indication of anxiety arising from ambiguity. *Long-Term Orientation* (LTO) provides a measure of the acceptance of delayed emotional and material gratification: long-term oriented groups prioritise sacrifice for the sake of future reward; short-term oriented groups emphasise tradition, status and social obligations. The final dimension, *Indulgence versus Restraint* (IND) represents the balance of happiness: indulgent groups prioritise optimism, friendships, hedonism and leisure; restrained groups emphasise centralised societal control, moral and social discipline, and cynicism.

Although Hofstede's work has been widely criticised for reproducibility, statistical reliability and generalisability (McSweeney, 2002; Oyserman et al., 2002; Oshlyansky et al., 2006), the model's parsimony, usefulness and insight have secured its place as the dominant model in culture research (Williamson, 2002), generating further criticism that alternative approaches are stifled by Hofstede's popularity (Baskerville, 2003). In light of these criticisms, it is worth considering Schwartz's model, which is described next.

3.2.2. Schwartz's Basic Human Values

Schwartz's research is manifest at two levels, group and individual level. Schwartz's widely cited Theory of Basic Human Values is grounded in Rokeach's theory of values (Rokeach, 1973) and conceptualizes individual-level values on a motivational continuum on which bipolar dimensions lie (Schwartz, 1992). Schwartz's individual-level framework contains 10 values (*achievement*; *benevolence*; *conformity*; *hedonism*; *power*; *security*; *self-direction*; *stimulation*; *tradition*; and *universalism*) defined in Table 3. These values can be arranged as a quasi-circumplex motivational continuum that lie on conceptual bipolar dimensions of: *openness to change vs conservation*; and *self-enhancement vs self-transcendence* (Figure 9).

Table 3: Definitions of Schwartz's Human Values

Value Dimension	Value	Conceptual Definition & Sub-Types
Self-Enhancement	Priority of personal interests over others	
	Achievement	Priority of personal success through the demonstration of competence.
	Power	Power over resources or dominance over people. Priority of social status, prestige and control over people and resources.
Conservation	Preserving the status quo	
	Security	Personal and societal security. Priority of safety, harmony and stable social relationships.
	Tradition	Priority of existing customs and ideals.
	Conformity	Interpersonal and rule-based conformity. Priority of restraint in actions and impulses.
Self-Transcendence	Commitment to the welfare of others	
	Benevolence	Priority of the welfare of others.
	Universalism	Priority of the welfare of the natural environment and wider society.
Openness to Change	Following one's own intellectual interests	
	Self-Direction	Self-direction of action and of thought. Priority of independent thought and action.
	Stimulation	Priority of variety and excitement in life.
	Hedonism	Priority of pleasure and gratification.

Schwartz posits that considering motivation as a circular continuum allows data to be partitioned into discrete values for scientific investigation based on scientific convenience, with specific instruments developed and validated for partitioning the continuum into 10 values in the original model, or 19 values in the refined model, as depicted in Figure 9 (Schwartz, 1992; Schwartz et al., 2012). Because the continuum can be partitioned depending on the nature of the research, the depiction in Figure 9 also shows dimensions of *societal* vs *personal focus*, analogous to Hofstede's *individualism* vs *collectivism.* Schwartz's values model has been tested extensively in a

variety of contexts, including schools and workplaces in sub-Saharan Africa, proving to be a reliable method of measuring values and cultural dimensions using modern statistical approaches (Schwartz et al., 2001; Schwartz and Boehnke, 2004).

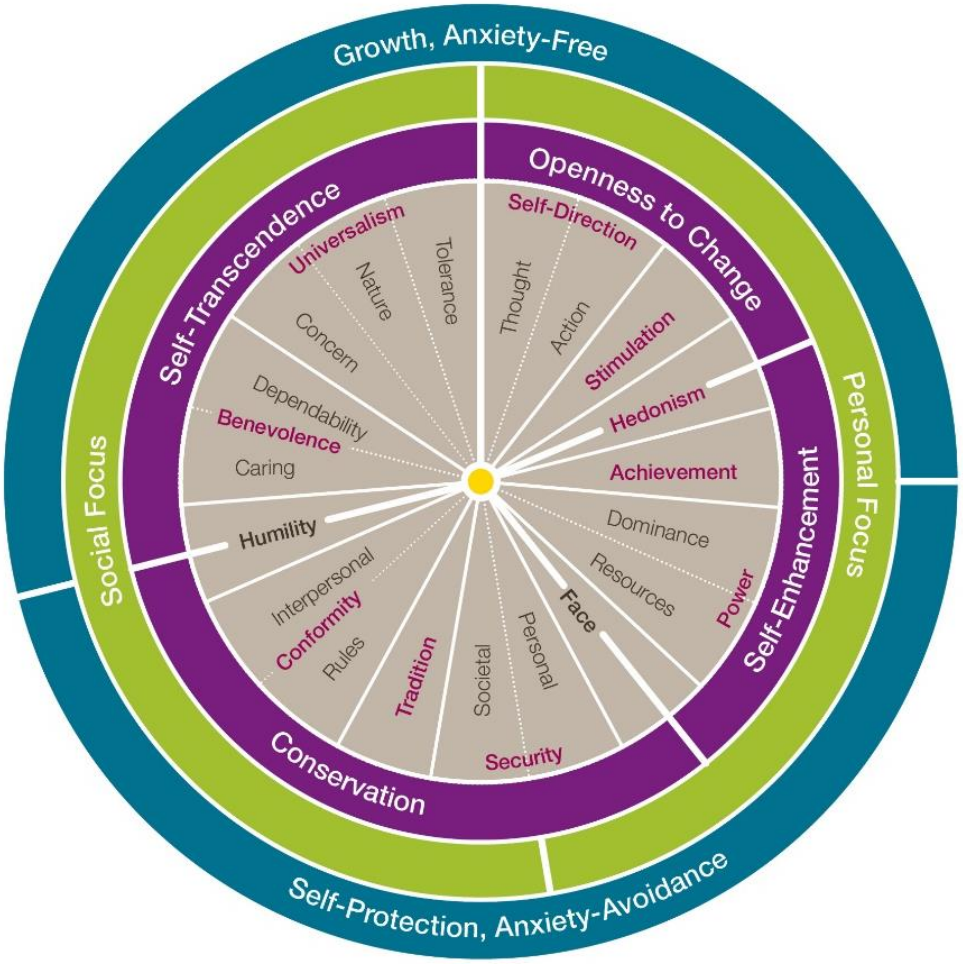


Figure 9: Schwartz's Refined Model of Basic Human Values (Schwartz et al., 2012)

In addition to developing an individual-level model, Schwartz developed a group-level model, relating his work at an individual-level to Hofstede's work at a group-level (Schwartz, 1994b). Schwartz proposed seven group-level value types: *mastery*, *hierarchy*, *conservatism*, *harmony*, *egalitarian commitment*, *intellectual autonomy* and *affective autonomy*. Schwartz's group-level model of culture is arranged in a circular continuum, similar and isomorphic to his individual-level values model (Fischer et al.,

2010), but distinct from Hofstede's assumption of orthogonal, independent dimensions (Schwartz, 2006a).

Schwartz's model has parallels between individual-level and group level, either at the societal or organisational level (Sagiv and Schwartz, 2007). For example, the group-level value of *affective autonomy* includes a priority on pleasure and excitement, analogous to the individual-level *hedonism* value. The group-level value of *mastery* orients towards self-assertion, achievement, leadership, dominance, competition and success, similar to the individual-level dimension of *self-enhancement*, including values of *achievement* and *power*. The opposing cultural value of *harmony* emphasises unity with nature and the environment, much like the individual-level value of *self-transcendence.*

3.3. Choosing a Cultural Model

3.3.1. Common Ground between Models

None of the models claims to be exhaustive, however, there is some overlap between models. From the models described so far in this chapter, there are some dimensions along which cultures can be considered as conceptually congruent. The dimension of *self vs group* is the most prominent bipolar concept in cross-cultural research and is a representation of interdependence between members of an in-group (Triandis, 1994). Hofstede's cultural framework termed this dimension as *Individualism vs Collectivism* which indicates the importance of social and group networks (Hofstede, 2005; Hofstede et al., 2010). Schwartz's values continuum similarly places *social* and *personal* focus at opposing poles (Schwartz, 2012).

Combining Hofstede and Schwartz's definitions of individualism yields a description with a focus on personal autonomy, prioritising small primary social groups with specifically negotiated social obligations, which facilitate decontextualized decision-making. Individualists balance social relationships with the cost and benefit of maintaining the relationship, and place importance on achieved status. Conversely, combining Schwartz, Hofstede and Triandis' definitions of collectivism yields a

description that focusses on contextualised decision-making processes in individuals, prioritising the objectives of larger in-groups (such as ethnic, faith or clan reference groups) that share a wider range of values. Individual satisfaction and well-being derives from meeting social obligations and maintaining harmony, and group hierarchy ascribes social status. In a workplace context, individualists prioritise challenges, personal time and freedom at work; collectivists prioritise training, skills and working conditions.

Early European sociologists noted the importance of the distinction between self and group. Tönnies proposed a bipolar axis of socioeconomic organisation: communities that were bound through social relationships and shared traditions were termed *Gemainschaft;* and collectives of self-interested individuals interacting in formal settings for commercial benefit were termed *Gesellschaft* (Tönnies, 1887). Durkheim proposed a bipolar axis of solidarity in social cohesion: small, religious communities with low division of labour are relatively homogeneous and subject to strong in-group or mechanical cohesive forces and therefore termed *mechanical societies*; over time these societies evolve through industrialisation which yielded specialisation and professional dependencies between individuals with heterogeneous value systems in societies characterised by *organic solidarity* (Durkheim, 2014). Weber similarly contrasted the collective focus of Catholicism with the individual focus of Protestantism (Weber, 2002).

Collectivist cultures place strong distinctions between in-group and out-group, which may be related to interpersonal trust (Allik and Realo, 2004; Triandis and Gelfand, 2012). Conversely, individualism prioritises autonomy and independence of the individual, with loose ties binding individuals with their membership groups. Individualism is positively correlated with trust and tolerance (Hofstede, 2003), subjective well-being (Suh et al., 1998), quality of life (Veenhoven, 1999), and self-esteem (Kitayama et al., 1997), although these correlations may be partially mediated by economic prosperity (Inglehart and Baker, 2000; Hofstede, 2003; Allik and Realo, 2004). Hofstede argued that resource scarcity forces individuals to depend on in-groups and protect from out-groups, a mechanism that builds social cohesion, whereas wealth, conversely, encourages moral and economic autonomy. Other researchers, both before and after Hofstede's widely cited and ground-breaking study have

incorporated some measure of the self vs group dimension into their models of culture. Individuals in collectivist cultures have a more diverse and complex in-group structure, and therefore experience complex and contextually specific decision-making processes.

At a group level, Schwartz contrasted intellectual and affective *autonomy*, where the expression of feelings and ideas is encouraged, with the opposing pole of *embeddedness*, where restraint is encouraged over thoughts and actions that might disrupt the status quo. At the individual-level, Schwartz makes a distinction between personal and social focus. A person who is socially focussed prioritises the preservation of the status quo, holding values such as: societal security and social order; interpersonal conformity, compliance and self-discipline; tradition, faith and the preservation of customs; and humility, modesty and satisfaction with one's life circumstances. Social focus also includes the priority of preserving the macro environment within which an individual exists, including values that prioritise: caring for the welfare of members of an in-group; loyalty to the in-group; tolerance of out-groups; social harmony, equality and fairness; and the protection of nature. A person who is individually focussed prioritises creative and decision-making autonomy; personal excitement, adventure, novelty and pleasure; performance, success and ambition; influence and dominance over people and resources; personal status and prestige. Schwartz found that using the term *individualist* obscured the detail of differences in *egalitarianism*, *mastery*, *hierarchy*, *autonomy* and *harmony*, which can be considered aspects of *individualism* (Schwartz and Asia, 2014).

Following the legacy of Hofstede and Schwartz and the subsequent strength of the quantitative values dimension literature there are numerous other dimensions that are conceptually analogous to the dimension of self vs group, including: teamwork; group loyalty; social responsibility; conformity; independence and integration (Taras et al., 2009). Steenkamp's proposed dimensions were derived from a combined data set of 24 countries that had been included in both Hofstede's and Schwartz's research, so, unsurprisingly, included an amalgam dimension of *autonomy vs collectivism* (Steenkamp, 2001). The idea of differentiating groups on a *'self vs group'* relativity is endorsed by modern researchers examining social change over time: as resources become less scarce, the need for in-group defence of resources lessens, allowing

survivalist values to diminish in importance compared with individual autonomy. Inglehart proposed that it is unsurprising that self vs group should be the primary dimension of culture since as societies develop there is a manifest progression from survival to self-expression as resources become more abundant and human choice becomes more autonomous.

3.3.2. How the Technology Adoption Literature Treats Culture

Culture has been related to technology adoption in two main ways. Firstly, in a manner that uses cross-cultural differences at a group-level to explain aggregate behaviour in data drawn at the individual-level in equivalent samples drawn from different populations (Straub et al., 1997). Secondly, in a manner that argues for an individual-level expression of group-level culture through the degree to which an individual identifies with a cultural norm (Srite and Karahanna, 2006). Both approaches need careful consideration of the ecological fallacy: the approaches of both Srite & Karahanna and Straub *et al.* acknowledge that culture could be argued as a group-level concept. However, the same criticism that is often levelled against TAM, UTAUT and Hofstede's model, can also be levelled to some extent at Srite and Karahanna: parsimony facilitates application to other research contexts, yet stifling alternative approaches: Srite and Karahanna's method of integrating espoused culture into TAM research has dominated the literature for the last decade, with little suggestion of alternative approaches (Hoehle et al., 2015). The third potential manner of integrating culture would be to measure values at the individual level (as a proxy for group-level culture) to relate to adoption intention at the individual level, which is the approach advocated in this study, but there is little available literature on that approach. The third approach seems least likely to breach the assumptions of ecology in that individual-level values are related to individual-level perceptions, and only upon aggregating the values data might one measure values dimensions which relate to culture. Moving on from the ecological fallacy, the influence of values (including espoused culture) on technology acceptance might occur in three ways: culture might interact with construct relationships within a model; culture might affect the stability of the model; or context (as an artefact arising from culture but distinct from culture) might affect the validity of the model.

In a number of studies, Srite *et al.* (Dutt and Srite, 2005; Srite and Karahanna, 2006; Srite, 2006) used Hofstede's established four-dimensional culture model for examination with Davis' Technology Acceptance Model (TAM) on the usage of personal computers by university students in the USA and found that dimensions such as *power distance, uncertainty avoidance* and *masculinity* moderated the effects of *subjective norms* on university students' intention to use ICT in the USA, but the primary dimension of *individualism* had no effect. This is unusual because *power distance* and *individualism* are closely correlated in both Hofstede's and Steenkamp's analyses (Hofstede, 1980; Steenkamp, 2001; Bond, 2002). Since Srite *et al*.'s parsimonious method of integrating Hofstede's four dimensional model with TAM, much of the associated literature has been investigated in a western context with generally available ICT, using student populations to ensure cultural distance, and finding mixed results (Srite, 2000; Srite and Karahanna, 2006; Oshlyansky et al., 2007; Oshlyansky, 2007; Tams et al., 2012). This method involves using espoused culture as an individual variable to moderate the construct relationships within the TAM model. More recent research has utilised equivalent samples in different countries to relate espoused culture to intention. Investigation of culture in the adoption of educational technology has been examined in European and Middle-Eastern contexts with workers and students (Nistor et al., 2014; Tarhini et al., 2016).

Udo's study of Information System Quality followed Srite and Karahanna's method but showed that a consistent moderating influence of culture was difficult to establish: *power distance* moderated the influence of *perceived usefulness* on satisfaction, but all other cultural dimensions had no effect for American users, whereas Nigerian users demonstrated moderating paths between *masculinity*, *individualism* and *uncertainty avoidance* on perceived *system quality* and *satisfaction*, indicating a potential difference in the perceived risk and self-efficacy of individuals in developing economies where infrastructure was lacking (Udo and Bagchi, 2011; Udo et al., 2012). Yoon's analogous study found *masculinity* and *uncertainty avoidance* to moderate the relationship between *perceived usefulness* and *intention* (Yoon, 2009). Similar studies have been carried out using Middle-Eastern (Akour et al., 2006; Twati and Gammack, 2006; Nadi, 2012; Abu Bakar, 2014; Ali Tarhini et al., 2015), Indian (Rao, 2011) and European (Nistor et al., 2014) contexts to investigate the effects of Hofstede's dimensions on technologies such as ICT use (including PCs, internet,

telecommunication) (Erumban and de Jong, 2006; Udo and Bagchi, 2011); online shopping and e-commerce (Choi and Geistfeld, 2004; Abu Bakar, 2014); and social technologies (Veltri and Elgarah, 2009; Al Omoush et al., 2012; Yaseen, 2014).

While these studies investigated TAM in homogenous cultural groups, a minority of studies examine individual level values. Nistor *et al.* tested Hofstede's model at group level with educational technology (Nistor et al., 2014): comparing computer adoption in the training of German and Romanian academic and professional students. Contrary to previous research (Zakour, 2004) no cultural interactions were found for the relationships between *performance expectancy*, *effort expectancy* and *social influence* with *behavioural intention*, although *individualism* was shown to be an important predictor of *social influence*.

The effect of Hofstede's dimensions on email adoption in Latin America was proposed by McCoy and Everard who found instability between existing and empirical culture measurement at a group level. While an extension of TAM (a precursor to UTAUT including *perceived behavioural control* and *subjective norm*) was investigated, the comparative differences could be explained through the lack of supporting infrastructure in developing countries, rather than culture (McCoy and Everard, 2000; McCoy et al., 2005). McCoy *et al.* found that TAM may be unstable in regions where the culture is averse to uncertainty, or there is a large power distance, potentially due to infrastructural or socioeconomic effects, however, McCoy's study did not focus primarily on sub-Saharan Africa, so generalisations about the African diaspora are difficult to make (McCoy et al., 2007).

These various studies have culminated in a response from the lead researchers in technology acceptance, who have (with the justification that Hofstede's model has been commonly used) indicated that Hofstede's model of culture should be used to determine the effects of espoused culture in technology acceptance (Hoehle et al., 2015). This line of thinking is theoretically problematic as it relies on measurement of individual-level agreement with group-level constructs to explain individual-level outcomes, which assumes convergent scale meaning across cultures, and also assumes participants have declarative knowledge on the implicit and indirect aspects

of culture (Oyserman et al., 2002). The preferred method would be to use individual-level values to explain individual-level outcomes, however, this method has yet to gain traction with the academic community in this area (Hoehle et al., 2015).

3.3.3. Why Schwartz's Model was Chosen for this Study

In this study, to examine the influence of culture on e-learning acceptance, values dimensions will be incorporated into the UTAUT model of technology acceptance. While it must be acknowledged that values do not encompass the entire breadth of the concept of culture, values represent the core of the culture "onion" and can therefore be used as a proxy for cultural variation in quantitative research. There are three main reasons for choosing Schwartz's values framework over Hofstede's cultural model: Schwartz's values framework applies at the same ecological level as the technology acceptance framework, i.e. the individual level; and Schwartz's inventories are more reliable in providing data that is robust to modern statistical techniques; and Schwartz's model is theoretically derived and empirically tested, compared to Hofstede's empirically derived model. These three reasons are elaborated and justified here.

Firstly, the ecological consideration. Technology acceptance modelling concerns the factors that influence an individual-level decision. Culture is a group-level concept that relates to individual decisions indirectly and imperfectly. Inferring individual-level relationships from group-level aggregate data is problematic because this approach treats a culture as a macro-scale individual with a singular, macro-scale psychological response, and assumes that all individuals within the macro-group identify with the group-level culture to the same extent (Hofstede, 2003; Straub et al., 2002; Subramanian et al., 2009; Brewer and Venaik, 2014). Many cultural scales, such as Hofstede's model are explicitly designed for group-level culture analysis and between-groups comparison, rather than within-groups or individual-level analysis (House and Hanges, 2004). Schwartz's work provides a clear distinction between individual-level values and value dimensions and how they relate to group-level culture, and the individual-level values are most appropriate operationalising and relating to individual-level technology acceptance (Schwartz, 1994a; Schwartz, 1994b). The distinction between group-level and individual level has been argued as both important and unimportant (Fischer et al., 2010), but for the purposes of choosing a reliable method of

examining individual-level decision-making, Schwartz's individual-level values framework is the most pragmatic choice.

Secondly, methodological considerations: Schwartz's Portrait Values Questionnaire (PVQ) is more reliable than Hofstede's Value Survey Module (VSM), and simpler than Schwartz's Values Survey (SVS). The reliability (alpha) for the PVQ 10 basic value types range from .4 to .75, when combined into the higher order dimensions the alpha values are .75 to .81 (Schwartz, 2003). The SVS basic value types show similar reliability (Uphill, 2007; Schwartz et al., 2000), are stable at individual level (Fontaine et al., 2008) and have been tested in African samples, including Namibia, Uganda, Nigeria, where reliability remains sufficient (although lower than expected due to weaker understanding of the value types descriptions (Schwartz and Bardi, 2001)). Schwartz's most recent model refinement (Schwartz et al., 2012) has been assessed for reliability and validity (Schwartz et al., 2012; Schwartz and Butenko, 2012), but has not been tested in sub-Saharan Africa. The PVQ method of questionnaire also addresses (to some small extent) the conceptual criticism that declarative knowledge is required to agree or disagree with explicit cultural statements, whereas a portrait style question allows a participant to judge desirability in a third person's attributes (Schwartz et al., 2001; Oyserman et al., 2002).

Hofstede's model can be unstable (Oshlyansky et al., 2006; McCoy et al., 2007), is based on non-conventional statistics (Williamson, 2002), can be difficult to replicate (Oshlyansky, 2007), and has numerous gaps in the assumptions made in the methodology (Oyserman et al., 2002). Despite criticisms, Hofstede's paradigm remains the choice of many researchers in examining cross-cultural technology adoption (Srite and Karahanna, 2006; Tarhini et al., 2017a). Schwartz's cultural model is theoretically superior, including Hofstede's dimensions but capturing additional dimensions of variance (Steenkamp, 2001; Ng et al., 2007). Schwartz's values model has been demonstrated to be more theoretically and empirically consistent when predicting consumer behaviour outside the USA (Hsu et al., 2013). Hofstede's dimensions were ground-breaking when proposed, and although the principles of his cultural dimensions remain the topic of much cultural research, modern statistical standards require a more robust instrument (Fischer et al., 2010). Schwartz's values reflect both individual-level opinion and cultural level influence, so can be analysed robustly at either level

(Schwartz, 1994b; Fischer et al., 2010). The analysis conducted by Steenkamp provides a mechanism for linking individual-level values from Schwartz's model with group-level findings from Hofstede's model (Steenkamp, 2001; Ng et al., 2007).

3.4. Values and Culture in sub-Saharan Africa

Although Schwartz's and Hofstede's models of values and culture have received significant research attention, as with TAM and UTAUT, these models were generated in western developed countries, and have seen significant application in these countries. As with technology adoption research, there has been significant attention on widening the scope of these models to countries in Europe, the Middle East, and the Far East, with comparatively less research in sub-Saharan Africa. Allik and Realo provide a typical example of western-focus in sub-Saharan African research in their study of culture across 42 countries, with Nigeria and South Africa providing African data: both Nigeria and South Africa enjoy relative economic affluence and technology infrastructure that is not typical of some other African countries, so it is doubtful that they provide typical results (Allik and Realo, 2004).

Some research conducted into values has included African nations such as Senegal, Côte d'Ivoire and Uganda finding that the values model is broadly applicable in the diaspora (Schwartz et al., 2001; Spini, 2003). While values may be operationalised, the overarching values structure may differ in the 'African' context[2] (Steinmetz et al., 2012). Applied values research is limited: South African students prioritise conformity values, potentially as part of their societal culture, and achievement values, potentially as part of their higher education setting (Fatoki, 2014); Madagascar's rural population also demonstrated shared culture (Ratsimanetrimanana, 2014). Culture can be affected by colonisation, as demonstrated by the example of Hofstede's dimensions in Uganda, which are closer to those of the UK than would be expected in the East African region, due to Uganda's history as a British colony (Rarick et al., 2013). Hofstede noted the link with Africa's dependency on foreign aid as a rationale for a degree of congruence with western cultural dimensions, but doubted the applicability of western logic to the

[2] There are so few studies in this area that the analysis by Steinmetz *et al.* combined them into an 'African group'

extent that he developed an African values survey, with mixed results (Hofstede et al., 2010). The literature is not conclusive: cultural models need further investigation to dispel doubts as to their efficacy in the African context.

The literature on values, culture and technology adoption has mainly used Hofstede's model at a group level, in comparison studies across the USA, Europe, Middle East and the Far East. This study is novel because it applies Schwartz's theory to African workplace contexts, and because it uses Schwartz's theory at an individual-level to elucidate adoption decisions at an individual level.

3.5. Chapter Summary

Reviewing the literature on Hofstede's and Schwartz's impact on the landscape of cultural research, in the context of Rokeach, the link can be made between culture, values, attitude, intention and behaviour, providing theoretical grounding for this study. A group-level expression of a values system provides the context in which individual-level expressions of values can be applied to scenarios, in which technology use can be a target for a discriminatory response. Culture provides the basis for the social context that allows an abstract value to become a contextual attitude, providing a mechanism through which values can affect learner decision-making. Examining the literature, Hofstede's model is more applicable at a group-level, and Schwartz's model is more reliable at the individual level, and better suited to the theoretical grounding of the technology adoption literature, therefore is chosen for this study. The next chapter builds a conceptual framework to integrate values with the UTAUT2 model.

4. Design and Method

4.1. Research Question and Sub-questions

Chapters 2 and 3 detailed the history of technology adoption literature; available and preferred methods of measuring values; the expected differences between adoption in the context of this study; and a literature gap in the integration of values and technology adoption in sub-Saharan Africa.

The newest model of technology adoption, UTAUT2, provides a theoretical foundation that includes constructs for social influence, and intrinsic and extrinsic motivation, which are expected to influence the adoption of e-learning as described in the literature review. Schwartz's refined theory of basic human values provides a reliable, theoretically derived framework to describe the motivational continuum that may influence the adoption of e-learning. This thesis develops and validates a novel model, integrating Schwartz's values and UTAUT2 to yield the *Values-Enhanced Technology Adoption* (VETA) Model (Figure 13). The following sections outline the proposed research questions (4.1); the VETA model to be tested in this study (4.2); and a method for investigation (4.3).

The overarching research question is: how do values influence e-learning adoption in organisations? The study uses the context of e-learning applied to the professional training of workers in research organisations in the UK, West Africa and East Africa. Research sub-questions are:

1. Which values are important in determining e-learning adoption?
2. How do *social influence, price value, hedonic motivation and habit* vary with context?
3. How does the explanatory power of the VETA model compare with UTAUT2?

The objectives of this study are:

- To validate UTAUT2 in a sub-Saharan African professional educational context
- To estimate the increase in explanatory power over UTAUT2 by incorporating the influence of values on the model: developing the VETA model

Although the original research proposal focussed on model development, and the influence of culture and values on the UTAUT2 model, as the study progressed it was clear that there were differences between the country contexts. Therefore, an additional objective for this study was developed: *to determine whether there are differences in facilitating conditions in developing and developed country contexts*.

The following section will: propose rationale for the influence of values on technology adoption; and develop a novel theoretical model (the *VETA (Values-Enhanced Technology Adoption) model*) derived from the literature (Figure 13). The remainder of the chapter will then focus on the methodological approach used to validate the VETA model and explore contextual differences in adoption factors.

4.2. Developing the VETA Model

The VETA model (Figure 13) is formed by adding values as the antecedents of adoption factors in UTAUT2. The rationale for development will be considered as follows: the overall rationale for integrating values with adoption models will be given (4.2.1); followed by a discussion of the relative position of values as predictors, moderators or mediators of path relationships (4.2.2); finally, the rationale for specific path relationships will be given (4.2.3).

4.2.1. Integrating Values and Adoption Models

The rationale deriving the VETA model (Figure 13) from prior research will be described in this section. From the literature review presented in the previous chapter, the predictor variables of UTAUT2 are expected to influence *behavioural intention* to use e-learning. Therefore, the UTAUT2 model is applied to the context of the adoption of e-learning in UK and African professional education. The UTAUT2 predicts system use through intention, as users make a conscious decision to engage with the system based on external factors.

The UTAUT2 as originally proposed has indirect construct relationships only through *behavioural intention* to predict system *use*. However, indirect relationships may be important in the context of this study. As found in the original TAM, *effort expectancy* is expected to predict *performance expectancy* as users will perceive a technology to be more useful if it is perceived as easy to use (Davis et al., 1989). In an organisation, users may perceive a technology to be more useful in helping to achieve job goals if referent others in the organisation, such as managers, endorse the technology, therefore, a relationship between *social influence* and *performance expectancy* is proposed (Rana et al., 2017). In a professional setting where the cost-benefit decision is likely to include non-monetary considerations such as effort and time, a user may deem technologies more useful if the benefits are greater relative to the cost: a relationship between *price value* and *performance expectancy* is proposed (Ain et al., 2016). Increasing the enjoyment of a useful system can help gain acceptance in workplace applications (Davis et al., 1992), especially relevant for online learning where instructional design considers intrinsic motivation (Malone, 1981; Ally, 2008): a path between *hedonic motivation* and *performance expectancy* is proposed. The development of the UTAUT2-based core of the VETA model therefore includes not only the predictive relationships of *performance expectancy, effort expectancy, social influence, hedonic motivation, price value* and *habit* on *behavioural intention*, but also includes the predictive relationships of *effort expectancy, social influence, hedonic motivation* and *price value* on *performance expectancy*, as shown in Figure 13. The rationale for model development is elaborated in 4.2.3; the next section discusses the appropriate positioning of values in adoption models.

4.2.2. The Position of Values in the VETA model

UTAUT2 posits that user perception of a technology, context or consumer attribute predicts intention as an outcome. Studies that have examined the influence of culture or values on technology adoption have predominantly been based on Hofstede's four-dimensional model of culture as applied to Davis's TAM by Srite and Karahanna, placing espoused culture as a moderator of adoption construct relationships under the rationale that culture is an individual difference variable (Srite and Karahanna, 2006). However, applying the rationale of Rokeach, Ajzen and Fishbein, that values fit within the belief structure, an attitude is the contextual application of a value, and therefore values would be placed as antecedents of attitudes (Rokeach, 1968; Fishbein and

Ajzen, 1975a). The positioning of values as an antecedent of adoption factors will be argued next.

Using the example of the predictor *social influence* and the value *conformity*, individuals espousing *conformity* values may place greater emphasis on social influence when deciding to use a system. From an analysis point of view, *social influence* on *behavioural intention* (path coefficient and effect size) may be greater for those who prefer *conformity* and smaller for those who least prefer *conformity* (Figure 10). Applying Schwartz's circular continuum with opposing values (Figure 9) means that the effect for *conformity* will be inversely proportional to the effect of the opposing value (*stimulation*). However, using values in the moderator position does not necessarily preclude a mediated or predictive latent variable relationship, which should also be considered. Figure 10 shows a moderated relationship as drawn in SmartPLS, the software used in this study, as noted in 4.3.3.6. The different elements within Figure 10 represent the elements in the VETA model, but for simplicity, to exemplify the potential types of relationships, Figure 10 shows just the two elements of *social influence* and *conformity*.

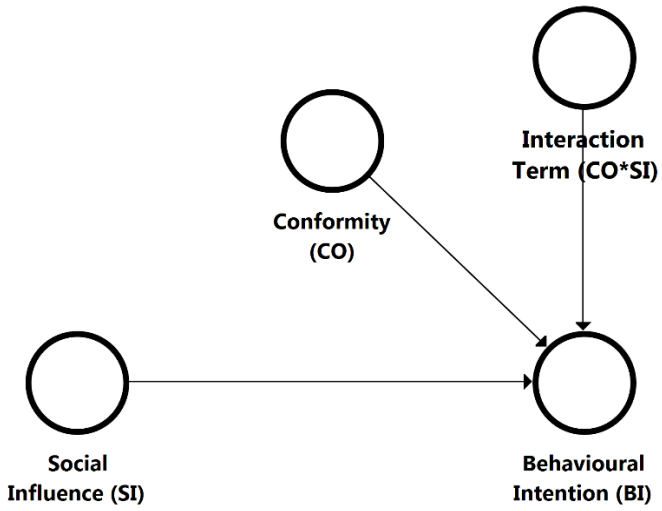


Figure 10: Value (*Conformity*) Moderating the Relationship between S*ocial Influence* and *Behavioural Intention*

Since attitudes can be conceptualised as context-specific values (3.1.2.1), values could be placed as attitude was in the original technology acceptance model (Davis et al., 1989): as a partial or full mediator of the predictor relationship on intention (Figure 11). Using the same example of *conformity* and *social influence*, this means that the positive opinion of referent others predicts intention partially through normative mechanisms and partially through other non-normative mechanisms, such as informational influence. A mediated relationship can occur even if the original predictor-outcome relationship is non-significant.

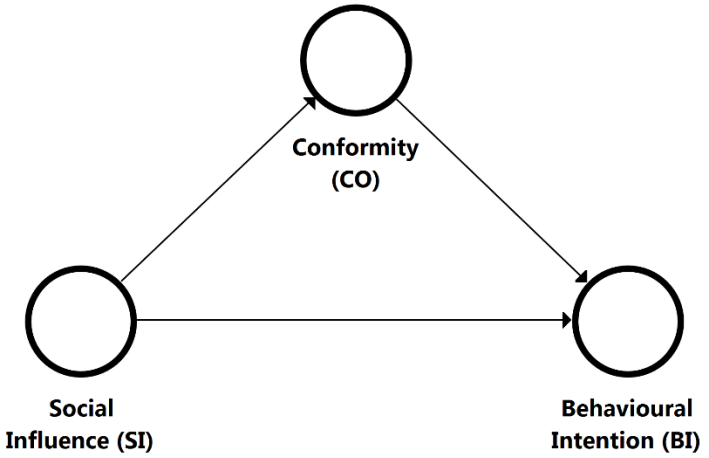


Figure 11: Value (*Conformity*) Mediating the Relationship between *Social Influence* and *Behavioural Intention*

Finally, the relationship could be predictive (Figure 12): a person with a preference for *conformity* forms intention because they conform to the opinions of referent others in their social environment. In a predictive or second-order model, the direct path (not shown in the figure) does not need to be significant. The literature integrating Schwartz's theory of human values with decision-making models, proposes operationalized values as first- or second-order predictors of adoption. Partitioning the continuum into sets of values that have a positive and negative influence on the variables under study is one potential approach (Bagchi and Kirs, 2009; Yang et al., 2015).

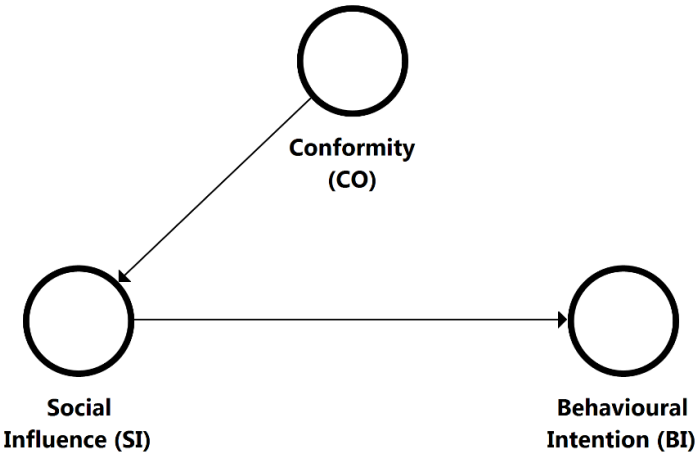


Figure 12: Value (*Conformity*) Predicting *Social Influence*

4.2.3. VETA Model development

4.2.3.1. The Core UTAUT2-Based Model

From the primary literature on technology acceptance (Davis et al., 1989), meta-analyses (Dwivedi et al., 2011), and literature specific to e-learning (Šumak, Heričko and Pušnik, 2011; Al-Gahtani, 2016; El-Masri and Tarhini, 2017), perceptions of usefulness and ease of use are important in predicting *behavioural intention* to use e-learning. For workplace e-learning to be perceived as useful, learners judge their ability to achieve outcomes in their working environment (Chen, 2010). Technology acceptance research has been conducted predominantly in developed countries with mixed results: the relevance of ease of use is greatest for vocational settings; the applicability of the model in developing countries is still relatively under-tested (Mbarika et al., 2007; Šumak, Heričko and Pušnik, 2011; Thomas et al., 2013; Raman, Don, et al., 2014). Despite some work that has questioned the relative importance of these variables in an African context (Brown, 2002; Musa, 2006), research in Africa is yet to reach consensus in the importance of *perceived usefulness* (and *performance expectancy*) and *perceived ease of use* (and *effort expectancy*) in technology adoption (Lin et al., 2011; Mtebe and Raisamo, 2014; Kolog, 2015). While, from the technology acceptance literature in developed countries these factors are expected to be important in predicting intention, demonstrating the predictive influence of *performance expectancy* and *effort expectancy* on *behavioural intention* in an African context warrants further investigation. Across the contexts of this study, learners who perceive e-learning as useful to their goals, and as easy to use, are more likely to intend to use

e-learning. Therefore, consistent with TAM, UTAUT and UTAUT2, the VETA model includes *performance expectancy* (PE) and *effort expectancy* (EE) as predictors of *behavioural intention (BI)*.

Effort expectancy is expected to predict *performance expectancy* as users perceive a technology to be more useful when it is easy to use (Davis et al., 1989). The e-learning adoption literature has found this relationship both empirically and through meta-analysis (Šumak, Heričko and Pušnik, 2011; Abdullah and Ward, 2016; Al-Gahtani, 2016). Across the contexts of this study, learners who perceive e-learning as easy to use are more likely to perceive it as useful. Therefore, consistent with TAM, the VETA model includes *effort expectancy* (EE) as a predictor of *performance expectancy* (PE).

In an organisation, users may perceive a technology to be more useful in helping to achieve job-related goals if referent others in the organisation, such as managers, endorse the use of such technology. The predictive influence of social factors on *performance expectancy* has been made in prior literature (Venkatesh et al., 2003; Abdullah and Ward, 2016; Dwivedi et al., 2017). Similar to *performance expectancy*, research in Africa has found varying effects from *social influence* on *behavioural intention*, warranting investigation in the contexts of this study (Mtebe and Raisamo, 2014; Kolog, 2015). Across the contexts of this study, learners who perceive e-learning as endorsed by referent others within their social environment are more likely to intend to use e-learning. Therefore, consistent with UTAUT and UTAUT2, the VETA model includes *social influence* (SI) as a predictor of *behavioural intention* (BI).

Consistent with TAM2, TAM3, the General Extended Technology Acceptance Model for E-Learning (GETAMEL) and research on student acceptance of web-based learning in western contexts, referent opinion may influence user perception of technology usefulness (Venkatesh, Morris and Ackerman, 2000; Martins and Kellermanns, 2004; Venkatesh and Bala, 2008; Williams and Williams, 2010; Abdullah and Ward, 2016). Pressure from peers, tutors, teachers, management and organisational policies are likely to be influential in shaping the opinions of learners regarding how useful e-learning might be in helping learners to achieve their goals via the information they can access, the knowledge that they gain and the status they might achieve amongst their

peers with such knowledge. Across the contexts of this study, learners who perceive e-learning as endorsed by referent others within their social environment are more likely to perceive e-learning as useful. Therefore, the VETA model includes *social influence* (SI) as a predictor of *performance expectancy* (PE).

The most recent iteration of UTAUT (UTAUT2) has been adapted to include three additional variables, as described in 2.1.5: *hedonic motivation* (HM); *price value* (PV); and *habit* (HAB). While e-learning is not explicitly a consumer application of technology, digital education can be argued as a commodity (Chau, 2010), making relevant concepts such as *intrinsic motivation*, *price value* and *habit* relevant to learner engagement.

Where TAM focussed on extrinsic motivation through the construct of *perceived usefulness,* subsequent model development in the technology acceptance literature acknowledged a relation between extrinsic and intrinsic motivation (Davis et al., 1992; Ryan and Deci, 2000), leading to the inclusion of *hedonic motivation* as a predictor of intention in UTAUT2 (Venkatesh et al., 2012). In the context of e-learning, intrinsic motivation can be linked to learner enjoyment, playfulness with e-learning, learning strategy, the flow of the learning experience, and engagement, as well as the success of online learning (Sørebø et al., 2009; Sánchez-Franco et al., 2009; Padilla-Meléndez et al., 2013; Barak et al., 2016). Across the contexts of this study, learners who are intrinsically motivated are more likely to intend to use e-learning, therefore, consistent with UTAUT2, *hedonic motivation* (HM) is included in the VETA model, as a predictor of *behavioural intention* (BI).

Hedonic motivation may link to learner perception of the usefulness of e-learning by facilitating learner exploration of information in an online environment, particularly in cultures where the extrinsic motivation focus of TAM does not explain learner behaviour (Saadé et al., 2009). Acknowledging Ryan and Deci's Self-Determination Theory, there is likely to be a continuum of motivation for learners to use e-learning technology from purely extrinsic to purely intrinsic, with the reality likely to be a complex mixture of both (Ryan and Deci, 2000). However, e-learning courses that are engaging, well designed and interesting are likely to be perceived as useful by e-learners (Roca

and Gagné, 2008). Across the contexts of this study, learners who perceive e-learning as intrinsically motivating are likely to perceive e-learning as useful. Therefore, *hedonic motivation* (HM) is included in the VETA model, as a predictor of *performance expectancy* (PE).

Price value is an evaluation of costs and benefits that a consumer makes when they incur costs when using a technology. With educational technology in a workplace scenario, learners do not incur direct financial costs, but the decision about when to use such technology must be made, balancing work priorities. Although *price value* is often excluded from studies where applications exclude direct monetary cost to users (Lewis et al., 2013; Raman and Don, 2013), for workplace learning, there are, therefore, costs perceived by professional learners (Ain et al., 2016). *Price value* is linked to a learner forming intention to use e-learning from prior literature (Zeithaml, 1988; Venkatesh et al., 2012). Because there are costs, although not direct financial costs, value can be established (Ain et al., 2016), and therefore, consistent with UTAUT2, *price value* (PV) is included in the VETA model applied to e-learning in this study, as a predictor of *behavioural intention* (BI).

Benefits linked to the extrinsic outcomes from e-learning yield overall learning value, linking price value to performance expectancy (Ain et al., 2016). In making a cost vs benefit decision, benefits in workplace learning are primarily extrinsic, relating to job outcomes, which are captured conceptually in the construct for *performance expectancy*. Therefore, *price value* (PV) is included in the VETA model applied to e-learning in this study, as a predictor of *performance expectancy* (PE).

Established routines in the workplace, for finding information and learning job-related skills can be important in determining future actions with respect to achieving work-related goals and participating in work-related initiatives, such as e-learning (Verplanken and Aarts, 1999; Wood, 2017). Prior behaviours, perceived to be automatic, can result in initial adoption and prolonged use (Kim and Malhotra, 2005; Limayem et al., 2007; Venkatesh et al., 2012), or can provide a barrier to new initiatives (Labrecque et al., 2017). Therefore, consistent with UTAUT2, *habit (*HAB) is included in the VETA model, as a predictor of *behavioural intention* (BI).

4.2.3.2. Values as Predictors of Adoption Factors

The concept of espoused culture and values has been linked to *social influence* and *subjective norm* in previous research as described in 3.3.2 (McCoy et al., 2005; Srite and Karahanna, 2006; Dinev et al., 2009; Tarhini et al., 2017b). Previous research using Hofstede's model of culture has demonstrated that, while further research is needed, there is an influence of culture on technology adoption. There has been limited interest in using Schwartz's model of values in decision-making models, but recent research has used dimensions at the higher level, such as *openness to change* or *conservation*, as predictors of adoption factors in diverse decision-making contexts, such as the intention to purchase online or to use social media, and interpersonal behaviour (Pahnila et al., 2011; Grigoryan et al., 2018; Ahmad and Sun, 2018; Seddig and Davidov, 2018). In developing the VETA model, it is expected that values related to *conservation* will be predictively relevant in workers decisions to use a mandated professional e-learning course, and that values relating to *self-enhancement* will be relevant to learner decisions with developing their knowledge and competence through the use of an online training course.

A learner's perception of the technology or contextual attributes of a workplace e-learning course can be linked with the priority that the learner places on their own interest in *self-enhancement*. Learning, irrespective of whether technology is involved, is likely to be linked with an individual's priority for *self-enhancement*. E-learning is designed to enhance individual-level performance, and therefore intention to use e-learning should be predicted by a learner's preference for self-enhancement as an individual-level priority (Veiga et al., 2001). Learner priority on *achievement* through course completion, and on the extrinsic outcomes that arise from *achievement*, such as increased status, perceived knowledge and career opportunity are linked to the values of achievement and power within the *self-enhancement* dimension (Table 3). With respect to workplace e-learning, values related to *self-enhancement* and *conservation* are likely to be important in determining learner opinion. Links between the dimensions of self-transcendence and individual-level adoption are unlikely and therefore not included in the VETA model for e-learning adoption, although should be considered when applying the model to technologies that have societal impact.

Individuals within societies emphasising hierarchy and conservatism are likely to perceive technologies as useful where they are part of the protocols of their reference group (Steenkamp, 2001; Schwartz et al., 2012). Individuals expressing high conservation values, both interpersonal and compliance, are likely to place importance on meeting obligations within their social and organisational spheres including meeting the expectations of significant influencers in their social environment, both in terms of peer and organisational influence (Schwartz et al., 2012). In the case of professional e-learning, workers that prioritise *conservation* of the status quo in their environment are likely to perceive e-learning as useful in helping them comply with the rules of their workplace, and ensuring enduring job security within their professional hierarchy. *Conformity* in a workplace scenario might arise through following rules laid down by the organisation in terms of mandatory or endorsed training programmes. The value of *security* contains subtypes of personal security (personal health, safety, wellbeing) and societal security (stable social order) (Schwartz et al., 2012): for vocational training, it can be expected that workers complete basic training delivered via technology to safeguard their future employment against threat of competition from peers and through maintaining competence, therefore individuals who place importance on personal security will perceive educational technology to be useful to their job performance. The value of *tradition* indicates an individual's priority on existing paradigms within their organisation (Schwartz, 1992). Workers prioritising the importance of existing organisational norms that relate to learning, development and career progression are likely to perceive the completion of workplace e-learning as useful to their work goals and endorsed by their normative framework. Workers will perceive vocational e-learning as useful to their career objectives and job security, endorsed by referent others in their organisational hierarchy and worth their time and effort to complete (Pahnila et al., 2011). Therefore, the VETA model includes conservation-type values (*security* (SE), *tradition* (TR) and *conformity* (CO)) as predictors of *performance expectancy* (PE) and *social influence* (SI).

From Hofstede's cultural model, *masculinity* is linked to the pursuit of work goals, earnings and career advancement (Hofstede et al., 2010). Following Figure 9 and Table 3, *achievement* and *power* in the domain of *self-enhancement* and the individual pursuit of mastery are akin to Hofstede's concept of *masculinity* (Steenkamp, 2001; Hsu et al., 2013). The pursuit of work-related, performance outcomes in technology

acceptance literature is conceptually channelled through the construct of *performance expectancy* (Venkatesh et al., 2003). Therefore, there is a conceptual link between user perception of the usefulness of e-learning in delivering work-related information, or improving work-related competence, and user priority on pursuing and achieving work-related goals and outcomes. The influence of *perceived usefulness* on *behavioural intention* has been found to be culturally moderated by Hofstede's dimension of *masculinity vs femininity* in e-commerce acceptance (Yoon, 2009), and *masculinity vs femininity* has been found to predict *behavioural intention* to use technology, mediated by *perceived usefulness* (Akour et al., 2006). The inherent usefulness of e-learning is, therefore, linked to the *self-enhancement* value of *achievement*: learners use content to improve their understanding, to achieve within standardised testing, and to potentially influence their extrinsically-rewarded job performance, such as career or promotion benefits. The concept of dominance over resources and people is linked to both formal and informal status in an organisation: progression within the formal organisational hierarchy through increased knowledge and competence brings increased resource responsibility, as well as managerial responsibility over others; increased social status also brings informal power through perceived expertise. Therefore, extrinsic outcomes from e-learning relate to resource- and dominance- types of *power* as defined by Schwartz (Schwartz et al., 2012), and may interact with adoption factors in a similar manner to *achievement*. Hofstede's dimension of *masculinity vs femininity* has been linked to *performance expectancy* (Hoehle et al., 2015), while Hofstede's dimension of *power distance* (linked to autonomy) has been shown to moderate the influence of *perceived usefulness* on *behavioural intention* (Tarhini et al., 2017a). This rationale links values for autonomy and mastery values with *performance expectancy* (Steenkamp, 2001). Therefore, the VETA model includes *achievement* (AC) and *power* (PO) as predictors of *performance expectancy* (PE).

The concept of *achievement* as proposed by Schwartz includes the demonstration of competence and the pursuit of personal success by the standards of one's reference groups (Schwartz, 1994). The value of *achievement* is therefore linked to the social environment, and the perceptions of referents within that social context. Similarly, values relating to *power* are relative to the social environment, in terms of dominance over resources or individuals, and therefore are linked to the concept of social norms and status (Schwartz et al., 2012; Ahmad and Sun, 2018). *Self-enhancement* values

from Schwartz's values model relate to Hofstede's *masculinity vs femininity* cultural dimension (Steenkamp, 2001), which have been found to moderate *subjective norm* in computer adoption (Srite and Karahanna, 2006). Autonomy-related values are also linked to Hofstede's *individualism vs collectivism* dimension which has been found to moderate the influence of *subjective norm* on *behavioural intention* (Tarhini et al., 2017a). Therefore, the VETA model includes *achievement* (AC) and *power* (PO) as predictors of *social influence* (SI).

The rationale above links *performance expectancy* and *self-enhancement* values, without considering the cost, effort or sacrifice made by individuals in a particular context in their pursuit of extrinsic outcomes. Any cost-benefit consideration made when learners judge the *price value* of e-learning may similarly be linked to the priority placed on the higher order value of *self-enhancement* because the benefits of e-learning are likely to be linked to learner perception of the value of achieved outcomes and the ability of learners to gain such outcomes from the use of e-learning courses (Ain et al., 2016). Therefore, the VETA model includes *achievement* (AC) and *power* (PO) as predictors of *price value* (PV).

While there is a potential conceptual link between intellectual freedom and learning, the value of self-direction is unlikely to be a determinant of mandated workplace training, since mandated training is controlled by others in the organisation, rather than the learner. However, there is likely to be a link between the learner engagement and value of *hedonism*, which spans the dimensions of *self-enhancement* and *openness-to-change.* The value of *hedonism* incorporates intrinsic motivation, including novelty, challenge, excitement and pleasure (Schwartz et al., 2012), factors which are likely to predict user perception of e-learning enjoyment, and which may influence individual engagement and performance with a technology system (Martocchio and Webster, 1992; Moon and Kim, 2001). The various constructs that intrinsically motivate technology users have been captured through a construct of cognitive absorption (Agarwal and Karahanna, 2000; Lowry et al., 2013), without attempting to capture the user's value priority on intrinsic motivation in a purely hedonic and cultural sense. Therefore, the VETA model includes *openness-to-change*-type values (*hedonism,* (HE)) as a predictor of *hedonic motivation* (HM).

The rationale described in this section yields an extended UTAUT2-based model, with values relating to *self-enhancement*, *conservation* and *hedonism* placed as predictors of *performance expectancy*, *social influence*, *price value* and *hedonic motivation*. However, it must be acknowledged that the literature places values in the moderating, mediating and predictive positions of technology acceptance construct relationships. The next section describes the rationale for favouring a predictive position.

Based on the above rationale for the influence of the values continuum on acceptance, the VETA model can be drawn (Figure 13). The VETA model for this study, shown in Figure 13, therefore represents the UTAUT2 model (shown in blue) with values in a predictive position (shown in orange), following the rationale for Figure 12 and the conceptualisation in 3.4. Each arrow between constructs in Figure 13 represents a hypothesised relationship between constructs.

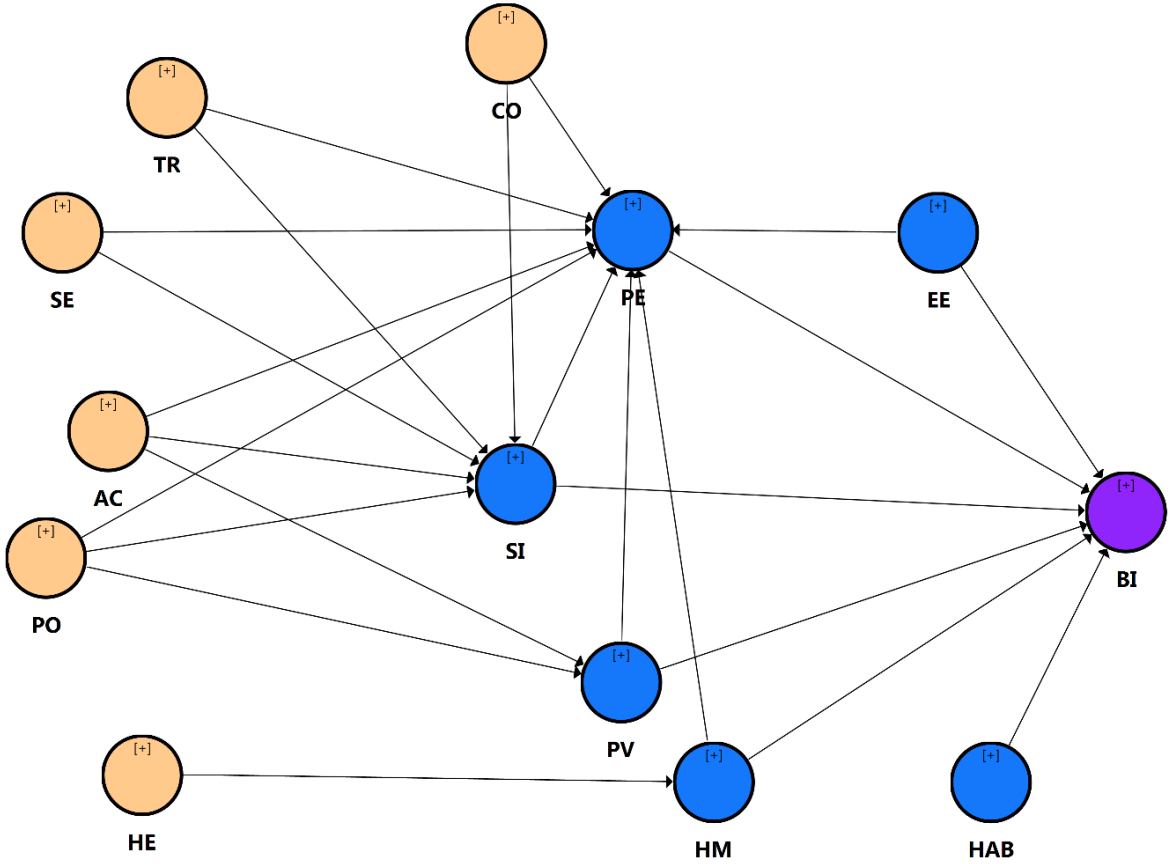


Figure 13: Proposed VETA Model

Legend:
AC=Achievement;
BI=Behavioural Intention;
CO=Conformity;
EE=Effort Expectancy;
HAB=Habit;
HE=Hedonism;
HM=Hedonic Motivation;
PE=Performance Expectancy; PO=Power;
PV=Price Value;
SE=Security; SI=Social Influence, TR=Tradition.
Blue= UTAUT2 predictor;
Orange=Value.

Each arrow in the diagram is a hypothesised predictive relationship.

4.3. Method

This study used a mixed-method design across three contexts. A survey was deployed with an e-learning course, followed by interviews six weeks after the e-learning was used: this method was repeated in the UK, The Gambia and East Africa to generate the data for this study. Survey items were taken from the UTAUT2 and Schwartz Human Values models as described in the literature review and analysed using the method used in the main technology adoption literature (section 4.3.3).

4.3.1. Assumptions and the Research Paradigm

Assumptions about the nature of phenomena under investigation, knowledge about said phenomena in context, the relationship between humans and their environment, and the method of investigating said phenomena in context are presented in this section (Burrell and Morgan, 1979).

4.3.1.1. Ontology and Epistemology

In technology adoption research, users discriminate in their technology behaviour intention based on attributes of the technology, the context and individual judgement. Individual opinion is formed within their value systems, independently from the researcher, and through online methods, can be observed independently. This study seeks to describe and interpret the values and attitudes held by discrete groups with the ontological assumption that such concepts can be objectively measured but are evolving within changing social environments. This study seeks to ascertain whether different social environments produce a difference in behavioural intention. Therefore, the research philosophy of this study is pragmatism and assumes that: individual perceptions examined through the lenses of education, psychology and information systems, can be objectively captured within a snapshot in time.

It is not pragmatic to consider qualitative, inductive or exploratory research as the polar opposite of quantitative, deductive or confirmatory research because the distinction

between such approaches are not grounded in data, but rather in epistemological and ontological assumptions (Crotty, 1998). Therefore adopting a forced choice between constructivist and post-positivist approaches to consider concepts such as “truth” and “reality” is similarly non-productive in the pursuit of answers to this research question (Creswell and Plano Clark, 2011). This study is, by nature, cross-cultural, and therefore requires an open and flexible approach to discovering the contextual specificity of the phenomenon of adoption behaviours. Technology adoption research is typically framed in a post-positivist manner, using survey instruments to capture latent variables that are linked in an overarching theoretical model. Values research operates within a similar set of assumptions. However, to generate data that expands on contextual similarities and differences between the groups in this study, a more exploratory approach within a constructivist worldview is necessary. Therefore, to capture an aggregate view of individual behaviours, a survey approach is needed, but to capture contextual detail in perception, a more exploratory approach is preferred, indicating that a mixed method would be most appropriate.

4.3.2. A Mixed Method Approach

A quantitative method will provide generalizable findings at the expense of the individual perspective, whereas a qualitative method will provide a detailed account of the individual perspective at the expense of generalizable findings. To maximise the potential to explore the phenomenon of learner decision-making with e-learning it is pragmatic to employ both quantitative and qualitative methods.

This study employed a non-equivalent group design across The Gambia, East Africa (Uganda and Kenya) and the UK as the quantitative method. Within each country stratified sampling was used to gather observations in two strata: fieldworkers (expected to be a relatively homogeneous group representing national, professional and organisational culture); computer users (a representation of organisational culture across multiple professions). This design facilitated participation, since each participant could use an analogous e-learning course that was directly relevant to their work.

Mixed methodology designs are sometimes more robust in determining answers to research questions (Cohen et al., 2007; Tashakkori and Teddlie, 1998; Creswell et al., 2003). This study involves the integration of two models grounded in psychology (that of decision-making in technology adoption and that of human values) as applied to learner decision-making at the technology interface. Both models utilise statistical analysis of survey responses. However, the survey method is necessarily restrictive in the questions asked, and while this method facilitates the collection of data that reflect group trends in technology adoption and values, surveys alone cannot capture the complexity of the social and infrastructural drivers that influence the decisions of Gambian, Kenyan and British learners in their respective organisational and national environments. Therefore, to gather a richer dataset, a more inductive approach was taken. Unstructured and semi-structured interviews allow the researcher to elicit values and perceptions from participants grounded in their context, both of which are core concepts to this thesis (Wellington, 2000). A mixed method is advocated by Venkatesh *et al.* for exploring UTAUT's applicability in developing and rural contexts (Venkatesh et al., 2013). Interview data was used to interpret the findings from the survey data as applied to the VETA model (Figure 13).

Using a qualitative approach therefore made it possible to look for differences due to context with respect to the UTAUT2 constructs *social influence, habit, hedonic motivation* and *price value*. Within each stratum interview participants were selected by age and gender. Therefore, the overall methodology employed was online survey for each cohort followed by one-to-one interviews with a small number of participants. The following sections detail the quantitative and qualitative methods of data collection.

4.3.2.1. Approvals

Before describing either method in detail, it is worth noting that this study was granted ethics approval from the University of Leeds, as well as approvals in each country: The Gambia, Uganda and Kenya. Example participant information, an example consent form and ethics approvals are shown in Appendix 3: Ethics Approvals.

The main methodological risks arising from this project were that workers would be freely participating in an informed manner in a workplace initiative to complete e-learning, but participation in the study (survey and interview) was voluntary, which required a personal sacrifice of time. Participants would also be exposed to questions about their personal beliefs, which might raise anxiety if they felt pressure to respond. These risks were mitigated by the participant information emphasising the voluntary nature of participation.

The main benefits of participation in the study were that workers would contribute to organisational knowledge about worker intention to use e-learning, which might not only contribute to scholarly literature in the area but would also better inform their organisations about the value of investing in professional training for these worker groups. Although workers (as individuals) could participate in e-learning without participating in the study, there was a benefit for organisations (as group entities) that were able to participate in the study: participating organisations gained access to learning materials and to an implementing manager (the researcher) that they did not otherwise have.

4.3.3. Quantitative Methodology

4.3.3.1. Partial Least Squares Structural Equation Modelling

Hair *et al.* (Hair et al., 2011) make the case that partial least squares structural equation modelling (PLS-SEM) is the appropriate tool where the research objective is theory development, over covariance-based structural equation modelling (CB-SEM), which is more appropriate for theory testing. The research objective of this study is to develop technology acceptance theory through the integration of values, and therefore the appropriate choice is PLS-SEM. Indeed, the prevailing analytical method in the development of technology adoption theory used by Venkatesh *et al.* (Venkatesh et al., 2003) when integrating acceptance models in a unified theory was partial least squares (PLS) variance-based structural equation modelling. PLS-SEM was also chosen because it is robust for smaller samples (such as the individual country groups) (Hair et al., 2011); and for data that does not satisfy the assumptions of CB-SEM (for example, non-normal distributed data, smaller sample sizes and multi-collinear data) (Hair et al., 2012; Hair Jr et al., 2014; Henseler et al., 2014; Garson, 2016)

The Shapiro-Wilks and Kolmogorov-Smirnov tests for normality were not used as they are considered less useful for satisfying PLS assumptions than testing for skewness and kurtosis (Hair et al., 2014). Variables in the VETA model were tested for skewness and kurtosis in SPSS 22. For the cross-country dataset, all values for both skewness and kurtosis for the three country groups (*East Africa*, *The Gambia* and *UK*) and the pooled data were between -1 and +1, with the exception of *price value* which yielded kurtosis values between 1.0 and 1.5 for all three cohorts. Since the data were non-normal in distribution, the assumptions of CB-SEM were not met: neither were the data extremely non-normal in distribution, making PLS-SEM the method of choice.

Although the pooled dataset for this study is large enough for either SEM method to be used (see 4.3.3.5), individual groups are small, so to explore the granularity of group differences with smaller sample sizes, PLS was chosen over CB-SEM. Recent advances in multi-group analysis for PLS and permutation testing facilitate the comparison of latent variable relationships as well as the comparison of group differences in UTAUT-based models (Henseler, 2012). Although PLS has been criticised for a lack of simulation studies validating the use of PLS in cases of small sample sizes or for null hypothesis significance testing (Ronkko and Evermann, 2013), such criticisms have been tested and refuted (Henseler et al., 2014).

4.3.3.2. Sampling Instruments

The quantitative research instrument was an online survey embedded within the first content module of an e-learning course. The survey included participant information and consent form, the survey questionnaire. The survey questionnaire included Schwartz's Portrait Values Questionnaire (PVQ5X) to measure values, and an adapted UTAUT2 questionnaire to measure adoption factors (Schwartz et al., 2012; Venkatesh et al., 2012). UTAUT2 items were scored on a 7-point Likert scale (1=*Strongly Agree*, 2=*Agree*, 3=*Slightly Agree*, 4= *Neutral*, 5=*Slightly disagree*, 6=*Disagree*, 7=*Strongly Disagree*) and coded prior to analysis so that a high score indicated positive perception of the adoption attribute. PVQ items were scored on a 6-point Likert scale (1=*Very much like me*, 2=*Like me*, 3=*Somewhat like me*, 4=*A little like me*, 5=*Not like me*, 6=*Not like me at all*) were coded before analysis such that a high score indicated high

portrait scoring on the latent value. Survey items are shown in Appendix 1: Survey Instruments**.**

4.3.3.3. Pilot Study

A pilot study of the survey instruments was conducted on a cohort of computer users in The Gambia (n=28) and in the UK (n=10) who had an operational need to access the computer user training used in this study. Participants were given access to the survey for 2 weeks. Two Gambian responses were discarded for incompleteness and the data was pooled. The pilot demonstrated that the survey deployment within the e-learning course worked as intended and produced data through the online survey, and that there were no particular infrastructural barriers in either country. Participants were given the option to comment on the survey, but no issues arose. While the sample size was too small to test the VETA model, the data was used to test that the UTAUT2 and Schwartz PVQ5X were performing as intended. Cronbach Alpha (Cronbach, 1951) was used in SPSS 22 (IBM Corp., 2013) as a measure of internal consistency. For the pooled pilot data, Cronbach Alpha coefficients for UTAUT2 constructs were above .7. For the Schwartz PVQ5X, Cronbach Alpha coefficients were tested in the 19-value, 10-value and 4-value configurations of the values continuum. Cronbach Alpha coefficients broadly followed the results reported by Schwartz *et al.* (Schwartz et al., 2012): coefficients were above .6 for the 19-value model, except for values of *face*, *benevolence-dependability*, and *self-direction* (both *thought* and *action* coefficients were above .55). The 10-value and 4-value model coefficients were all between .6-.9. While it was not possible to examine the structural model, the pilot had demonstrated that the survey instrument was operational. The data was discarded.

4.3.3.4. Participant Selection

The gap in the literature indicated analysis of a dataset including comparable African and Western organisations would provide sufficient material to answer the research question. Thirty health research centres operating in sub-Saharan Africa were approached (Kombe, 2015) of which three agreed to participate in the study: MRC Laboratories, The Gambia; MRC Uganda; KEMRI Wellcome Trust Research Programme. Four research organisations in the UK were approached, of which two agreed to participate (British Geological Survey and British Antarctic Survey).

Participating organisations were given an e-learning course relevant to their work (customised to their work from a core set of modules) and required to provide sufficient resource (a leading manager or officer to deploy the e-learning and be the focal point for local questions or ICT support) and support (endorsement for the e-learning course from senior management). These stipulations were made to ensure that the study did not fail due to lack of deployment. British Antarctic Survey deployed the research instrument but ultimately pulled out of the study due to lack of support resource. The survey was run in MRC Uganda, but the study was not continued to interview due to low sample size (n=23), instead the Uganda surveys were pooled with the Kenya sample to generate an East African sample (Table 8). Two additional courses with surveys were deployed in The Gambia as part of a repeated measures design but were discarded due to participant attrition.

4.3.3.5. Sample Size and Statistical Power

PLS convention for *a priori* sample size calculation is 10 times the maximum number of relationships on a latent variable (Hair et al., 2014). This means that a sample of 101 is sufficient to check 10 predictor relationships on a single variable. The VETA model can be treated as a 10-predictor model (seven adoption variables, plus four values dimensions). However, in addition to the *a priori* calculation, it is useful to conduct an additional test in G*Power (Faul et al., 2007; Faul et al., 2009), to reflect the complexity of the model[3]. Detectable effect sizes calculated in this way are shown in Table 4.

While the PLS output will indicate whether there is doubt in the path model (type II errors are indicated through test statistics and p-values), any significant findings below that which would be detectable through conventional methods must be approached with caution. G*Power is the preferred method of the SmartPLS development team[4]. A post-hoc minimum detectable effect size for the VETA model was calculated in G*Power 3.1 as shown Table 4, demonstrating that pooling data and running multi-

[3] There is no explicit reference for this approach other than the SmartPLS user forum, http://forum.smartpls.com/viewtopic.php?f=11&t=2974

[4] http://forum.smartpls.com/viewtopic.php?f=5&t=15528

group analysis (MGA) was preferable over analysing each cohort separately, to take advantage of the larger sample size and retain suitable experimental power (80%).

Table 4: Detectable Effect Sizes (f2, α=0.05, power=0.8, 10 predictors)

Group	Sample Size	Detectable Effect Size
UK	113	.16
Gambia	162	.11
East Africa	81	.22
Cross-Country Group	**353**	**.045**

4.3.3.6. Software, Data Analysis Procedures and Specifications

Survey data was analysed in Smart-PLS v3.2.6 (Ringle et al., 2015). The PLS algorithm was run in Mode A which is recommended for sample sizes over 100 and large expected R2 (Sarstedt et al., 2016). The statistical significance of path coefficients were evaluated using bootstrapping, completed using 500 samples while exploring the VETA model, using 4999 samples for the final data preparation, which is a convention based on the results being comparable with infinite bootstrapping without prohibitive processing time (Henseler, Hubona, et al., 2016). Bootstrapping generated path coefficients (β) with confidence intervals, p-values and t-values: for brevity, p-values are reported using the threshold $p<0.05$ as the threshold of statistical significance, accompanied with Cohen's f^2 as the measure of effect size (0.35=large; 0.15=medium; 0.02=small) (Cohen, 1988).

For each scale, Composite Reliability (CR) was used instead of Cronbach's α, preferred for testing internal consistency in PLS because it does not assume all variables are equally reliable (Cronbach, 1951; Nunnally, 1978; Nunnally and Bernstein, 1994; Hair et al., 2011), using a threshold of 0.7 to indicate a reliable variable (Field, 2005; Henseler, Hubona, et al., 2016). Convergent Validity was established firstly by checking that the outer loading was .7 or higher, and that the Average Variance Extracted (AVE) was above the threshold of .5 (Hair et al., 1998).

Items with outer loadings between .4 and .7 were considered for removal if doing so increased CR or AVE in the latent variable.

Discriminant validity was checked through: item cross-loading (an “order of magnitude” difference should be apparent, which approximates to a difference of 0.1 (Gefen and Straub, 2005)); the Fornell-Larcker criterion (Fornell and Larcker, 1981) and the Hetero-Trait Mono-Trait (HTMT) below a threshold value of 0.9 (Henseler et al., 2015). Variance Inflation Factors (VIF) below a threshold value of 4 were taken as an indication that multi-collinearity issues were not present (Menard, 1995; Hair et al., 1998; Rogerson, 2001; Pan and Jackson, 2008; Venkatesh et al., 2012). Multi-Group Analysis (MGA) was used to examine differences between country groups in the VETA model. Variance explained in the VETA model was assessed by the adjusted R^2 where the convention is .75=substantial; .5=moderate; .25=weak. The model fit criterion used was standardised root mean square residual (SRMR) (Henseler, Hubona, et al., 2016), with a threshold of 0.10 or below to indicate an acceptable model fit, with a more conservative threshold at 0.08 (Hu and Bentler, 1998; Henseler et al., 2014; Garson, 2016). Moderator analysis was conducted by PLS-Multi-Group Analysis (PLA-MGA) (Hair Jr et al., 2014). Using this approach the moderating effect of categorical demographic variables was analysed: age, gender, education and profession (Eberl, 2011).

4.3.3.7. Data Processing

4.3.3.7.1. Data Cleaning

Data was cleaned in SPSS Statistics for Windows Version 22.0 (SPSS 22) (IBM Corp., 2013). Following removal of duplicate entries, cases that were missing a whole page of the survey were removed; cases that had more than five item responses missing from either page of the survey were removed; variables were checked through “missing value analysis” in SPSS 22 to confirm that no variable had more than 5% missing data (a prerequisite for using mean replacement in PLS) (Hair et al., 2014). Responses with a standard deviation of 0 across either survey page were removed; responses from cases with standard deviation of less than 1.0 were examined visually to judge whether the responses could reasonably arise from a participant engaging with the questions. Outlier analysis was conducted to remove cases with a z-score over 3 (Tripathy, 2013).

The number of usable responses following data cleaning in this manner are shown in Table 8.

4.3.4. Qualitative Methodology

To answer research sub-question 2 (4.1) and understand the contextual differences that generate user perception of adoption factors, a qualitative approach is necessary to support survey-based validation, since survey data alone cannot provide the depth of data needed to answer the research sub-question. A qualitative approach allows a deeper understanding of the factors that are important to learners when considering e-learning in their social and physical context, as well as potential barriers in each context that would not be uncovered through technology adoption or values surveys, and provides insight into how the additional constructs of UTAUT2 expand, which has yet to be attempted in the literature. The remainder of this section details the qualitative methodology used in this study.

4.3.4.1. Choosing the Qualitative Method

To gain high value data at low cost, focus-groups and interviews are the most common methods in qualitative research (Milena et al., 2008). Since part of the investigation is about individual perceptions of influence from peers or other actors within the organisational setting, focus groups introduce the potential for bias from these peers and other actors: a method of eliciting individual perceptions without peer influence was needed. Because the population of fieldworkers in The Gambia and Kenya was likely to be geographically dispersed due to the nature of community health work, a group approach was also unlikely to be practicable.

The research question focussed on values as the core of culture, direct observation of the outer layers of the culture “onion”, such as customs and practises were not within the scope of this study, therefore ethnographic methods such as observation or participation were not considered. Similarly, multi-modal methods incorporating video or still-image data were not necessary in elucidating themes at the individual level. Since the interview purpose was to collect rich data exploring the themes from the quantitative part of the method, a semi-structured approach was taken, allowing the

freedom to probe participants on their perceptions of e-learning whilst retaining a data structure that allows post-analysis triangulation (Bernard, 1995).

4.3.4.2. Determining the Interview Sample

This section justifies the approach taken to determine the number and type of interview samples needed to answer the research question. Determining non-probabilistic sample sizes relies on the concept of theoretical saturation, but there are few guidelines for estimating adequate sample sizes (Guest et al., 2006). Thematic codes were generated theoretically from the literature (Braun and Clarke, 2006). Theoretical saturation (in terms of data redundancy or the point at which no new codes were generated) was not used as the method for estimating *a priori* sample size (Guest et al., 2006). Therefore, an alternative method of determining sample size was explored. Selecting respondents by age and gender gave a sample of four interviews to represent each country (Table 5). Based on discussions with local managers in each study location, an *a priori* estimate of the mean age was set as 30 years.

Table 5: Interview Design per Cohort

Participant number	**Gender**	**Age***	**Participation**
1	Male	Younger	Has completed e-learning
2	Female	Younger	Has completed e-learning
3	Male	Older	Has completed e-learning
4	Female	Older	Has completed e-learning
5	Male	-	Has not accessed e-learning
6	Female	-	Has not accessed e-learning

*Age: ‘Younger’ is below 30 years of age, ‘Older’ is over 30 years of age

To minimise potential selection bias and to control for environmental variables not tested directly by survey or interview, a comparison group of two non-participants per cohort was included. Therefore, six respondents stratified by age and gender (Davis, 1989; Venkatesh, Morris and Ackerman, 2000; Porter and Donthu, 2006; Hasan, 2010) were completed in each country group, to build a data corpus representative of the

study populations, as shown in Table 5 (Morse, 1994; Javidan et al., 2006; Bernard, 2011; Creswell, 2012). Across three countries, a total of 18 interviews were completed.

4.3.4.3. Determining the Interview Schedule

The interview method was used to elucidate contextual differences adoption factors. Since the technology deployed across contexts was constant, and *performance expectancy* was linked a priori to *social influence*, *price value* and *hedonic motivation*, perceptions of technology attributes were not included in the interview schedule. The areas of largest difference between cohorts could be uncovered by exploring *social influence*, *price value*, *hedonic motivation* and *habit*. To maximise efficiency in the method questions were posed around these four areas. Interview questions are shown in Appendix 2: Interview Questions.

Based on the literature, *social influence* could arise from organisational, peer and external routes. Following an open question about influence, these areas were explicitly investigated. For consumer attributes of *price value*, *hedonic motivation* and *habit*, interviewees were asked both directly about their perception of e-learning and indirectly about their evaluation of e-learning compared to learning without technology.

Questions were structured to elucidate participant's opinions on e-learning as well as their judgment of the benefits of e-learning compared with prior learning experience (Willig, 2013). Contrast questions (i.e. comparing e-learning to non-e-learning methods of training) were included to avoid a purely theoretical discussion on the esoteric perception of a technology, which could be biased on what the participant thought that the researcher wanted to hear. Questions were designed within the shared paradigm of adoption and values research: participants were assumed to have a sense of agency that allowed them to make decisions based on their perceptions of numerous external factors.

4.3.4.4. Pilot Study

A pilot study for the interview method was completed on three participants in The Gambia (two males, one female, all between 25 and 40 years old) with the purposes of testing: *a priori* coding categories; processes of interviewing, recording and transcribing; and processes of recruiting and consenting participants. Participants were selected by convenience. The pilot study allowed the main themes to be expanded into sub-themes to be used in the data reduction of the main study. The main findings of the pilot were that the process of recruiting, consenting, interviewing, recording and transcribing needed little change. Procedurally, it was clear that thirty-minute interviews were appropriate, but that fifteen minutes should be allowed either side of the interview for administration. The *a priori* coding scheme worked well, with some minor modification in sub-themes to avoid conceptual overlap. Following this pilot study, the interview data for these three participants was discarded.

4.3.4.5. The Instrument and the Approach

Study data was gathered per cohort as shown in Table 5. Local managers asked for volunteers in the participant categories in Table 5. To be eligible for interview, participants must have completed the e-learning course between 4 and 8 weeks prior to the date of the interview. To minimise travel, all interviews in each cohort were completed within a one-week period. The local manager in each country arranged an office for interviews to take place, and a waiting area for participants prior to interview. Participants were given the study information by email up to a week. Each room was quiet and private, facilitating uninhibited conversation. Study information included information about the research topic, risks and benefits of participating, anonymity, and data retention in compliance with the ethics approval in each country is shown in Appendix 3: Ethics Approvals.

From the participants that volunteered for interview, data was gathered in thirty-minute semi-structured one-to-one interviews with participants, as per the interview questions shown in Appendix 2: Interview Questions. Each interview was preceded with approximately 15 minutes of introduction to the researcher and the study, to allow the interviewees to re-familiarise themselves with the study information that they had seen in advance, and to allow for questions about the study. Following this discussion,

interviewees completed a consent form and the interview began. The semi-structured interview questions were preceded by a brief introduction from the interviewee, where they were asked demographic information and for a brief description of their job.

Interviews were recorded as .wav files (192kbps) using two ALS-807903 8Gb Digital Stereo USB Recorders, one as a primary recorder and one as a backup. Following each interview, a further few minutes were allowed for the participant to ask any further questions of the researcher, about the study or about e-learning in general. Following the departure of each interviewee from the interview room, recorded audio files were transferred to an encrypted laptop and backed up on an encrypted hard drive in preparation for the next interview. Although each recorder potentially held up to 20 interview files, each file was transferred to a resilient, secure, encrypted storage device immediately following the interview. Transcription of audio files was outsourced (UK Transcription) using the 'intelligent' verbatim method (where 'ums' 'ahs' are not transcribed) (McLellan et al., 2003). Transcripts were proof-read by the researcher and then coded per the data reduction method described next.

4.3.4.6. Thematic Coding Process

A priori categories (and subcategories) were developed from predictors in UTAUT2, treating each predictor as a theme (DeSantis and Ugarriza, 2000): performance expectancy (useful, increases productivity, facilitates work); effort expectancy (easy to use, easy to access); social influence (friends support, peer influence, manager support, director support); facilitating conditions (organisational support, electricity, internet, device, work time); habit (routine, ritual); hedonic motivation (fun, enjoyable, interesting, visually stimulating); price value (worth, benefit, value) (Namey et al., 2008). These categories were tested on pilot data as described in 4.3.4.4 to generate the manual shown in Appendix 4: Coding Scheme.

Data was coded in NVivo 10. A node hierarchy was created corresponding to the coding manual; data sources were imported as text files into NVivo; data sources were classified by demography as in Table 5; each transcript was read through for consistency with the audio file; text was selected in the main window and coded under

existing nodes in the node hierarchy; each excerpt was assigned first, second and third cycle codes at one time.

Following initial structural coding, second-cycle focussed coding was used to summarise data into themes according to the *a priori* categories and elicit the most useful data categorisation to support the VETA model (Saldaña 2010, Ch.3), with new sub-categories created as required by the data (Harding 2013, Ch.5). Third-cycle coding was employed to differentiate between positive and negative factors, where positive factors were classified as those that enabled technology use. Thematic coding was used within NVivo 10 (QSR, 2012) to assign data excerpts to the node classification shown in Appendix 4: Coding Scheme. For example, a node hierarchy of "social influence/peer influence/positive" involved positive messages about technology use from the interviewee's peer group; a code of "facilitating condition/network/negative" involved the interviewee stating that network outages prevented them from using the technology.

4.3.4.7. Coding Reliability

To ensure reliability in the coding process an inter-rater reliability was calculated using the process described here. A second rater was used to independently code 20% of the interview data corpus. The second rater (Rater B) was selected on ability (the person has experience handling text data) and attitude (there was no power dynamic between the rater and the researcher that discouraged the person from raising disagreements). The second rater was trained to deploy the coding manual that had been generated by the researcher (Rater A). This training included: an initial 2-hour meeting to discuss the study and the meaning of the primary, secondary and tertiary codes used in the three-cycle coding method; the procedure of coding in three cycles; and some discussion about how to resolve disagreements in coding. Following initial training, coding of five example unitised data excerpts was demonstrated to Rater B and a further five example excerpts were coded by Rater B under the supervision of Rater A.

To generate a test sample of approximately 20% of samples, four interview transcripts were selected randomly from the main data corpus to test the reliability of the coding manual. Transcripts were unitised into sentences and paragraphs that corresponded to codes in the three-cycle process outlined in the previous paragraph. This ensured that there would be no inter-rater variation in sentence or paragraph length (Cohen et al., 2007; Campbell et al., 2013). This process gave a test sample of 100 unitised data excerpts to assign under the coding scheme as a test sample, approximating between 21 and 27 excerpts per interview. Demographic information and information relating to the interview process was removed from transcripts to preserve anonymity. Rater B was given 7 days to code the test sample using NVivo 10, while Rater A independently coded the same interviews. Upon completion the raters convened to discuss any disagreements in coding and to come to consensus about them, either to come to agreement or to retain disagreements. Once both raters had agreed their respective final coding of the test sample the files were merged in NVivo 10 and the inter-rater coefficient calculated using Cohen's Kappa as the coefficient of reliability (where Kappa above 0.75 indicates excellent reliability).

Cohen's Kappa was chosen over other measures of inter-rater reliability because: it is more rigorous than methods such as simple percentage agreement that do not consider chance agreement (Krippendorff, 2004); it applied to the scenario of two raters unlike Fleiss's Kappa and Krippendorff's Alpha (Hayes and Krippendorff, 2007; Gwet, 2011) and it was easily available within NVivo 10. For the test data of 100 excerpts there was agreement between the two raters (noted as raters A and B), with an overall Kappa coefficient for the test sample of 0.97 (generated within NVivo 10), indicating excellent reliability in the coding scheme. The average Kappa for each variable across the test sample was in the range 0.9-1, which demonstrated minor variation in reliability across variable codes. Following inter-rater reliability testing the four test interviews were re-incorporated into the main data corpus. During the rater discussions two minor alterations were made to the coding scheme. Firstly, to expand the code for habit/prior experience to include prior ICT experience in general; secondly to remove the use of personal time from facilitating conditions/time due to overlap with price value/time. Following the inter-rater reliability exercise, the remainder of the interviews were coded by Rater A using the finalised

coding scheme. To correct for minor alterations in the coding scheme following the reliability exercise, all interviews were re-examined for the corrected coding scheme.

4.3.4.8. Non-Participants

To determine whether there was bias in the interviews arising from selection of participants from a pool of people who had engaged with an e-learning intervention, in each cohort two interviews were completed with participants who had chosen not to access the course. This gave a group of non-participants who had not been exposed to the e-learning or the survey. While their interview responses to the structured questions are reported in the results section alongside other interviews, each non-participant was asked why they had chosen to not participate in the e-learning course, with the option of not answering the question if they chose not to.

4.3.5. Chapter Summary

This chapter justifies the choice of mixed method design within the ontological and epistemological assumptions of the researcher's worldview, to gather a data corpus that is both: of sufficient size to determine the overall influence of values on adoption; and of sufficient depth to uncover contextual differences in the perception of adoption. This chapter justifies the choice of survey methodology to validate the VETA model and interview methodology to support the survey method and to understand contextual differences between cohorts in the UK and sub-Saharan Africa. This chapter details the method of data collection for both aspects of the design: the process of gathering online survey data; and the process of gathering interview data. This chapter detailed data management procedures employed reduce the data for analysis: ensuring clean, reliable and valid survey data. Finally, the protocols for data analysis were described: coding interview data; and using partial least squares structural equation modelling to analyse survey data. The next chapters present the results from the described data collection and analysis method.

5. Results: Survey Data

The research question concerns the influence of values on adoption. This chapter presents the quantitative data relevant to the relationship between values and adoption in the proposed VETA model (Figure 13). This chapter is structured in five sections. Firstly, data from the cross-country model is presented comparing the implementation of the survey across East Africa, The Gambia and the UK. Following demographic information and descriptive statistics, the survey findings are presented: findings from the UTAUT2 part of the structural model are presented (section 5.3 and section 5.4) followed by findings from the influence of values on the UTAUT2 part of the model (section 5.5), and examination of indirect effects in the VETA model (5.6). Group differences between country, age, gender and professional groups are reported by multi-group analysis.

5.1. Demographic Information and Descriptive Statistics

The pooled sample included data from all cohorts at their initial exposure to the research instrument (e-learning and survey). The pooled sample contained more males (65.7%) than females (Table 6). While the UK and East African samples were more balanced in terms of gender (56.1% and 58.0% male respectively) the Gambian sample was approximately three-quarters (77.2%) male yielding a gender imbalance in the pooled sample[5]. The age range of the population across the African cohorts was similar, with over 80% of participants (86.9% in The Gambia, 93.7% in East Africa, and 81.3% in the pooled sample) of participants falling between the ages of 25 and 50. The UK sample was slightly more widely distributed, with more participants over the age of 50 (Table 6). Therefore, because each country sample was predominantly homogeneous with respect to nationality, the sample was assumed to be arguably representative of worker populations in the study contexts.

[5] The national population of The Gambia is 50.6% female (United Nations, 2017)

Table 6: Demographic information

		The Gambia (n=160)		UK (n=113)		East Africa (n=80)		Pooled (n=353)	
		n	%	n	%	n	%	n	%
Gender	Male	125	77.2	63	56.1	47	58.0	232	65.7
	Female	37	22.8	50	43.9	34	42.0	121	34.3
Age	Under 25	6	3.7	2	1.8	0	0	8	2.3
	25-29	31	19.1	7	6.1	19	23.8	57	16.2
	30-34	33	20.4	20	17.5	26	32.5	79	22.4
	35-39	29	17.9	13	11.4	18	22.5	58	16.5
	40-44	19	11.7	20	17.5	8	10.0	46	13.1
	45-49	27	16.7	16	14.0	4	5.0	47	13.4
	50-54	11	6.8	9	7.9	3	3.8	23	6.5
	55-60	6	3.7	16	14.0	2	2.5	24	6.8
	Over 60	0	0	10	9.6	0	0	10	2.8
Nationality	UK	1	0.6	103	91.2	2	2.5	106	30.2
	Gambia	141	88.1	-	-	-	-	139	39.6
	Kenya	-	-	-	-	64	79.0	64	18.2
	Uganda	-	-	-	-	15	18.5	15	2.8
	Other*	19*	10.7	10	8.8	-	-	29	8.1

* Missing country data = 2. Across the UK and Gambian cohorts 10 participants were from Nigeria

The Gambian and UK populations included 8.8-10.7% of participants of non-native nationalities (Table 6), which were retained as the study intended to generate a heterogeneous values continuum from pooled homogeneous groups and retaining sample diversity supported this end. The different nationalities in the UK and Gambian samples were local to the sample: the UK sample included other European participants; the Gambian sample included other West African participants. The East African sample included Ugandan and Kenyan participants only.

The mean responses and standard deviations for each construct in each country and the pooled data are shown in Table 7 and in Figure 14. Figure 14 shows the mean response as a line graph with standard deviation as the vertical error bars.

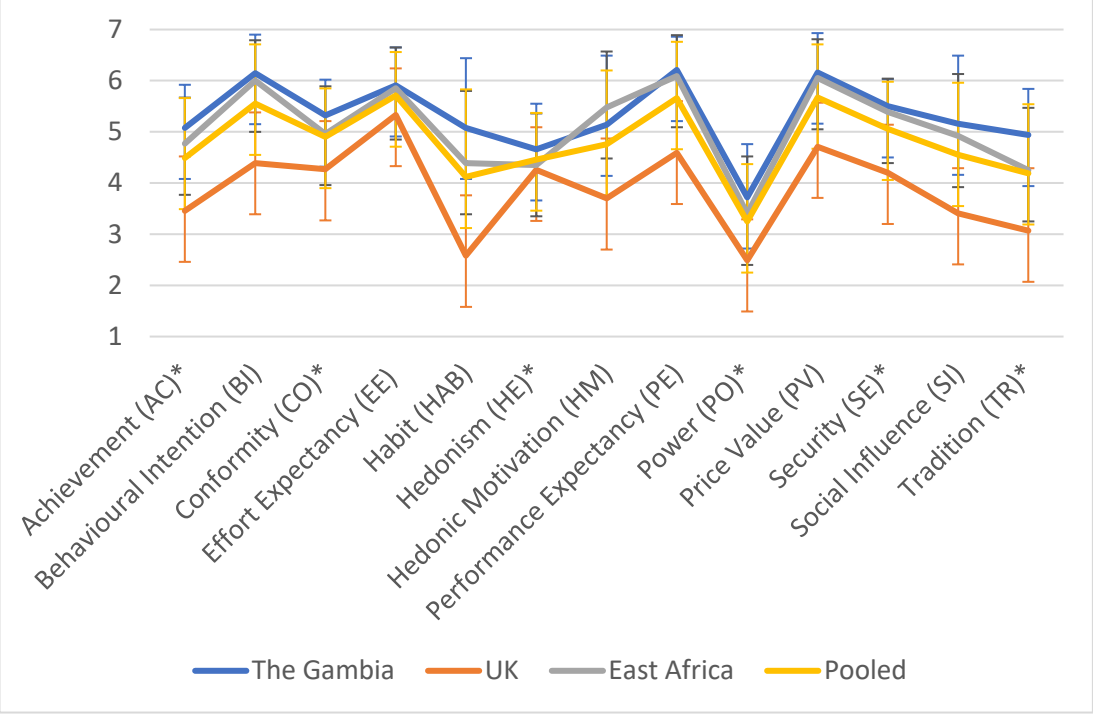


Figure 14: Mean survey responses, all country groups and pooled data

Table 7: Descriptive Statistics for cross-country data

		The Gambia		UK		East Africa		Pooled	
	Items	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Achievement (AC)*	2	5.08	0.84	3.46	1.06	4.77	0.90	4.49	1.17
Behavioural Intention (BI)	3	6.15†	0.75	4.39	0.99	6.00†	0.79	5.55	1.16
Conformity (CO)*	3	5.32	0.70	4.27	0.94	4.96	0.93	4.90	0.95
Effort Expectancy (EE)	5	5.91†	0.74	5.33	0.91	5.85†	0.80	5.71	0.85
Habit (HAB)	3	5.08	1.36	2.58	1.18	4.39	1.41	4.12	1.71
Hedonism (HE)*	4	4.66	0.89	4.26‡	0.83	4.35	1.01	4.46	0.91
Hedonic Motivation (HM)	2	5.14†	1.35	3.70	1.17	5.48†	1.09	4.76	1.44
Performance Expectancy (PE)	3	6.21	0.65	4.59	1.01	6.09	0.80	5.66	1.10
Power (PO)*	4	3.72	1.04	2.49	0.80	3.40	1.12	3.25	1.12
Price Value (PV)	3	6.16†	0.77	4.71	0.86	6.05†	0.76	5.67	1.04
Security (SE)*	4	5.50†	0.53	4.20	0.94	5.39†	0.65	5.06	0.92
Social Influence (SI)	6	5.16†	1.33	3.41	0.88	4.92†	1.21	4.55	1.41
Tradition (TR)*	3	4.94	0.90	3.07	1.22	4.25	1.22	4.19	1.35

*Schwartz Values, indicated on a 6-point scale. All other items are from UTAUT2 and are indicated on a 7-point scale. † means between African groups were significantly different, means between UK and African groups were not significantly different (tested through an ANOVA procedure in SPSS 22, with between-groups tests conducted via Tukey HSD, Bonferroni post-hoc tests. Both post-hoc tests gave the same result). ‡ means between UK and both African groups were significantly different tested as with †

Although the means were, for some variables, generally lower for the UK and generally higher for the African groups, the overall pattern of mean responses was similar between groups. Similarly, standard deviations were broadly comparable with responses across groups, giving confidence that a mean-centred approach was appropriate to elucidate the VETA model (Schwartz, 2006b; Hair et al., 2014)**.** Data were pooled to take advantage of a greater sample size. The descriptive data in Table 7 and Figure 14 showed a similar acceptance profile from African learners, displaying high *performance expectancy*, *effort expectancy*, *price value* and *behavioural intention*; intermediate *social influence*, *hedonic motivation* and *habit*. UK responses were lower across all variables except *effort expectancy*, which was comparable to the African responses. There was little difference in the responses from African respondents except for *habit* and *tradition*, with lower responses coming from East African respondents.

5.2. The Measurement Model

5.2.1. Data Grouping

Data was pooled into a single cross-country dataset as shown in (Table 8), where usable responses are given as a percentage of total responses. Uganda and Kenya cohort sample sizes were too small for separate analysis, so were combined to yield an East Africa group. The response rate is given after data cleaning *(Usable Responses*). Raw datasets combined as shown in were saved as .csv data files, readable by SPSS 22 and SmartPLS.

Table 8: Cohorts and responses

Country	**Total Responses**	**Usable responses**
UK	149	113 (75.8%)
Gambia	238	160 (56.5%)
East Africa – Uganda	23	15 (65.2%)
East Africa – Kenya	73	65 (89%)
Total	**483**	**353 (73.1%)**

Sample size, model fit and variance explained for groups for the VETA model (Figure 13) is shown in Table 9. Each country group was of sufficient sample size to test the model, except the East African group, which had a higher detectable effect size (below which path coefficients in multi-group analysis were not significant) shown in Table 4 (Henseler, Hubona, et al., 2016). For all country groups, the standardised root mean square residual (SRMR) was close to 0.08, below both conservative (0.08) and more lenient (0.10) accepted thresholds, indicating an acceptable model fit (Table 9). For each group, the variance explained in the dependent variables of the VETA model were also broadly comparable, indicating that it was worth proceeding with the testing of measurement invariance (5.2.2). The variance explained in *social influence* was higher in African countries, indicating there may be contextual differences in this construct. In summary, all groups and the pooled data were progressed to the measurement model.

Table 9: Model Fit and Variance Explained

Group		**N**	**Adj. R^2 BI**	**Adj. R^2 PE**	**Adj. R^2 HM**	**Adj. R^2 PV**	**Adj. R^2 SI**	**SRMR**
	Pooled	353	.736	.654	.110	.270	.356	.070
Country	East Africa	80	.641	.602	.123	.032	.220	.070
	Gambia	160	.530	.477	.051	.055	.176	.076
	UK	113	.517	.416	.042	.006	.043	.083

BI=Behavioural Intention, PE=Performance Expectancy, HM=Hedonic Motivation, PV=Price Value, SI=Social Influence, SRMR=Standardised Root Mean Square Residual

Table 9 answers research sub-question 3 in section 4.1, by demonstrating the explanatory power of the VETA model. The data showed that the VETA model performed similarly in both UK and Gambian cohorts, explaining 52-64% of the variance in *behavioural intention* in each country-group sample and 74% of the variance in *behavioural intention* in the pooled sample, comparable with UTAUT2 (Venkatesh et al., 2012). The variance in *performance expectancy* explained by second-order construct relationships was 42-60% each country-group sample and 65%

of the variance in *performance expectancy* in the pooled sample. The variance in *social influence* explained by values was 4-22% each country-group sample and 36% of the variance in *social influence* in the pooled sample. The variance in *price value* explained by value construct relationships was 1-6% each country-group sample and 27% of the variance in *price value* in the pooled sample. The variance in *hedonic motivation* explained by value construct relationships was 4-12% each country-group sample and 11% of the variance in *hedonic motivation* in the pooled sample. The influence of values on the VETA model explained some of the variance in *social influence*, *price value* and *hedonic motivation*. Although values may explain part of the variation in *performance expectancy*, there is also a predictive relationship from *social influence*, *price value* and *hedonic motivation*. Values therefore increased the explanatory power of the VETA model compared with UTAUT2 through indirect influence on *behavioural intention* to use e-learning. However, the power of the VETA model in explaining variance in *behavioural intention* was not improved compared to UTAUT2. Table 9 therefore answers one objective of the study: t*o estimate the increase in explanatory power over UTAUT2 by incorporating the influence of values on the model.*

5.2.2. Invariance Testing

To investigate whether the VETA model was equivalent across countries, invariance testing was completed (Vanderberg and Lance, 2000; Rigdon et al., 2010; Becker et al., 2013; Garson, 2016). All data had undergone the same data processing described in 4.3.3.6, and the same structural model was applied. The process of ensuring the model was equivalent in each country group and the pooled data was: the PLS algorithm was run on the data for the three country groups and the parameters of composite reliability (CR), Average Variance Extracted (AVE), hetero-trait mono-trait (HTMT) divergent validity, Variance Inflation Factors (VIFs) in the inner and outer models were compared against thresholds described in 4.3.3.6. Items falling outside these thresholds were considered for removal, the PLS algorithm was re-run and the process repeated until the model was stable. After several iterations of this process, the values within the hypothesised dimensions (*conformity*, *security*, *tradition*, *power*, *achievement* and *hedonism*) were all represented by more than two variables with sufficient psychometric properties across all three groups. This process allowed values to be partitioned to produce a model that applied in the same way across all countries,

shown in Figure 15. Measurement invariance was confirmed through the MICOM procedure (Henseler, Ringle, et al., 2016) indicating that the data could be pooled.

5.2.3. Overview of the Structural Model

Having described the sample, the descriptive statistics and the psychometric properties of the data, the remainder of this chapter reports the results of the VETA model for the cross-country data as shown in Figure 16. The VETA model is reported in two sections: the core UTAUT2 model (direct paths in 5.3 and indirect paths in 5.4); and the influence of values on that model (5.5). Following consideration of the two parts of the model, indirect effects for the whole model are shown (5.6). As described in 4.2, the model includes the influence of conservation values (*conformity*, *tradition* and *security*); self-enhancement values (*achievement* and *power*); and a single openness-to-change value (*hedonism*). Figure 16 shows the structural model indicating the path relationships between values (orange) and the UTAUT2 model (blue and purple). Path coefficients are shown in Figure 16 with p-values shown in parentheses along the paths between latent variables. Paths significant at the $p<0.05$ level are bold. Path model results for data are also presented in a tabular form as β_p (Pooled) alongside multi group analyses for ease of comparison (Table 11, Table 12 and Table 13). The remainder of this chapter details the paths in the structural model that meet the criteria for significance described in the previous chapter, using judgement to note where non-significant paths contribute to the findings, to ascertain where values have an influence on the model.

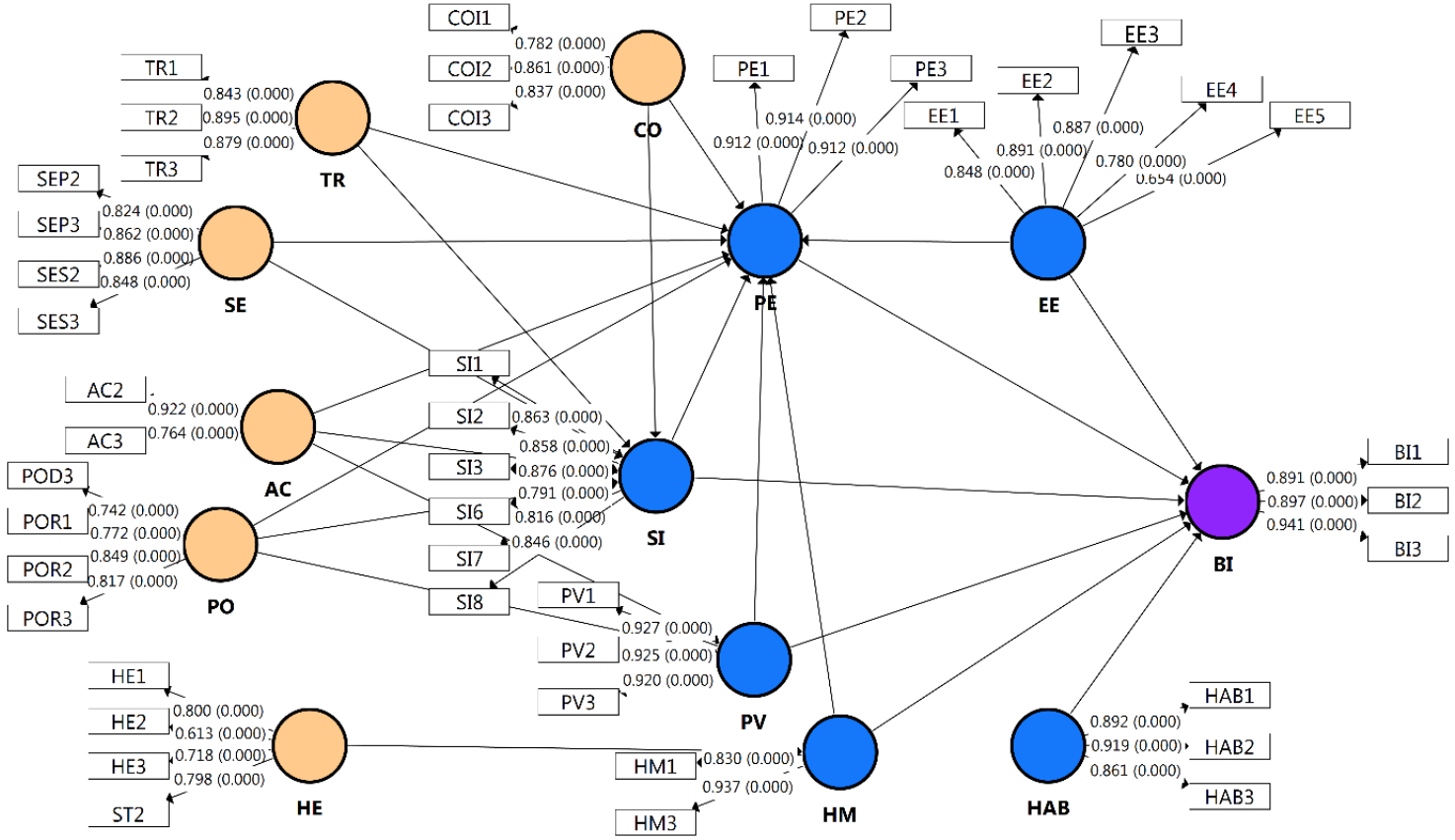


Figure 15: VETA Measurement Model, pooled sample data

Legend:

AC=Achievement;

BI=Behavioural Intention;

CO=Conformity;

EE=Effort Expectancy;

HAB=Habit;

HE=Hedonism;

HM=Hedonic Motivation;

PE=Performance Expectancy; PO=Power;

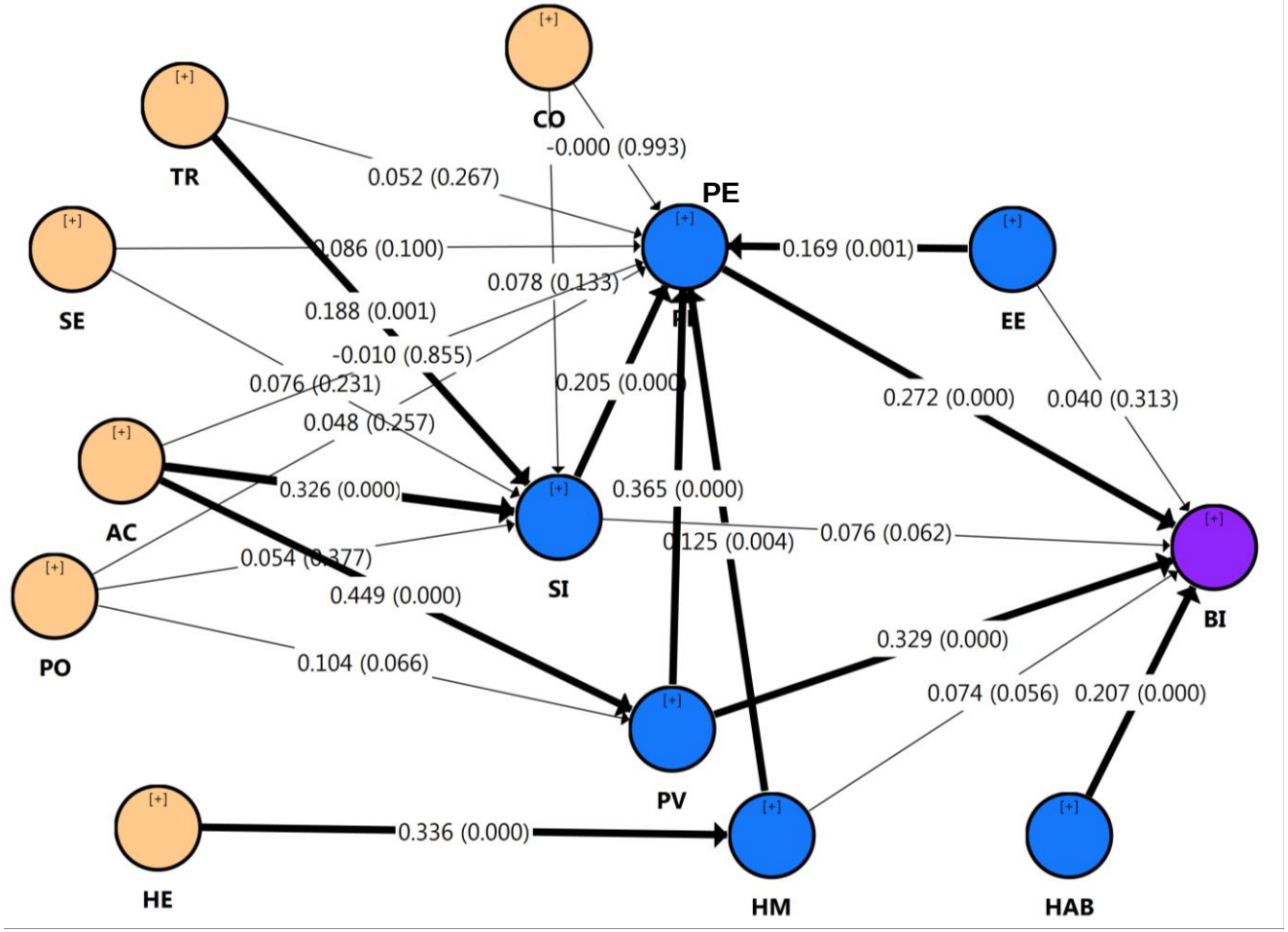
PV=Price Value;

SE=Security; SI=Social Influence, TR=Tradition.

Blue= UTAUT2 predictor;

Orange=Value.

Item loadings are shown with p-values in parentheses



Key:

AC=Achievement; BI=Behavioural Intention; CO=Conformity; EE=Effort Expectancy; HAB=Habit; HE=Hedonism; HM=Hedonic Motivation; PE=Performance Expectancy; PO=Power; PV=Price Value; SE=Security; SI=Social Influence. Blue= UTAUT2 predictor; Orange=Value.

Legend: Significant paths are bold. Values on path lines indicate standardised path coefficients; values on path lines in parentheses indicate the p-value for the path coefficient.

Figure 16: VETA Structural Model, pooled sample data

Table 10 shows the effect sizes corresponding to the path coefficients shown in Figure 16. The dependent variables in Figure 16 are shown across the top rows of Table 10, and the independent variables are shown down the remaining rows, with the effect sizes between variables shown in the bulk of the table. The finding with the greatest practical significance for the VETA model (for the pooled sample) is that *price value* (PV) showed a medium significant effect on both *performance expectancy* (f^2(PV-PE)=0.162, p=0.008) and *behavioural intention* (f^2(PV-BI)= 0.150, p=0.007) to use e-learning. Although *behavioural intention* was also predicted by *habit* and *performance expectancy*, the effect sizes were small (f^2(HAB-BI)=0.067, p=0.038; f^2(PE-BI)=0.096, p=0.020). *Performance expectancy* was also predicted by *social influence* with a small effect (f^2(SI-PE)=0.066, p=0.031). Examining the influence of values on the adoption model showed the strongest influence of the value of *achievement* with a medium effect on price value (f^2(AC-PV)=0.162, p<0.001), and with a small effect on *social influence* (f^2(AC-SI)= 0.072, p=0.039). The value of *hedonism* had an effect on *hedonic motivation* that approached the medium effect size threshold (f^2(HE-HM)=0.138, p<0.001). Although there were other paths that showed a statistically significant effect in terms of the path coefficient, the effect sizes were small as shown in Table 10**.** These paths will be discussed further in the main results data shown in sections 5.3 to 5.5.

There was no direct influence of these values on learner perception of usefulness. Although the overall model is useful in the context of the research question, there may be important differences between groups that affect the generalisability of the model. In sections 5.3 to 5.5, the nuances of country and demographic variation on the direct (5.3) and indirect/non-significant (5.4) predictors of *behavioural intention* in the UTAUT2 part of the structural model will be reported, followed by the influence of values on the structural model (section 5.5). Indirect effects for the whole VETA model are shown in 5.6.

Table 10: Effect Sizes of Paths in the Cross-Country Structural Model (Cohen's f2)

	Dependent Variables as shown in Figure 16				
Independent Variables as shown in Figure 16	**Behavioural Intention (BI)**	**Hedonic Motivation (HM)**	**Performance Expectancy (PE)**	**Price Value (PV)**	**Social Influence (SI)**
Achievement (AC)	-	-	0.004	**0.162*** **	**0.072***
Conformity (CO)	-	-	0.003	-	0.009
Effort Expectancy (EE)	0.009	-	0.064	-	-
Habit (HAB)	**0.067***	-	-	-	-
Hedonism (HE)	-	**0.138*** **	-	-	-
Hedonic Motivation (HM)	0.014	-	0.027	-	-
Performance Expectancy (PE)	**0.096***	-	-	-	-
Power (PO)	-	-	0.006	0.012	0.006
Price Value (PV)	**0.150****	-	**0.162****	-	-
Security (SE)	-	-	0.009	-	0.004
Social Influence (SI)	0.011	-	**0.066***	-	-
Tradition (TR)	-	-	0.008	-	0.032

†p<0.1; *p<0.05; **p<0.01, ***p<0.001; Effect sizes significant at p<0.05 AND above the threshold for detection at this sample size are highlighted in **bold**. All other relationships are non-significant.

5.3. Direct Predictors of Behavioural Intention in the VETA model

The constructs in Figure 16 that influenced *behavioural intention* in the pooled data are discussed in this section, presented in the order that they were added to the UTAUT2 literature as described in the literature review (2.1). Path coefficients and p-values for the pooled data shown in Figure 16 are included in the right-hand columns (as β_P (Pooled)) of Table 11, Table 12, and Table 13 for ease of comparison with the multi-group data.

5.3.1. Performance Expectancy

Performance expectancy predicted *behavioural intention* in the cross-country pooled data with a significant but small effect according to Cohen's thresholds (Cohen, 1988) described in the previous chapter (Table 10, β(Pooled)=0.272, P<0.001; f^2=0.096), such that learners intended to use e-learning where it was perceived as useful in achieving their goals (Figure 16). Multi-group analysis showed that the path (Table 11, PE->BI) was significant and positive in The Gambia (β=0.169, p=0.042, f^2=0.039) and the UK (β=0.236, p=0.006, f^2=0.080), but not significant in the East African sample (β=0.171, p=0.159), yet the difference between the groups was not significant (Table 11). The influence of *performance expectancy* on *behavioural intention* did not differ with age, gender, education or profession (Table 12 and Table 13). Finding: *performance expectancy* predicted *behavioural intention* to use e-learning across country and demographic groups except in East Africa. Hypothesis: *performance expectancy* predicts *behavioural intention* – supported in the pooled data, UK and The Gambia groups and across demographic groups.

5.3.2. Price Value

In the cross-country pooled data, *price value* (PV) predicted *behavioural intention* (BI) such that learners intended to use e-learning where it was perceived as worth the effort that they perceived they needed to contribute towards use (Figure 16**,** Table 10, β=0.329, p<0.001; f^2=0.150). The influence of *price value* on *behavioural intention* (PV->BI) was positive and significant across all countries (Table 11), supporting the generalizable finding that learners in research organisations make decisions to adopt e-learning based on the perceived costs and benefits of using e-learning technology.

Table 11: Country Differences in the Cross-Country Dataset

	β (Gambia)	β (UK)	β (E.Africa)	Δβ (UK vs Gambia)	Δβ (E.Africa vs Gambia)	Δβ (UK vs E.Africa)	β_P (Pooled)
EE -> BI	-0.040	**0.208****	0.007	**0.256***	0.039	*0.217†*	0.040
EE -> PE	**0.252****	0.092	**0.538*****	0.162	**0.313***	**0.474****	**0.169****
HAB -> BI	**0.261****	**0.216****	0.155	0.054	0.112	0.059	**0.207*****
HM -> BI	0.019	0.046	**0.338*****	0.033	**0.340*****	**0.307****	*0.074†*
HM -> PE	0.051	**0.210***	0.068	0.155	0.023	0.132	**0.125****
PE -> BI	**0.169***	**0.236****	0.171	0.067	0.003	0.064	**0.272*****
PV -> BI	**0.360*****	**0.258***	**0.276***	0.102	0.087	0.015	**0.329*****
PV -> PE	**0.370*****	**0.300*****	0.164	0.078	0.229	0.151	**0.365*****
SI -> BI	0.103	0.050	0.075	0.051	0.028	0.023	*0.076†*
SI -> PE	0.124	**0.329*****	**0.244***	*0.227†*	0.119	0.108	**0.205*****

*For individual group path coefficients (β), the test is one-tailed and therefore the significance thresholds are: †p<0.1; *p<0.05; **p<0.01, ***p<0.001; all other relationships are non-significant. Path coefficients significant at p<0.05 are shown in* ***bold****. Path coefficients significant at 0.1<p<0.05 are shown in* italics*. For multi-group analysis (Δβ), the test is two-tailed, and therefore the significance thresholds are: †p<0.05; *p<0.025; **p<0.005, ***p<0.0005; all other relationships are non-significant. Path coefficients significant at p<0.025 are shown in bold.*

Multi-group analysis showed that the influence of *price value* on *behavioural intention* to use e-learning was positive in the pooled cross-country data, in all three country groups (Table 11), and that path was not moderated by age, gender, education or profession (Table 12 and Table 13). Finding: *price value* predicted *behavioural intention* to use e-learning across all groups. Hypothesis: *price value* predicts *behavioural intention* – supported in the pooled data, and in all country groups, without moderation by demography.

Price value (PV) also predicted *performance expectancy* (PE) in the pooled data with a medium effect (Figure 16, Table 10, $\beta=0.365$, $P<0.001$; $f^2=0.162$). The link between *price value* and *performance expectancy* (PV->PE) was positive and significant in The Gambia and UK but not in East Africa. There was no significant group difference between East Africa and other country groups, indicating that the lack of a significant path in the East African group might be explained by the lower sample size in this group. The path of *price value* on *performance expectancy* (PV->PE) was not moderated by age, gender or profession. The difference between education groups was not significant at $p<0.025$ for a two-tailed test (Table 13**,** $\Delta\beta=0.234$, $p=0.044$), because the path coefficient for postgraduates was positive and approached significance at the $p<0.05$ level (Table 13**,** $\beta=0.203$, $p=0.063$), while the path for graduates was significant (Table 13, $\beta=0.437$, $p<0.001$) indicating that the path could be considered as positive and across education groups without any moderating effect. Finding: *price value* predicted learner perception of the performance of e-learning across groups. Hypothesis: *price value* predicted *performance expectancy* – supported in the pooled data, in The Gambia and UK, and across demographic groups except for postgraduates.

5.3.3. Habit

Habit influenced *behavioural intention* in the pooled cross-country data with a small, significant effect (Table 10, Table 11, $\beta(\text{Pooled})=0.207$, $p<0.001$; $f^2=0.067$), such that learners intended to use e-learning when they regularly or automatically used e-learning or online methods of learning already. The effect was present in the UK and The Gambia but not in the East African group. This path was significant across all groups (age, education, profession, male gender) except for females producing a

significant gender difference (Table 12**,** Δβ[Male/Female]=0.206, p=0.021). Finding: *habit* predicted *behavioural intention* to use e-learning across all groups except for female workers and East African workers.

5.4. Indirect or Non-Significant Predictors of Intention in the VETA model

5.4.1. Hedonic Motivation

Hedonic motivation had no direct relationship with *behavioural intention* (HM->BI) in the pooled cross-country data (Table 11). There was a significant difference between country groups such that East African participants intended to use e-learning because they perceived it to be interesting or enjoyable (Table 11**,** β=0.352, p<0.001; Δβ [E.Africa/Gambia]=0.340, p=0.001; Δβ[UK/E.Africa]=0.307, p=0.005), in contrast to The Gambia and UK groups where the path was non-significant. This path was not moderated by gender or education, and, although *behavioural intention* was only influenced by *hedonic motivation* for younger participants (Table 12) and fieldworkers (Table 13). The difference between professional groups was not significant in a two-tailed test, but there was a significant difference between age groups (Table 12**,** Δβ=0.182, p=0.008). Finding: *hedonic motivation* only predicted *behavioural intention* to use e-learning for younger workers and East African workers. Hypothesis: hedonic motivation predicts behavioural intention – not supported in the pooled data.

Similarly, *hedonic motivation* did not uniformly predict *performance expectancy* (HM->PE) across countries, having a significant path in the pooled data and the UK group only (Table 11, β=0.206, p=0.016) but not in the African groups, such that UK participants perceived e-learning as more useful in assisting with their performance goals where it was interesting or enjoyable. The influence of *hedonic motivation* on *performance expectancy* differed for age , gender, education and profession groups such that the path was significant for female (Table 12, β=0.237, p=0.015), older **(**Table 12, β=0.125, p=0.034), postgraduate (Table 13, β=0.240, p=0.012) and non-fieldworker occupations (Table 13, β=0.156, p=0.006). However, the between-groups differences for demographic variables did not show any significance, as the alternative age and gender groups (male, younger) showed positive paths approaching significance. The fieldwork and lower-education groups showed no link between *hedonic motivation* and

performance expectancy, and it should be noted that there is a degree of conceptual overlap in these group definitions, since fieldworkers are not graduates. Finding: *hedonic motivation* only predicted *performance expectancy* of e-learning for UK workers and specific demographic groups. Hypothesis: *hedonic motivation* predicts *performance expectancy* – not supported.

5.4.2. Effort Expectancy

Effort expectancy did not predict *behavioural intention* (EE->BI) in the pooled cross-country data, acting instead via *performance expectancy* (Figure 16). *Effort expectancy* had no direct influence on *behavioural intention* for the African countries, only for the UK (Table 11, β=0.210, p=0.005), with a significant difference between The Gambia and the UK (Table 11**,** Δβ[UK/The Gambia]=0.256, p=0.012) and a difference approaching significance between East Africa and the UK (Table 11**,** Δβ[UK/E. Africa]=0.217, p=0.045). Learners do not intend to use e-learning just because it is easy to use, but perceive it as more useful where it is easy to use. Although there was no influence in the pooled data, *effort expectancy* was a consideration for females (Table 12, β=0.127, p=0.020). While the path for fieldworkers was not noteworthy alone (Table 13, β=-0.133, p=0.079), the direction of influence was negative, notable by the significant group difference between professions (Table 13, Δβ[FW/non-FW]=0.227, p=0.006). Finding: *effort expectancy* only predicted *behavioural intention* to use e-learning in the UK group and for females but not in the pooled data or African groups. Hypothesis: *effort expectancy* predicts *behavioural intention* – not supported.

Effort expectancy predicted *performance expectancy* (EE->PE) in the African groups but not in the UK, with a significant group difference between East Africa and UK (Δβ[UK/East Africa]=0.474, p=0.004), and approaching significance between The Gambia and East Africa (Δβ[The Gambia/East Africa]=0.313, p=0.041). There was a significant overall effect in the pooled cross-country data set (Table 11**,** β=0.125, p=0.004).

Table 12: Age and Gender Differences in the Cross-Country Dataset

	β (Male)	β (Female)	Δβ (Male vs Female)	β (Over 35)	Δβ (Under 35)	Δβ (Under 35 vs over 35)	β_P (Pooled)
EE -> BI	-0.014	**0.127***	*0.141†*	0.067	-0.013	0.080	0.040
EE -> PE	**0.189****	**0.144***	0.045	**0.188***	*0.148†*	0.041	**0.169****
HAB -> BI	**0.297*****	0.091	**0.206***	**0.221*****	**0.211****	0.010	**0.207*****
HM -> BI	*0.072†*	0.120	0.048	-0.001	**0.182*****	**0.182***	*0.074†*
HM -> PE	*0.084†*	**0.237***	0.153	**0.125***	*0.118†*	0.007	**0.125****
PE -> BI	**0.244*****	**0.277***	0.033	**0.293*****	**0.235****	0.059	**0.272*****
PV -> BI	**0.334*****	**0.300****	0.034	**0.346*****	**0.318*****	0.029	**0.329*****
PV -> PE	**0.377*****	**0.294***	0.084	**0.367*****	**0.369*****	0.002	**0.365*****
SI -> BI	0.051	0.114	0.063	0.043	**0.119***	0.077	*0.076†*
SI -> PE	**0.233*****	**0.189***	0.044	**0.194****	**0.242*****	0.048	**0.205*****

*For individual group path coefficients (β), the test is one-tailed and therefore the significance thresholds are: †p<0.1; *p<0.05; **p<0.01, ***p<0.001; all other relationships are non-significant. Path coefficients significant at p<0.05 are shown in* ***bold****. Path coefficients significant at 0.1<p<0.05 are shown in* italics*. For multi-group analysis (Δβ), the test is two-tailed, and therefore the significance thresholds are: †p<0.05; *p<0.025; **p<0.005, ***p<0.0005; all other relationships are non-significant. Path coefficients significant at p<0.025 are shown in bold.*

The overall effect was supported within the demographic groups, with positive and significant paths across all groups except for postgraduates and older workers, where the path approached significance. Finding: *effort expectancy* predicted *performance expectancy* of e-learning across African groups and in the pooled data, moderated by age and education such that the path was not significant for younger or more educated workers. Hypothesis: *effort expectancy* predicts *performance expectancy* – supported.

5.4.3. Social Influence

Social influence had no direct significant effect on *behavioural intention* in the cross-country data set (Table 11 and Figure 16, β=0.076, p=0.058). There was no difference between countries, or by age or profession. There was a significant path for younger workers (Table 12, β=0.119, p=0.032) and for non-fieldworkers (Table 13, β=0.099, p=0.041), without producing a significant between-groups difference in either case. Hypothesis: *social influence* predicts *behavioural intention* – not supported in the pooled data.

Although *social influence* had no direct influence on *behavioural intention*, there was an indirect effect via *performance expectancy* (SI->PE) with a small effect size (Table 10 f^2=0.065, β=0.205, p<0.001). Learners perceive e-learning as useful where referent others in their social environment endorse e-learning, but do not intend to use e-learning solely because of normative influence. The path was consistent across all demographic and country groups except in The Gambia producing a difference between the UK and The Gambia that approached significance in the two-tailed test (Δβ[The Gambia/East Africa]=0.227, p=0.026). Finding: *social influence* predicted *performance expectancy* of e-learning across groups except in The Gambia. Hypothesis: *social influence* predicts *performance expectancy* – partially supported.

Table 13: Education and Profession Differences in the Cross-Country Dataset

	β (Grad)	Δβ (PostGrad)	Δβ (Graduate vs PostGrad)	β (FW)	Δβ (NonFW)	Δβ (FW vs NonFW)	β_P (Pooled)
EE -> BI	0.070	0.106	0.035	*-0.133†*	*0.094†*	**0.227***	0.040
EE -> PE	**0.170***	*0.178†*	0.007	**0.344****	**0.148***	0.195	**0.169****
HAB -> BI	**0.149***	**0.322*****	0.173	**0.208***	**0.240*****	0.032	**0.207*****
HM -> BI	0.057	0.107	0.050	**0.134***	0.049	0.085	*0.074†*
HM -> PE	0.064	**0.240****	0.176	0.019	**0.156****	0.137	**0.125****
PE -> BI	**0.306*****	**0.216***	0.090	**0.328****	**0.257*****	0.071	**0.272*****
PV -> BI	**0.326*****	**0.239***	0.087	**0.353*****	**0.272*****	0.081	**0.329*****
PV -> PE	**0.437*****	*0.203†*	*0.234†*	**0.364*****	**0.349*****	0.015	**0.365*****
SI -> BI	0.072	0.037	0.035	0.021	**0.099***	0.078	*0.076†*
SI -> PE	**0.231*****	**0.197***	0.034	**0.246***	**0.195*****	0.051	**0.205*****

*For individual group path coefficients (β), the test is one-tailed and therefore the significance thresholds are: †p<0.1; *p<0.05; **p<0.01, ***p<0.001; all other relationships are non-significant. Path coefficients significant at p<0.05 are shown in* ***bold****. Path coefficients significant at 0.1<p<0.05 are shown in* italics*. For multi-group analysis (Δβ), the test is two-tailed, and therefore the significance thresholds are: †p<0.05; *p<0.025; **p<0.005, ***p<0.0005; all other relationships are non-significant. Path coefficients significant at p<0.025 are shown in* ***bold****.*

5.4.4. Summary of the UTAUT2 part of the VETA model

While the research question did not demand explicit hypotheses regarding the UTAUT2 model, these hypotheses were novel in context, so were tested to compare findings against the literature corpus and are shown in Table 14.

Table 14: Summary of UTAUT2 path hypotheses

Path & Hypothesis	The Gambia	UK	E. Africa	Pooled Sample
PE-BI	**Supported**	**Supported**	-	**Supported**
EE-BI	-	**Supported**	-	Not Supported (except for females)*
EE-PE	**Supported**	-	**Supported**	**Supported**
SI-BI	-	-	-	Not Supported (except for younger workers)*
SI-PE	-	**Supported**	**Supported**	**Supported**
HM-BI	-	-	**Supported**	Not Supported (except for younger workers)
HM-PE	-	**Supported**	-	**Supported** (moderated by age, gender, profession and education)
PV-BI	**Supported**	**Supported**	**Supported**	**Supported**
PV-PE	**Supported**	**Supported**	**Supported**	**Supported**
HAB-BI	**Supported**	**Supported**	-	**Supported** *(moderated by gender)*

** No significant difference between groups*

Paths that were statistically significant at p<0.05 were indicated as “supported” because the likelihood of obtaining the observed data given the null hypothesis (no predictive effect) was lower than the conventional threshold, therefore the alternative hypothesis (that within the assumptions and thresholds of the study the null could be rejected) was supported, with the magnitude of effect shown in Table 10. The next section completes reporting on the structural model shown in Figure 16 by detailing the influence of values on the adoption of e-learning.

5.5. The Values Part of the VETA Model

5.5.1. The Influence of ‘Conservation’ Values

The *conservation* dimension includes values that represent an individual’s priority for preserving the status quo, such as *conformity*, *tradition* and *security*. The influence of these values on the UTAUT2 model as depicted in Figure 16 will be reported in this section.

The value of *conformity* did not directly predict *performance expectancy* or *social influence* in the cross-country dataset. Examining the country group data for the predictive effect of *conformity* on *social influence* (CO->SI) indicated that the lack of overall effect in the pooled data arose from the combination of a non-significant negative path in the UK and a non-significant positive path in the African groups, identified through multi-group analysis as a significant difference between The Gambia and the UK (Table 15, Δβ[UK/The Gambia]=0.351, p=0.023) and between East Africa and the UK (Table 15, Δβ[UK/E. Africa]=0.418, p=0.020). The predictive effect of *conformity* on *social influence* was positive and significant for females (Table 16, β=0.227, p=0.003), but negligible for males, yielding a significant difference between gender groups (Table 16, Δβ[Male/Female]=0.233, p=0.014).

The influence of *conformity* on *performance expectancy* (CO->PE) was moderated by gender such that it approached significance for both genders but with opposite signs, with a significant gender difference (Table 16**,** β[Male]=0.095, p=0.056, β[Female]=-0.132, p=0.085, Δβ[Male/Female]=0.227, p=0.005). Although the effect was below the

threshold for significance, females with a higher priority for *conformity* perceived e-learning as less useful in achieving their goals; males with a higher priority for *conformity* perceived e-learning as useful. There was no effect of *conformity* on *performance expectancy* in any other demographic group. Finding: the value of *conformity* had no influence on the adoption of e-learning, except for female workers. Hypotheses: *conformity* predicts *performance expectancy* or *social influence* – not supported.

The value of *security* had no influence on *performance expectancy* (SE->PE) in the cross-country dataset, nor in any of the country groups. There was a difference in the professions that approached significance, such that the path approached significance for non-fieldworkers but was unimportant for fieldworkers (Table 17, β[nonFW]=0.122, p=0.067, $\Delta\beta$[FW/nonFW]=0.227, p=0.028). There was also a gender difference such that the influence of *security* on *performance expectancy* was significant for females (Table 16, β[Female]=0.291, p<0.001, $\Delta\beta$[Male/Female]=0.346, p=0.002). The path also approached significance for younger workers (Table 16, β[Under 35]=0.142, p<0.062). Finding: the value of *security* had no influence on the adoption of e-learning, except for female workers. Hypotheses: *security* predicts *performance expectancy* or *social influence* – not supported.

The value of *tradition* had no influence on *performance expectancy* in the cross-country or individual country data. The path (TR->PE) was also non-significant across all demographic groups except for postgraduates (Table 17, β=0.167, p=0.041). Finding: the value of *tradition* had no influence on learner perception of the usefulness of e-learning, except for postgraduate workers. Hypotheses: *tradition* predicts *performance expectancy* – not supported.

Table 15: Country Differences in the Cross-Country Dataset, the Influence of Values

	β (Gambia)	β (UK)	β (E.Africa)	Δβ (UK vs Gambia)	Δβ (E.Africa vs Gambia)	Δβ (UK vs E.Africa)	β_P (Pooled)
AC -> PE	0.083	**-0.212***	-0.005	**0.295***	0.088	0.207	-0.010
AC -> PV	**0.226****	0.093	*0.277†*	0.133	0.050	0.184	**0.449*****
AC -> SI	**0.275***	0.144	**0.284***	0.131	0.009	0.140	**0.326*****
CO -> PE	0.036	0.097	-0.045	0.061	0.081	0.142	0.000
CO -> SI	*0.148†*	-0.203	0.215	**0.351***	0.067	**0.418***	0.078
HE -> HM	**0.239****	*0.226†*	**0.366*****	0.013	0.128	0.141	**0.336*****
PO -> PE	0.017	0.114	-0.004	0.096	0.021	0.118	0.048
PO -> PV	0.062	0.084	-0.135	0.022	0.197	0.219	*0.104†*
PO -> SI	-0.001	-0.077	0.042	0.076	0.043	0.119	0.054
SE -> PE	-0.066	0.082	-0.065	0.148	0.002	0.146	0.086
SE -> SI	-0.061	0.108	0.102	0.169	0.163	0.006	0.076
TR -> PE	0.146	-0.074	-0.051	0.220	0.197	0.023	0.052
TR -> SI	**0.218****	0.169	0.000	0.049	0.218	0.169	**0.188****

*For individual group path coefficients (β), the test is one-tailed and therefore the significance thresholds are: †p<0.1; *p<0.05; **p<0.01, ***p<0.001; all other relationships are non-significant. Path coefficients significant at p<0.05 are shown in* ***bold****. Path coefficients significant at 0.1<p<0.05 are shown in* italics*. For multi-group analysis (Δβ), the test is two-tailed, and therefore the significance thresholds are: †p<0.05; *p<0.025; **p<0.005, ***p<0.0005; all other relationships are non-significant. Path coefficients significant at p<0.025 are shown in bold.*

The value of *tradition* had a significant influence on *social influence* (TR->SI) in the cross-country data (Table 15, β=0.188, p=0.001), which arose mainly from the Gambian group (Table 15, β=0.218, p=0.003). The path was moderated by age, gender and education such that the path was significant for males (Table 16, β=0.253, p<0.001), older workers (Table 16, β=0.231, p<0.001) and workers with a level of education at graduate or below (Table 17, β=0.202, p<0.001). Finding: the value of *tradition* influenced learner perception of *social influence*, moderated by age, gender and education. Hypotheses: *tradition* predicts *social influence* – supported.

5.5.2. The Influence of 'Self-Enhancement' Values

The *self-enhancement* dimension includes values that represent an individual's priority for their own individual interests over that of their referent group, such as *power* and *achievement*. The influence of these values on the UTAUT2 model as depicted in Figure 16 will be reported in this section.

There was a relationship between *achievement* (AC) and *price value* (PV) in the pooled data (Table 15, β=0.449, p<0.001): the path (AC->PV) was important in the African country groups but not in the UK, with a positive significant path in The Gambia (Table 15, β=0.226, p=0.005) and a path approaching significance (Table 15, β=0.277, p=0.064) in East Africa. The differences between country groups were non-significant. This path was positive and significant in all demographic groups except for postgraduates. Finding: learners prioritising the value of *achievement* considered the cost-benefit trade-off for using e-learning favourably in African groups. Hypothesis: *achievement* predicts *price value* – supported.

Table 16: Age and Gender Differences in the Cross-Country Dataset, the Influence of Values

	β (Male)	β (Female)	Δβ (Male vs Female)	β (Over 35)	Δβ (Under 35)	Δβ (Under 35 vs over 35)	β_P (Pooled)
AC -> PE	0.028	-0.114	0.142	-0.029	-0.048	0.018	-0.010
AC -> PV	**0.500*****	**0.400*****	0.100	**0.483*****	**0.369*****	0.115	**0.449*****
AC -> SI	**0.332*****	**0.334****	0.002	**0.344*****	**0.298***	0.046	**0.326*****
CO -> PE	*0.095†*	*-0.132†*	**0.227****	0.068	-0.094	0.162	0.000
CO -> SI	-0.006	**0.227****	**0.233***	0.069	0.128	0.059	0.078
HE -> HM	**0.327*****	**0.363*****	0.036	**0.358*****	**0.246****	0.112	**0.336*****
PO -> PE	0.058	0.000	0.057	0.028	0.081	0.053	0.048
PO -> PV	0.096	0.093	0.004	0.091	0.130	0.040	*0.104†*
PO -> SI	0.030	0.100	0.070	0.069	0.024	0.045	0.054
SE -> PE	-0.054	**0.291****	**0.346****	0.039	*0.142†*	0.103	0.086
SE -> SI	0.101	0.018	0.084	0.021	0.142	0.121	0.076
TR -> PE	0.073	0.047	0.026	0.073	0.048	0.025	0.052
TR -> SI	**0.253*****	0.054	0.198	**0.231****	0.115	0.116	**0.188****

*For individual group path coefficients (β), the test is one-tailed and therefore the significance thresholds are: †p<0.1; *p<0.05; **p<0.01, ***p<0.001; all other relationships are non-significant. Path coefficients significant at p<0.05 are shown in* ***bold****. Path coefficients significant at 0.1<p<0.05 are shown in* italics*. For multi-group analysis (Δβ), the test is two-tailed, and therefore the significance thresholds are: †p<0.05; *p<0.025; **p<0.005, ***p<0.0005; all other relationships are non-significant. Path coefficients significant at p<0.025 are shown in* ***bold****.*

Conversely, the relationship between *achievement* and *performance expectancy* (AC->PE) was significant and negative in the UK (Table 15, β=-0.212, p=0.026, f^2=0.054), showing no effect in the pooled or African data, or in the demographic groups. Finding: there was no effect of learner perception of *achievement* on their perception of e-learning usefulness in African groups and a negative effect in the UK. Hypothesis: *achievement* predicts *performance expectancy* – not supported.

An individual's priority on the value of *achievement* predicted their perception of *social influence* (AC->SI) in the pooled data with a small effect (Figure 16, Table 15, β=0.326, p<0.001, f^2=0.072). Although there were significant and positive paths in the African countries (Table 15, β[The Gambia]=0.275, p=0.013, β[E.Africa]=0.284, p=0.041) but not in the UK, the difference between countries was not significant. As with the influence of achievement on *price value*, *achievement* predicted *social influence* positively in all demographic groups except for postgraduates. Finding: learners prioritising the value of *achievement* considered their referents encourage the use of e-learning in African groups. Hypothesis: *achievement* predicts *social influence* – supported.

The value of *power* had little effect on the model. The influence of *power* on *price value* approached significance in the pooled data (Figure 16, Table 15, β=0.104, p=0.066), arising predominantly from the non-fieldwork group (Table 17, β=0.160, p=0.042), but had little other effect on any of the variables in the model. Finding: learners prioritising the value of *power* considered that the use of e-learning did not provide a competitive advantage. Hypotheses: *power* predicts *social influence, price value* or *performance expectancy* – not supported.

5.5.3. The Influence of 'Openness to Change' Values

The *openness to change* dimension includes values that represent an individual's priority for the pursuit of gratification, variety and excitement, such as *hedonism.* The influence of *hedonism* on the UTAUT2 model as depicted in Figure 16 will be reported in this section.

Table 17: Education and Profession Differences in the Cross-Country Dataset, the Influence of Values

	β (Grad)	Δβ (PostGrad)	Δβ (Graduate vs PostGrad)	β (FW)	Δβ (NonFW)	Δβ (FW vs NonFW)	β_P (Pooled)
AC -> PE	0.104	-0.161	**0.265***	-0.008	-0.021	0.012	-0.010
AC -> PV	**0.462*****	0.166	**0.296***	**0.345*****	**0.353*****	0.008	**0.449*****
AC -> SI	**0.287****	0.219	0.068	**0.321****	**0.269****	0.052	**0.326*****
CO -> PE	0.058	-0.097	0.155	0.078	-0.023	0.102	0.000
CO -> SI	0.046	-0.030	0.076	0.070	0.052	0.019	0.078
HE -> HM	**0.314*****	**0.342*****	0.028	**0.343*****	**0.357*****	0.014	**0.336*****
PO -> PE	0.002	0.139	0.136	0.094	0.041	0.053	0.048
PO -> PV	0.060	0.181	0.120	-0.067	**0.160***	*0.227†*	*0.104†*
PO -> SI	0.055	0.111	0.055	0.059	0.089	0.031	0.054
SE -> PE	0.001	0.146	0.145	-0.079	*0.122†*	*0.201†*	0.086
SE -> SI	0.123	-0.004	0.126	*0.183†*	0.094	0.090	0.076
TR -> PE	-0.013	**0.167***	0.179	-0.032	0.048	0.080	0.052
TR -> SI	**0.202****	0.100	0.102	0.016	*0.135†*	0.119	**0.188****

*For individual group path coefficients (β), the test is one-tailed and therefore the significance thresholds are: †p<0.1; *p<0.05; **p<0.01, ***p<0.001; all other relationships are non-significant. Path coefficients significant at p<0.05 are shown in* ***bold****. Path coefficients significant at 0.1<p<0.05 are shown in* italics*. For multi-group analysis (Δβ), the test is two-tailed, and therefore the significance thresholds are: †p<0.05; *p<0.025; **p<0.005, ***p<0.0005; all other relationships are non-significant. Path coefficients significant at p<0.025 are shown in* ***bold****.*

An individual's priority for the value of *hedonism* predicted learner's perception of *hedonic motivation* with a positive and significant path in the pooled sample, in the African groups, and in all demographic groups. The path in the UK group also approached significance (Table 15**,** β=0.226, p=0.067). Finding: learners prioritising the value of *hedonism* perceived e-learning as intrinsically motivating. Hypothesis: *hedonism* predicts *hedonic motivation* – supported.

5.5.4. Summary of Values Addition to the UTAUT2 Model

The hypotheses relating directly to the influence of values on the adoption model are shown in Table 18 (see Table 14 for UTAUT2 path hypotheses). Paths that are statistically significant at $p<0.05$ are indicated as "supported" in that the likelihood of obtaining the observed data given the null hypothesis (no predictive effect) is lower than the conventional threshold, therefore the alternative hypothesis (that within the assumptions and thresholds of the study the null can be rejected) is supported.

Table 18: Summary of values path hypotheses

Path	The Gambia	UK	E. Africa	Pooled Sample
AC-PE	-	**Supported**	-	-
AC-PV	**Supported**	-	-	**Supported**
AC-SI	**Supported**	-	**Supported**	**Supported**
CO-PE	-	-	-	-
CO-SI	-	-	-	-
HE-HM	**Supported**	-	**Supported**	**Supported**
PO-PE	-	-	-	-
PO-PV	-	-	-	-
PO-SI	-	-	-	-
SE-PE	-	-	-	-
SE-SI	-	-	-	-
TR-PE	-	-	-	-
TR-SI	**Supported**	-	-	**Supported**

5.6. Indirect Effects and Mediation Analysis

To determine mediated paths in the structural model, total (direct plus indirect, D+I) and indirect (I) path coefficients for each path are shown in Table 19. Examining indirect paths in the UTAUT2 part of the model, several variables had both a direct effect on *behavioural intention* and an indirect effect via *performance expectancy* indicating that user perceptions influence their perception of usefulness as well as their intention to use e-learning. The influence of *effort expectancy* on *behavioural intention* included a small direct effect and a small indirect effect via *performance expectancy* (Table 19, β(EE-BI)=0.089, p=0.046; β(EE-PE)=0.170, p=0.001). *Hedonic motivation* had both a direct and an indirect effect on *behavioural intention* via *performance expectancy* (Table 19, β(HM-BI)=0.108, p=0.009; β(HM-PE)=0.123, p=0.004). *Price value* had both a strong direct effect on *behavioural intention* and a strong indirect effect via *performance expectancy* (Table 19, β(PV-BI)=0.430, p<0.001; β(PV-PE)=0.368, p<0.001). *Social influence* had a direct effect on *behavioural intention* with a stronger indirect effect via *performance expectancy* (Table 19, β(SI-BI)=0.129, p=0.004; β(SI-PE)=0.202, p<0.001). Finding: *price value*, *social influence*, *effort expectancy* and *hedonic motivation* influenced *behavioural intention* to use e-learning partially via *performance expectancy* such that learner perception of these different attributes affected how useful they perceived e-learning.

Examining the effect of values on intention, the influence of *achievement* on *behavioural intention* (AC->BI) and *performance expectancy* (AC->PE) was entirely mediated by *price value* and *social influence* with the indirect paths accounting for much of the total effect in each country group and in the pooled data (Table 19, β(AC-BI)=0.232, p<0.001; β(AC-PE)=0.220, p=0.001; β(AC-PV)=0.448, p<0.001; β(AC-SI)=0.324, p<0.001).

Table 19: Total (D+I) and Indirect (I) Effects in the Cross-Country Structural Model

	The Gambia		UK		E. Africa		Pooled	
	D+I	I	D+I	I	D+I	I	D+I	I
AC-BI	**0.150****	**0.150****	0.003	0.003	*0.110†*	*0.110†*	**0.232*****	**0.232*****
AC-PE	*0.199†*	**0.121***	-0.113	0.065	0.103	*0.115†*	**0.220****	**0.230*****
AC-PV	**0.239****	-	0.112	-	*0.278†*	-	**0.448*****	-
AC-SI	**0.263***	-	0.098	-	**0.293***	-	**0.324*****	-
CO-BI	0.026	0.026	-0.005	-0.005	0.022	0.022	0.012	0.012
CO-PE	0.056	0.020	0.007	-0.060	0.024	0.056	0.020	0.017
CO-SI	*0.157†*	-	-0.184	-	0.228	-	0.081	-
EE-BI	0.001	*0.041†*	**0.230****	0.022	0.102	0.095	**0.089***	**0.045****
EE-PE	**0.252****	-	0.092	-	**0.538*****	-	**0.170****	-
HAB-BI	**0.261****	-	**0.216****	-	0.155	-	**0.206*****	-
HE-BI	0.007	0.007	0.025	0.025	**0.140****	**0.140****	**0.038***	**0.038***
HE-HM	**0.273****	-	*0.247†*	-	**0.400*****	-	**0.345*****	-
HE-PE	0.014	0.014	0.053	0.053	0.027	0.027	**0.043***	**0.043***
HM-BI	0.027	0.008	0.096	*0.050†*	**0.349*****	0.011	**0.108****	**0.033***
HM-PE	0.051	-	**0.210***	-	0.068	-	0.123**	-
PE-BI	**0.169***	-	**0.236****	-	0.171	-	**0.268*****	-
PO-BI	0.035	0.035	0.039	0.039	-0.022	-0.022	**0.067***	**0.067***
PO-PE	0.060	0.030	0.067	0.015	-0.004	-0.008	*0.098†*	*0.052†*

PO-PV	0.074	-	0.066	-	-0.113	-	*0.109†*	-
PO-SI	0.023	-	-0.015	-	0.048	-	0.058	-
PV-BI	**0.424*** **	0.064†	**0.327*** **	**0.070***	**0.303***	0.027	**0.430*** **	**0.098*** **
PV-PE	**0.370*** **	-	**0.300*** **	-	0.164	-	**0.368*** **	-
SE-BI	-0.016	-0.016	0.039	0.039	0.006	0.006	*0.034†*	*0.034†*
SE-PE	-0.070	-0.007	0.140	0.040	-0.021	0.028	*0.103†*	0.015
SE-SI	-0.060	-	0.121	-	0.111	-	0.077	-
SI-BI	*0.125†*	0.022	0.128	**0.078***	0.116	0.040	**0.129** **	**0.055** **
SI-PE	0.124	-	**0.329*** **	-	**0.244***	-	**0.202*** **	-
TR-BI	**0.051***	**0.051***	0.006	0.006	-0.008	-0.008	**0.038***	**0.038***
TR-PE	**0.177***	0.028	-0.008	0.057	-0.054	0.001	*0.090†*	**0.038***
TR-SI	**0.224** **	-	0.170	-	0.005	-	**0.186** **	-

*The significance thresholds are: †p<0.1; *p<0.05; **p<0.01, ***p<0.001; all other relationships are non-significant. Path coefficients significant at p<0.05 are shown in* ***bold****. Path coefficients approaching the threshold of significance at 0.1<p<0.05 are shown in* italics*. AC=achievement; BI=behavioural intention; CO=conformity; EE=effort expectancy; HAB=habit; HE=hedonism; HM=hedonic motivation; PE=performance expectancy; PO=power; PV=price value; SE=security; SI=social influence; TR=tradition.*

Power, conformity and *security* had paths that approached significance at 0.1<p<0.05 which are mentioned here. *Power* had a significant indirect effect on *behavioural intention* most likely via *performance expectancy* and *price value* but not via *social influence* (Table 19, β(PO-BI)=0.067, p=0.045; β(PO-PE)=0.098, p=0.057; β(PO-PV)=0.109, p=0.066; β(PO-SI)=0.058, p=0.377). Indirect and total effects were negligible in size and significance for *conformity* and *security* on *behavioural intention* and *performance expectancy*, except for *security* which had an indirect effect on *behavioural intention* via *performance expectancy* that approached significance (Table 19, β(SE-BI)=0.034, p<0.071; β(SE-PE)=0.103, p<0.065). Finding: *achievement, power* and *security* all had indirect influence on *behavioural intention* via learner perceptions *of performance expectancy*, *social influence* and *price value*.

5.7. Summary of Survey Data

The UTAUT2 model was partially supported in predicting the intention of worker populations to use e-learning in the UK, The Gambia and East Africa: *behavioural intention* was predicted by *performance expectancy*, *price value*, and *habit* (Figure 16). *Performance expectancy*, in turn, was predicted by *effort expectancy*, *hedonic motivation*, *social influence* and *price value*. *Effort expectancy* had no significant direct effect on *behavioural intention*. The effect of *social influence* and *hedonic motivation* were close to being significant at the p<0.05 level (Figure 16). In terms of practical significance, *behavioural intention* was predicted by *performance expectancy, price value* and *habit* with a small effect size (Table 10); *performance expectancy* was predicted by *social influence* and *price value* with a small effect size (Table 10).

The values of *achievement, hedonism* and *tradition* were important as predictors of the factors that influence *behavioural intention* (Table 10 and Figure 16). Learners who prioritised the values of *achievement* and *tradition* perceived that referents in their social environment encouraged the use of e-learning and therefore perceived e-learning as useful in achieving their goals. Learners who prioritised the value of *achievement* perceived e-learning as worth the cost in terms of time, trouble and money, which, in turn, influenced perceptions of usefulness as well as *behavioural intention* to use e-learning. Learners found e-learning enjoyable if they were predisposed to the importance of enjoyment, which led them to perceive e-learning as

useful, thereby influencing their intention to use e-learning. These results will be discussed in light of *a priori* expectations and the literature corpus in chapters 2 and 3. The next chapter presents analysis of the interview data.

6. Results: Interview Data

This chapter describes the findings from semi-structured interviews of e-learning participants. The research question concerning the influence of values on adoption is primarily explored through quantitative analysis of survey data, supported by interview data to elucidate context. Analysis of the survey data yielded several key findings that might be deconstructed through the analysis of interview data.

Within the survey data, findings were:

1. The UTAUT2 model was partially confirmed with some significant construct relationships: *price value*, *habit* and *performance expectancy* predicted *behavioural intention* to use e-learning.
2. Some UTAUT2 construct relationships were non-significant: *social influence* did not directly predict *behavioural intention*, rather acting via *performance expectancy; effort expectancy* did not predict *behavioural intention*, yet there are known barriers to *ease of use* in the African context; *hedonic motivation* did not directly predict *behavioural intention*, rather acting via *performance expectancy.*
3. Values influenced *behavioural intention* via learner perception of *social influence* and *price value*: learner priority on the value of *achievement* predicted *behavioural intention* to use e-learning via *social influence* and *price value*; learner priority on the value of *tradition* predicted *behavioural intention* to use e-learning via *social influence*; learner priority on *hedonism* predicted *behavioural intention* via learner *hedonic motivation*.

This chapter presents interview data as connection maps to demonstrate the relative complexity of each theme (visually representing each theme/sub-theme as either present or absent in the data from interviewees). The data for each theme is broken down further with graphical group comparisons (between country differences, age and gender differences), and example excerpts from interviews, to elucidate the first two findings from the list above. It is not possible to present interview data on values, since, by design, interviews focussed on the contextual differences in UTAUT2 constructs only (7.5.2). Within the connection maps, each theme/sub-theme is displayed on the

right-hand side of a circular map, with data sources (interviewees) displayed on the left. Each connection line in a connection map represents the presence of one theme/sub-theme node within one data source. Where a data source has no nodes present it is excluded from the map. The text descriptions of the data indicate the number of data sources where a node was present as a sample size (n). For example, in Figure 17, the theme (node) of social influence was mentioned by all participants, except for the data source *Female (43) The Gambia*, for whom there is no connection with the theme of *social influence* marked on the diagram.

To preserve anonymity: names have been replaced with participant information in the format: “gender (age) country”; manager or champion names have been replaced with, for example, *[manager]* and *[the champion]*; and organisation names have been replaced with *[the organisation]*. Where necessary to add a descriptor for the context of a response, this is written as [*context*]. Across 3 contexts (The Gambia, UK and East Africa) a total of 18 interviews were completed. Where in the survey data, the East African sample contained data from both Uganda and Kenya, interviews were only carried out in Kenya, therefore participants in connection maps are referred to by country (Kenya), yet the survey group that participants correspond to is the East African group, as indicated in the group graphs.

6.1. Overview of data relating to UTAUT2

The whole sample connection map is shown in Figure 17, which shows the connections between the themes of UTAUT2 (nodes on the right of the diagram) and the participants (interview sources on the left of the diagram). UTAUT2 themes *performance expectancy* (n=18), *social influence* (n=17), *facilitating conditions* (n=16), *habit* (n=15), *hedonic motivation* (n=13), *price value* (n=12), and *effort expectancy* (n=5) were discussed by participants.

Figure 18 shows the breakdown of theme-level responses by country, demonstrating that most themes are represented across countries to a similar degree, with the exceptions of *price value* and *hedonic motivation*, which are under-represented in the Gambian sample compared to the other two country groups. Both Figure 17 and Figure

18 show that, across the whole sample, the UTAUT2 constructs were generally perceived by participants as relevant to their behaviour with e-learning, except for *effort expectancy*, which was mentioned least (n=5). The lack of discussion around *effort expectancy* supports the finding from the survey data that there was no direct influence of *effort expectancy* on *behavioural intention* to use e-learning.

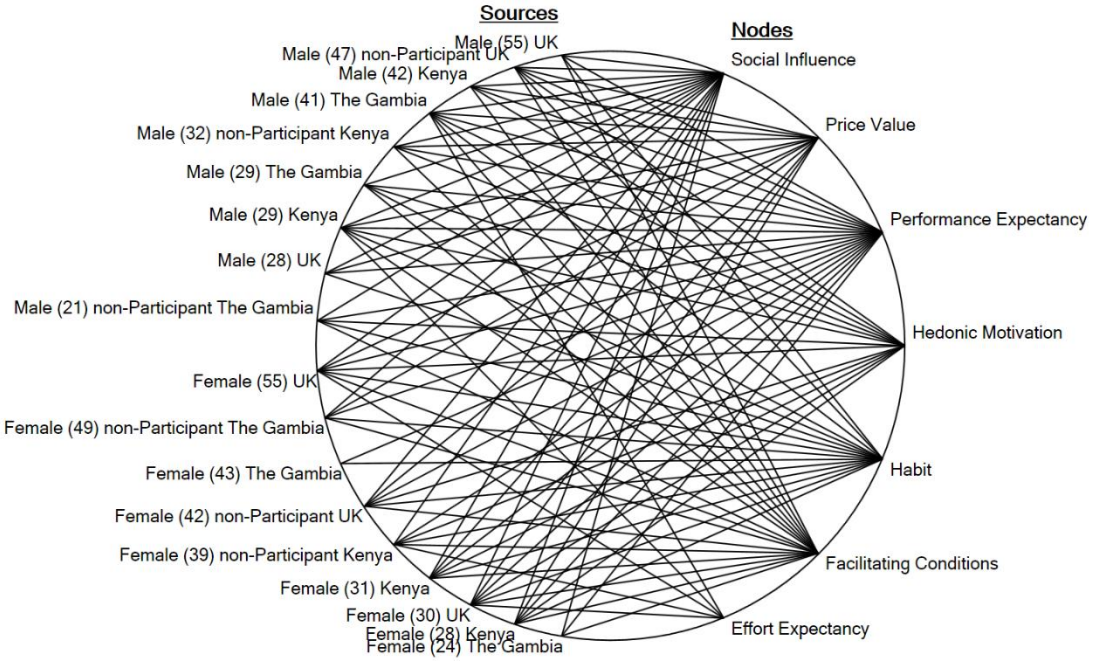


Figure 17: Connection Map: All UTAUT2 variables for the whole sample

In a general sense, the interview data also highlights the importance of *facilitating conditions*, which was not included in the survey data model, but is present in the interview data as a theme to a similar degree as *social influence* or *performance expectancy*. Based on the overview of the data, there is sufficient presence (and some prioritisation) of the UTAUT2 constructs in interviewee consideration of e-learning, interview data was probed further to elucidate the survey findings. However, with a small total sample of 18 participants, it is not intended to infer a comparable level of trend analysis to the survey data, merely to highlight where the interview data provides general support or lack of support for the survey findings. The remainder of this chapter presents the interview data relating to findings from the survey data: themes that predicted *behavioural intention* to use e-learning (6.2); themes that did not predict

behavioural intention to use e-learning (6.3); and the influence of *facilitating conditions* (6.4).

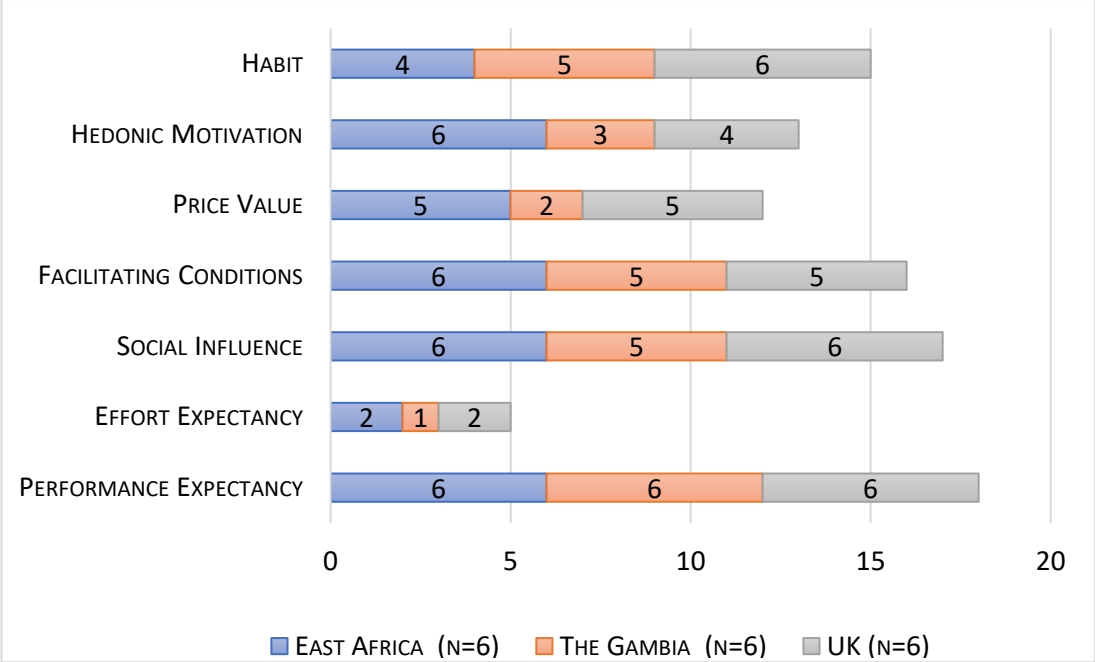


Figure 18: UTAUT2 variable breakdown by country (n=18)

6.2. The role of Price Value, Habit and Performance Expectancy

This section presents the interview data for the UTAUT2 themes that were shown by survey data to have a direct predictive effect on behavioural intention to use e-learning: *price value* (6.2.1), *performance expectancy* (6.2.2) and *habit* (6.2.3).

6.2.1. Learner Perception of Price Value

The connection map for the theme of *price value* for the whole sample (Figure 19) shows that learners considered *price value* (n=12) in terms of sub-themes: *time* (n=8), *travel* (n=6), *effort* (n=6), *cost* (n=6) and *concentration* (n=2). Gambian participants mostly did not comment on *price value*, but the two participants who mentioned *price value* considered *time* as the main perceived cost.

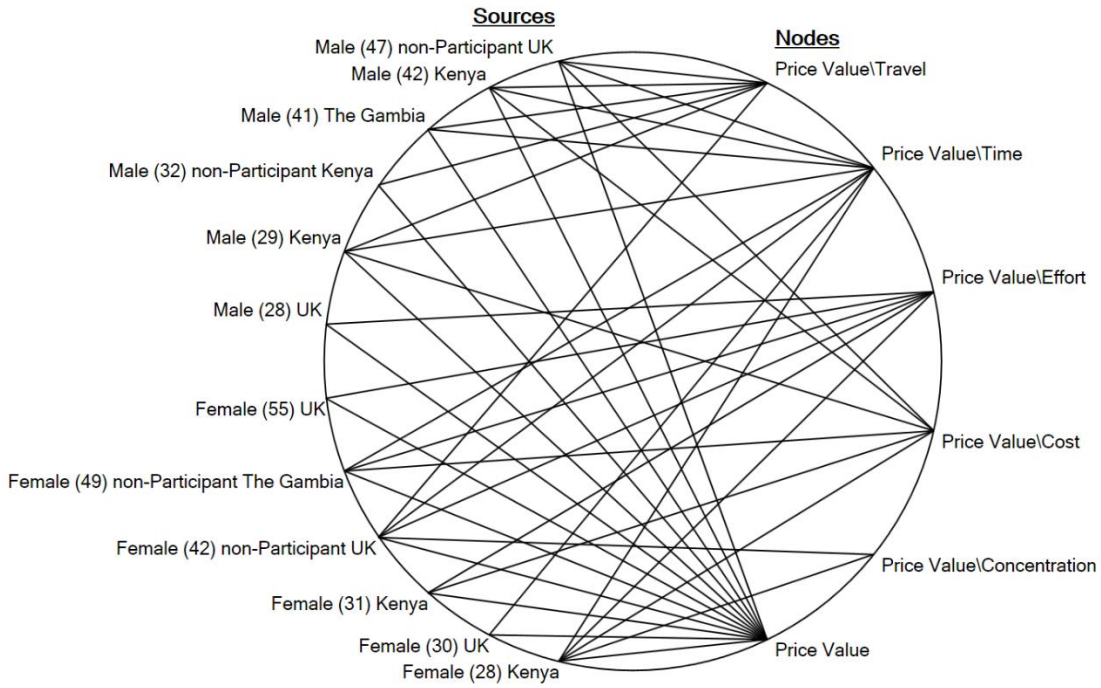


Figure 19: Connection Map: Price Value, Whole Sample

Price value was mentioned by five of the six UK interviewees, with *time* and *effort* being the main perceived costs. Five Kenyan participants responded on the theme of *price value*, and described *cost*, *time* and *travel* as the main perceived costs. There was a country difference in that there was a lack of occurrence of theme-level *price value* data in the Gambian sample in comparison to the Kenyan and UK samples ($n_{The\ Gambia}$=2, n_{Kenya}=5, n_{UK}=5). Figure 20 shows the breakdown of the theme of *price value* into sub-themes, and the relative importance of sub-themes in participant responses from each country group.

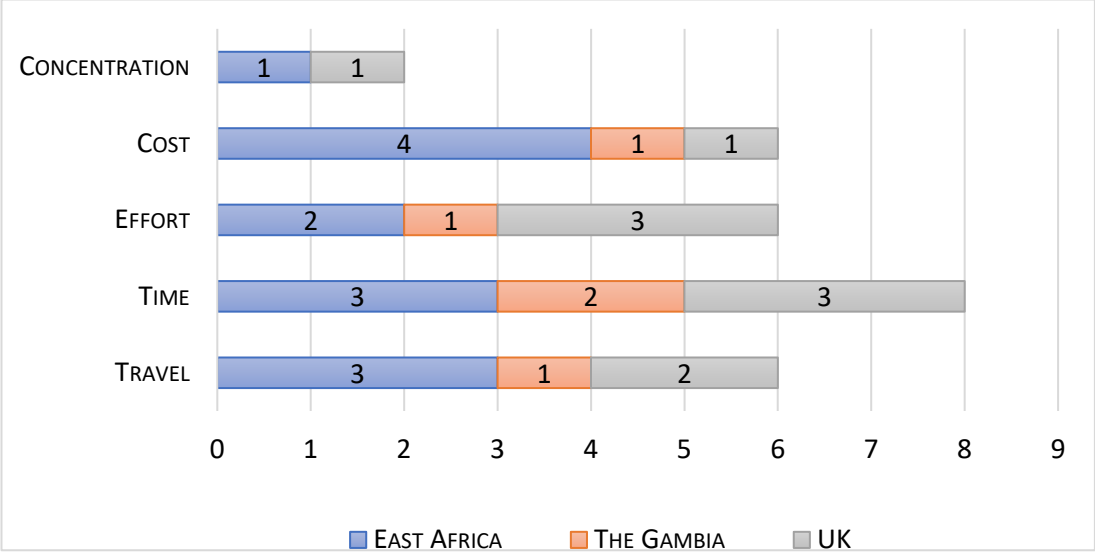


Figure 20: Price value sub-themes across country groups (n=12)

Time was the most cited sub-theme of *price value* by interviewees (n=8), occurring across country groups as a sub-theme with reasonable uniformity ($n_{The\ Gambia}$=2, n_{Kenya}=3, n_{UK}=3). Workers perceived *time* as a resource in short supply, important in making decisions around when to access e-learning amongst other work priorities: the flexibility of e-learning was perceived as beneficial, despite the inherent *time* cost of training. The male non-participant in the UK group noted that time costs include aspects of both travel time and training time. The following example excerpts were coded as "*price value/time*":

> *"You can sacrifice your time first. Because if you are planning to do a procedure, let's take that procedure takes like 2 hours, you must do it for like 1 hour 45 minutes, and the 15 minutes to do that e-learning programme. So, you have sacrificed your time." – Female (28) Kenya*

> *"It's more enjoyable… In that it does not cost you much time. So less time-consuming." – Male (29) Kenya*

> *"So, finding the time to do it. So, at work, you know, you've always got a lot to do, trying to fit it in. Make sure you prioritise it over other things otherwise you'll never get around to it." – Female (30) UK*

Travel, cost and *effort* were cited by participants in all three country groups as important aspects of price value (Figure 20). Comparing interview data across country groups demonstrated a difference in the sub-themes espoused by participants. *Travel* (n=6) ($n_{The\ Gambia}$=1, n_{Kenya}=3, n_{UK}=2) and *cost* (n=6) ($n_{The\ Gambia}$=1, n_{Kenya}=4, n_{UK}=1) were most frequently mentioned in Kenya. *Effort* (n=6) most frequently mentioned as a sub-theme of *price value* in the UK ($n_{The\ Gambia}$=1, n_{Kenya}=2, n_{UK}=3). *Effort* was described across groups in terms of concentration required to motivate oneself to access the course and to understand the course materials. The following example excerpts were coded as "*price value/effort*":

> *"You sacrifice your energy too; you stop doing this thing, sitting at the computer, you do the course. That is your energy." – Female (28) Kenya*

> *"You need self-motivation, because again you've got nobody else to chivvy you along. You have to be quite motivated, which can be an effort. You have to think. (Laughter) Sometimes you don't want to think, but you have to think. You have to use your brain. Which, again, sometimes you don't want to do when you've been at work all day." – Female (42) non-participant UK*

Travel was described favourably by participants. Although there were *time* and financial *costs* associated with travel, participants acknowledged that *travel* demands were lower for e-learning than for classroom methods of training. The following example excerpt was coded as "*price value/travel*":

> *"Other kinds of learning, you know, like the manual one, it is time-consuming. It requires a lot of time for you to travel to where the institute is, you see, rather than eLearning." – Male (29) Kenya*

Learners valued the "zero" *cost* of e-learning that was provided by their workplace. Learners described the value of not having to use their own money to pay for course materials as a beneficial aspect of *price value*. The cost aspect of *price value* was distinct but related to the cost aspect of *facilitating conditions* (6.4) which captures the

cost elements of the underlying infrastructure. The following example excerpt was coded as "*price value/cost*":

> *"I always think about training but if I think about the money I'm going to use to pay - I have my family, my children, my father-in-law - I am the one who is taking care of those people. Do you understand what I'm…? My children they are taken care (of), their father is taking them, some of them are taken care of by me and my bills I take care of them. So… I can't take my money and pay for an expensive course. I want to learn but I do not have the skill." – Female (49) non-participant The Gambia*

> *"Sometimes you have to incur the cost of travelling. For myself, I was supposed to be attending classes for tutorials, at the start of every semester I used to go and meet with the teachers face-to-face, and that's where I had to pay for my travel. I have to pay for my accommodation for the time I was there. Those were, basically, some of the costs that I had to pay." – Male (32) non-participant Kenya*

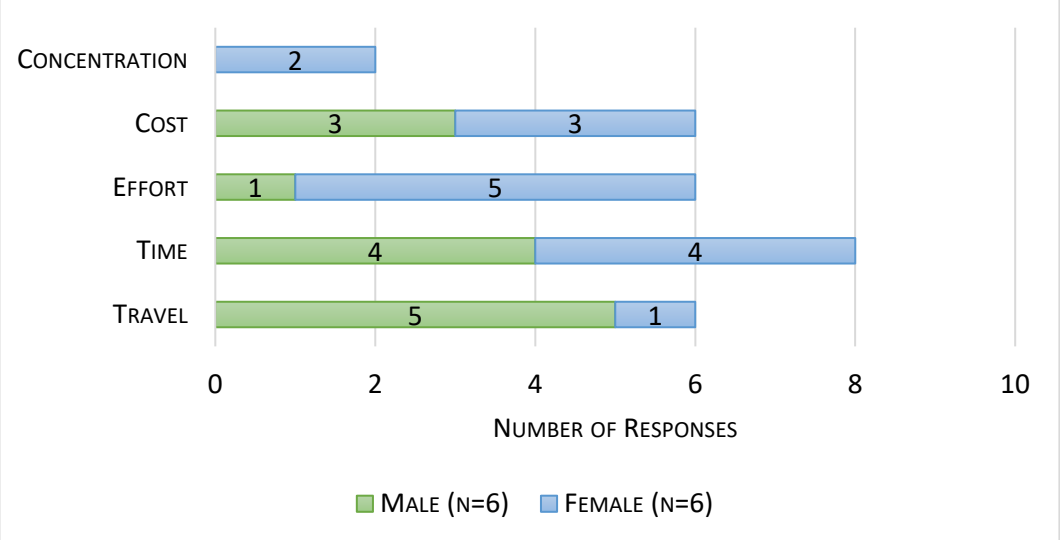


Figure 21: Price value sub-themes by gender across all country groups

There was no gender or age difference in the occurrence of theme-level *price value* nodes in the sample (n_{Male}=6, n_{Female}=6, n_{Older}=6, $n_{Younger}$=6).

Figure 21 shows the *price value* sub-theme responses from male and female participants across all country groups, with participants that provided no *price value* response excluded from the figure. Both gender groups equally prioritised time and cost ($n_{Male}=n_{Female}$) as aspects of *price value.* Male participants perceived travel as an important aspect of *price value* compared with female participants who perceived effort as an important aspect of *price value*. Two female participants noted concentration as a cost element of *price value*.

Figure 22 shows the data for younger interviewees, under the age of 35, compared with older interviewees, over the age of 35, with participants that provided no *price value* response excluded from the figure. The data shows a balanced view of effort, cost and concentration ($n_{Older}=n_{Younger}$) sub-themes between age groups, with a slight age bias such that a greater number of older participants perceived time and travel as a sub-theme of price-value compared to younger participants. However, overall, the data did not indicate a noteworthy difference between the perception of older and younger participants relating to the theme of *price value*.

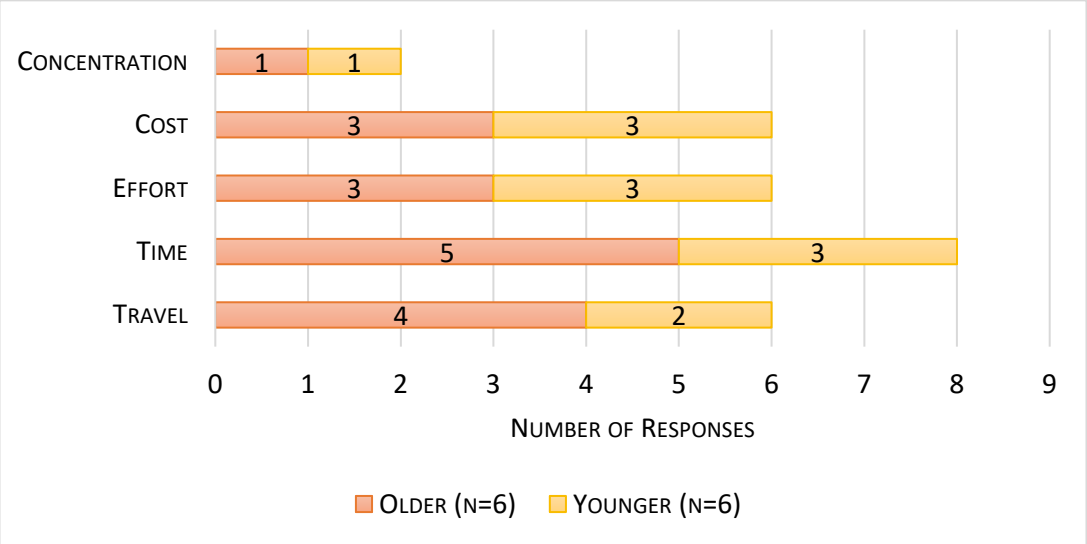


Figure 22: Price value sub-themes by age

In summary, *price value* was mainly constructed of sub-themes *time*, *effort*, *cost* and *travel*. *Time* was perceived as a finite resource that needed to be spent to complete e-

learning, more important for older participants. *Effort* was perceived in both cognitive and motivational terms and more important for female participants. *Travel* and financial *cost* were perceived in terms of the time and money cost of travelling to a place with suitable infrastructure for e-learning, and the cost benefit of the organisation paying for training. These direct costs were more important in the African context.

6.2.2. Learner Expectation in Performance Expectancy

Although *performance expectancy* was not explicitly included in the interview questions, many of the responses included learner perceptions of performance attributes of the technology: these responses are included here. The connection map for the whole sample for the theme of *performance expectancy* and associated sub-themes is shown in Figure 23.

The theme of *performance expectancy* was discussed by all participants (n=18), without age, gender or cohort differences. Across the whole sample, the sub-themes that interviewees discussed were *learner control* (n=14), *effectiveness of learning* (n=12), *quality of education* (n=10), *work performance* (n=10), *efficiency* (n=9), *positive prior experience* (n=1) and *knowledge quality* (n=1).

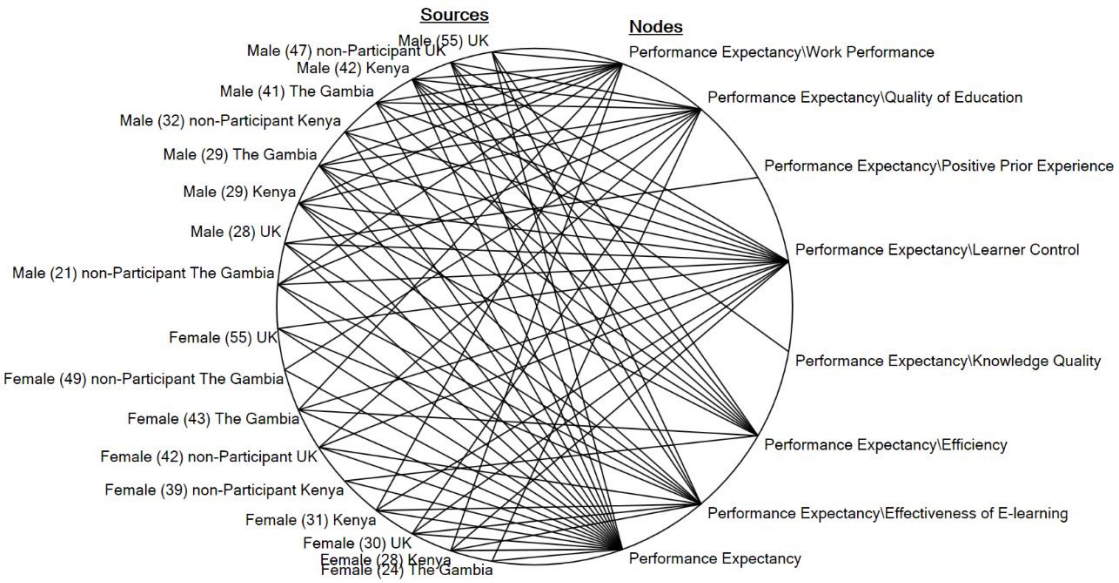


Figure 23: Connection Map: Performance Expectancy, Whole Sample

The difference in the perception of the theme, *performance expectancy*, in the different context groups, The Gambia, UK and East Africa, can be seen in Figure 24. Learner control was of equivalent importance across all cohorts ($n_{The\ Gambia}$=4, n_{Kenya}=5, n_{UK}=5).

Learners in each group indicated that they valued the flexibility in e-learning that gave them the control to access information around their work, when and where they chose, and for the duration that they chose. The following example excerpts are from the data corpus, coded as "*performance expectancy/learner control*" demonstrating that learner control over the time, place and pace that they accessed e-learning was the most cited sub-theme of the most referenced theme across country and demographic groups in the interview data.

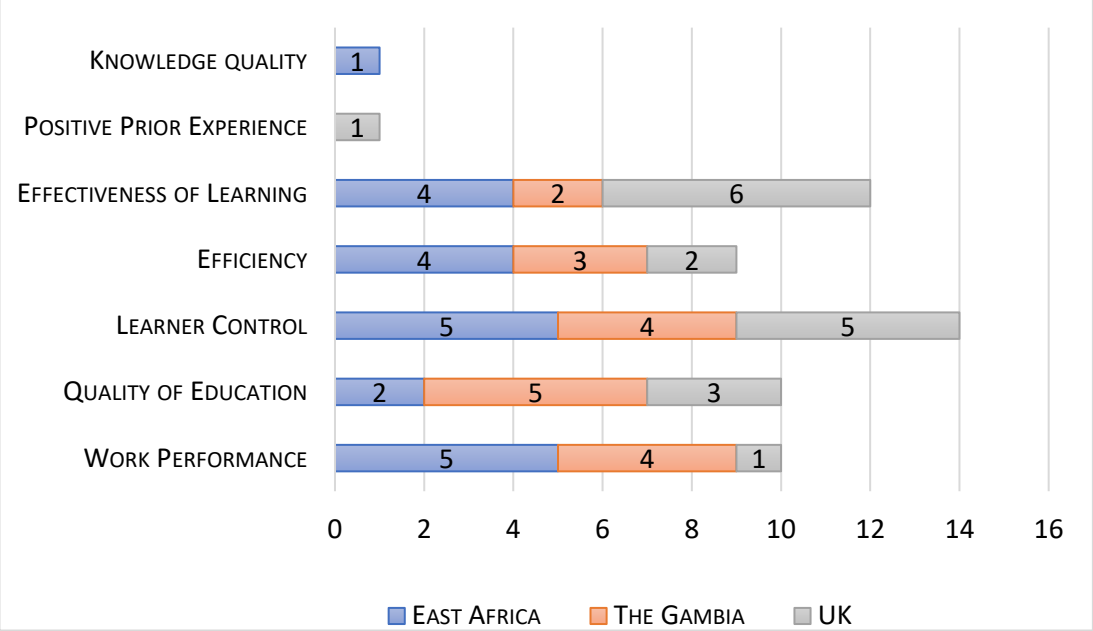


Figure 24: Performance expectancy across country groups (n=18)

"I think it's more enjoyable because I get to programme myself the way I want to learn. If it was like, a formal classroom, I have to be there every time but with e-Learning, I can programme myself. I can read this from 10 to 12 or what- depending on what I want to do, and

I can also like, save that, come and learn some later time" – Female (31) Kenya

"Well, it's good because you can do it from your own home. It's quite enjoyable, in terms of you can do it at your own pace, to a certain extent. Obviously, there are deadlines. I like the flexibility of it. That's probably about all I enjoyed about it, I think." – Female (42) non-participant UK

"When you are not working, and you don't have time to be going to classes, scheduled classes. If I have any time, you can log in at any time. If you go home, and have internet access at home, you can get to log in. You can even get your coffee and do your e-learning." – Male (22) non-participant The Gambia

"It has a number of benefits because you can do it at any time, even right now when I have some work I can do that work and when I'm done, or I see that I'm far beyond the halfway and the target is far away I can seek to do my work. So it's so convenient, you can do it at any given time" – Male (32) non-participant Kenya

Although coded under the sub-theme of *learner control*, the male non-participant from the UK group indicated that the flexibility of e-learning created the perceived expectation from the organisation that e-learning was an acceptable addition to the workload of individuals, thereby causing a problem for workers to manage their time and fit e-learning in around work priorities. Although the same issue was noted by other participants as a benefit of e-learning, it is worth noting that learner perception of flexibility can be both positive and negative:

"What's not enjoyable about it, I think, is when they get to- I think e-learning, if anything, it needs to be short and to the point and sweet. When you've got to be spending 20 minutes or half an hour going through stuff- The other thing that it doesn't take into account is people's day to day jobs. Quite often, if you're going on a training course or whatever, you're booked in, you're taken out of your working environment, and for that period of time, you are dedicated to

that course. Whereas with e-learning – and this is another failure from it – you're expected to pull it in with your day to day job. Now, some people are more busy than others. Some of us are extremely hectic. So, to open up something that says, 'Please can you do this? It's going to take you 30 minutes,' you're thinking, "Oh, Christ." To try to fit that in, and also try to do it in an open plan office, it is not suitable" – Male (47) non-participant UK

There was a difference between cohorts in the perception of the *effectiveness of e-learning* ($n_{The\ Gambia}$=2, n_{Kenya}=4, n_{UK}=6). UK participants described performance attributes of e-learning most, Gambian participants least. However, the range of issues within this sub-theme identified by participants differed little between country groups. The following example excerpts were coded as "*performance expectancy/effectiveness of e-learning*":

"There's probably a greater range of topics that you could do as well because you're not relying on the expertise that are local to you, that are within travelling distance. You could, you know, do anything you wanted, up to a point I suppose." – Female (30) UK

"It tends to be more interactive. You click on things. You get little demos and what have you about how things should be, and how you might not be doing things properly. I think it's more enjoyable." – Female (55) UK

"It goes and it's reliable. Faster. Compared to others, the future is e-learning. If someone can explain something, you want a person to repeat it back, when he was explaining it the first time and the second time, it is slightly different than if something is fixed." – Male (21) non-participant The Gambia

"Sometimes you start to feel it's boring when you are alone and interaction in a classroom and when you are alone doing the e-learning. Sometimes interaction in a classroom when you are alone it makes you feel worried… Sometimes the e-learning, you know, e-learning you are alone… So sometimes you feel bored."– Male (29) The Gambia

Quality of education was the next most mentioned sub-theme within the theme of performance expectancy, proving most important in The Gambia ($n_{The\ Gambia}$=5, n_{Kenya}=3, n_{UK}=2). This sub-theme was primarily coded for the participant's perception of the quality of formal education in terms of qualifications or certificates that would be gained through the completion of e-learning compared to the status of analogous qualifications arising from traditional training, as a tangible extrinsic outcome of the learning process, and the career benefits that could arise from these outcomes. The following example excerpts were coded as "*performance expectancy/quality of education*":

> *"So, people were not taking it seriously because they are saying when you complete e-learning what kind of certificate are they going to award you and what would those certificate benefit you in the future. So, people are not seeing maybe e-learning as something very important or relevant to their course. They are seeing that maybe after doing the e-learning we are not going to be upgraded or not be able to get anything from it." – Female (24) The Gambia*

> *"Probably quite important. It depends what it is again. If it's a short course, it doesn't really matter but if it's something that you're committing more time to then you want to feel like you're getting something out of it as you're doing it rather than just the end result of a qualification or whatever." – Female (30) UK*

> *"It's good. When they get the certificates, they feel that they are more comfortable because they have the certificates. Sometimes, when vacancies are out, they include that in the requirements. If you have a field worker certificate, for Level 1, Level 2 or Level 3, it actually helps you. When they get the certificate, it also motivates them to enlist. In that way they can secure a better position in the field, than the present position they are in." – Male (21) non-participant The Gambia*

> *"You know, in terms of the work position, if you go, you expand your learning capacity, no? There is the possibility of you getting an upgrade in the job… A promotion, like that, if you have some papers, you know. " – Male (29) Kenya*

Efficiency of e-learning was the next most mentioned sub-theme within the theme of performance expectancy (n=9), proving more important in African groups than for UK workers ($n_{The\ Gambia}$=3, n_{Kenya}=4, n_{UK}=2). Participants indicated two main aspects of the efficiency of e-learning: that it was quicker than traditional methods, and that, by virtue of accessing e-learning through a web-enabled computer, one could search for any other information needed alongside the e-learning course, which was not possible in a traditional classroom setting. The following example excerpts were coded as "*performance expectancy/efficiency*":

> *"E-learning is fast, it's convenient also, plus the normal courses in class for us also, so for e-learning you have your own time, any time you want to come and do your work and it's fast also. You can do one or two modules in the week if you are fast and you have time also." – Female (43) The Gambia*

> *"It's faster. You know many things compared to the others." – Female (39) Kenya*

> *"In that it does not cost you much time. So less time-consuming." – Male (29) Kenya*

> *"When I've access to the internet you can have - you can start anything you want to start on the internet to guide you on your e-learning. But if - when it is not e-learning you have to study from books, read books. If you need something… you have to go for a specific book to read about it. On the internet e-learning is - you can start it on the internet by using Google to read anything you want to do" – Male (29) The Gambia*

> *"With eLearning you have access to so many resources, you have got eBooks, you've got some journals, so you have this puzzle of so many resources to make sure that you have very smooth learning. It's not really a big comparison because even the regular students will also access these, but with e-learning, since you are already having the internet as the primary source for your learning you also find it easier to move around the internet and search for some resources and some eBooks. So, you are more acquainted to using the internet*

resources than getting to a real library, taking a book and researching on something. So, it's more convenient when you are already on the internet, you are even used to using the internet resources. For me I would say it's a benefit." – Male (32) non-participant Kenya

Work performance as a sub-theme concerned the technical application of learned knowledge or skills to the work of the learners. *Work performance* was discussed more by African participants ($n_{The\ Gambia}$=4, n_{Kenya}=5, n_{UK}=1), a reflection of the greater relevance of the training content and general ICT skills to the African workers. The following example excerpts were coded as "*performance expectancy/work performance*":

"Kind of skills are like, as for our job, we are not supposed to diagnose someone or give medication. We are there in terms of research, but at the end of the day, if you see like, okay you have got those symptoms of malaria, signs or symptoms of measles, so when a patient comes – because we are dealing with medical patients - so you are in a position that you can outline this patient is a medical case, and this one is not a medical case. So, using those symptoms, or using this information I got from the e-learning, so I can say this is a patient I need that I should do research with, or this is a patient, no I am not supposed to do research with". – Female (28) The Gambia

"It also helps you to know the use of computers and access easily. Some people don't use computers, but if you are used to e-learning it can help you even to make you know a bit of computer." – Male (21) non-participant The Gambia

There was no gender or age difference in the occurrence of theme-level *performance expectancy* nodes in the sample (n_{Male}=9, n_{Female}=9, n_{Older}=9, $n_{Younger}$=9). Figure 25 shows the *performance expectancy* sub-theme responses from male and female participants across all country groups, all of whom referenced the theme of *performance expectancy* in their interview data.

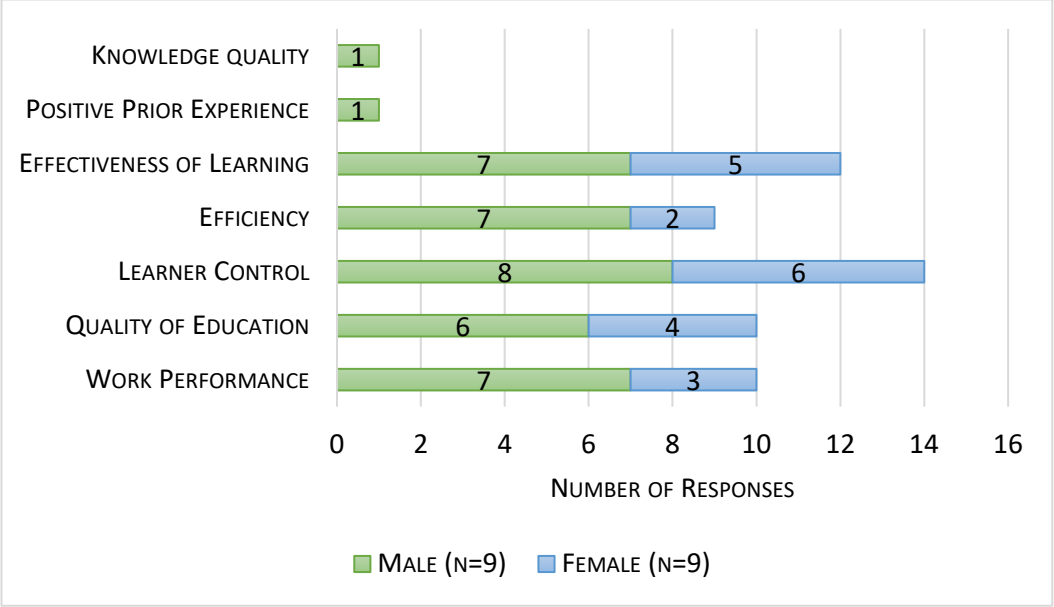


Figure 25: Performance expectancy sub-themes by gender

None of the sub-themes of *performance expectancy* were equally referenced by the two gender groups (i.e. $n_{Male} \neq n_{Female}$ for all sub-themes). Male participant data favoured all sub-themes of *performance expectancy* when compared with female participant data. However, as demonstrated by the data excerpts earlier in this section, the gender differences in the perception of learner control, quality of education and effectiveness of e-learning were slight. The sub-themes of knowledge quality and positive prior experience were only referenced by male participants, albeit with a single participant mentioning each sub-theme.

Figure 26 shows the data for younger interviewees, under the age of 35, compared with older interviewees, over the age of 35, with participants that provided no *price value* response excluded from the figure. The data shows a balanced view of the quality of education sub-theme ($n_{Older} = n_{Younger}$) between age groups. There was a slight age difference in learner perception of effectiveness of learning, learner control and work performance such that these sub-themes were more prevalent in the data from participants under 35 years of age. However, as demonstrated by the data in this section, age differences in learner control, work performance and effectiveness of e-learning were slight. Efficiency of e-learning was more important to older learners.

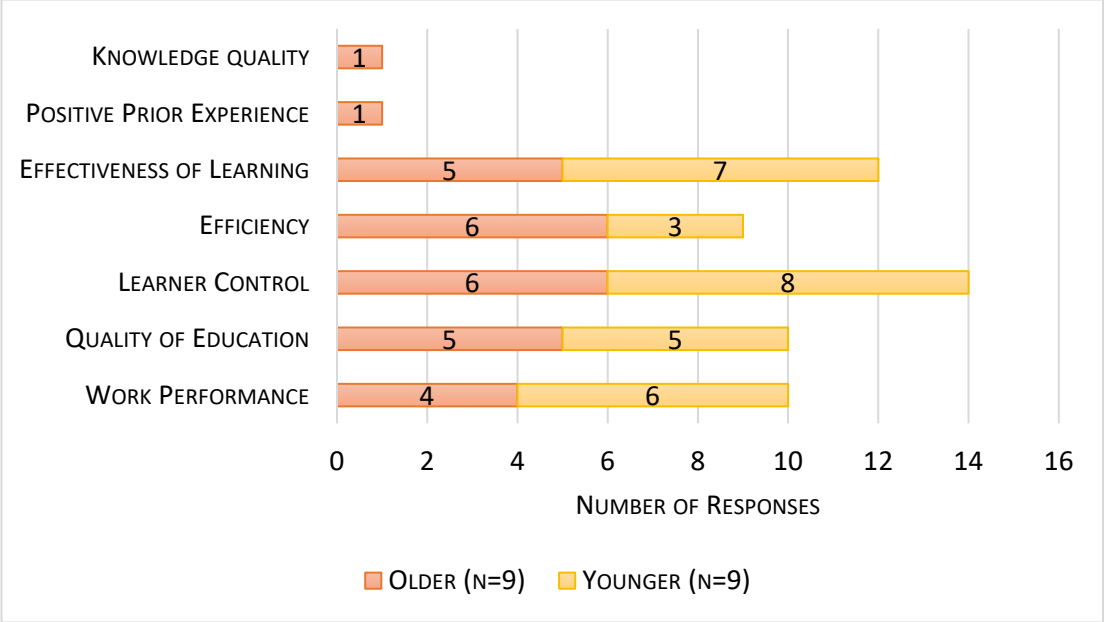


Figure 26: Performance expectancy sub-themes by age

In summary, *performance expectancy*, although not explicit in the question set, was discussed by participants in terms of the performance attributes of e-learning: *learner control* over the time, pace and place of e-learning access; the *effectiveness of learning,* the *quality of education* as qualifications and certificates; *work performance* related to skills gained from e-learning completion; and the perceived *efficiency* of e-learning over traditional teaching. *Learner control* was important across all contexts, more important for younger and male participants than older and female participants. *Quality of education* and *work performance* were most important in African groups, and for male participants.

6.2.3. Learner Habits

Habit was observed in the data sample (n=15) with sub-themes *online habits* (n=10), *offline habits* (n=6), *no learning* (n=3), and *prior experience* (n=2). The connection map for the theme and subthemes of habit are shown in Figure 27.

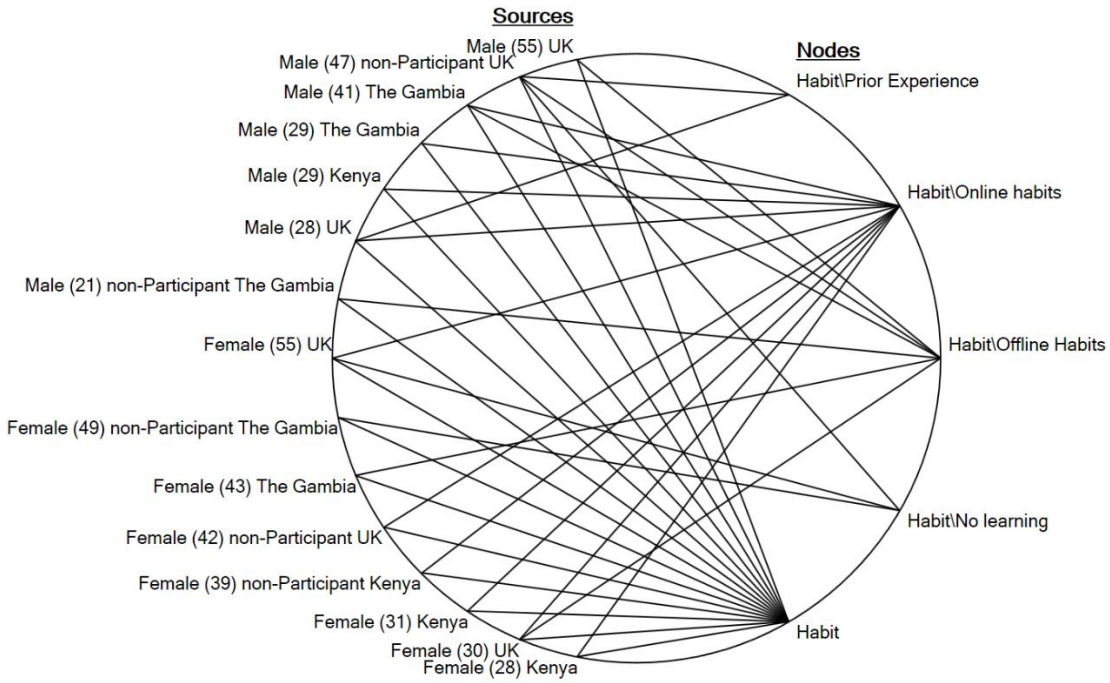


Figure 27: Connection Map: Habit, Whole Sample

Figure 28 shows the breakdown of the theme of *habit* into sub-themes, and the relative importance of sub-themes in participant responses from each country group. *Online habits* was the most cited sub-theme of *habit* by interviewees (n=10), occurring more in East African and UK groups than in The Gambia ($n_{The\ Gambia}$=4, n_{Kenya}=2, n_{UK}=4). Workers had developed online habits socially, such as for using news sites and social media, that they related to their preferences for learning online.

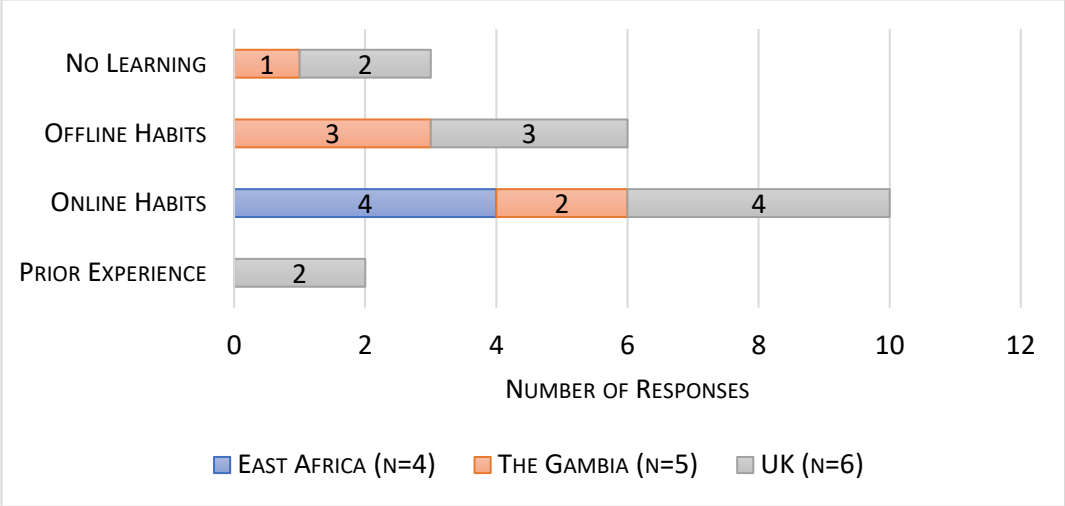


Figure 28: Habit sub-themes across country groups (n=15)

Workers in all contexts indicated they had built up habits for accessing information online because of the ease of rapidly accessing a variety of information. Workers used social media and Google for news feeds and research, with online research being supported by managers. The following example excerpts were coded as "*habit/online habits*":

> *"…my dad knows I'm into cooking so he bought me this really good encyclopaedia style cookbook and that's great but I haven't taken it out apart from maybe twice because whenever there's something that you think, "Oh I don't know how to cook a hollandaise sauce," you'll be like, "I'm going to Google that." You're just used to looking at things online and finding out things there and then step by step so you get websites like Instructables don't you, which isn't dissimilar from eLearning. I'm used to it through that." – Male (28), UK*

> *"When he [the Manager] gives you this challenge, that's when you sit down and start researching on the Internet. I go into Google, I am going to research this and this on this website and you tell him it does tell you- "Where did you get this information?" Well, from reading it here." – Female (31), Kenya*

"I think you do it without even thinking about it. I think it's one of those things that, because it's so easily accessible to look something up online, I think people… You asked me the question earlier what my habits are and why I don't really learn. Well, I obviously do. I'm learning all the time. We're all learning all the time. I think people use e-learning without even realising and thinking that they're using it… If you need to look something up you are finding things out, so therefore you are learning, and searching is…As I say, whereas previously I would have gone to the library, and got a book out to research what I needed to know, now I can do that on the internet." – Female (55) UK

There was no notable gender or age difference in the occurrence of theme-level *habit* nodes in the sample (n_{Male}=7, n_{Female}=8, n_{Older}=8, $n_{Younger}$=7). Figure 29 shows the *habit* sub-theme responses from male and female participants across all country groups (n=15). None of the sub-themes of *habit* were equally referenced by the two gender groups (i.e. $n_{Male} \neq n_{Female}$ for all sub-themes).

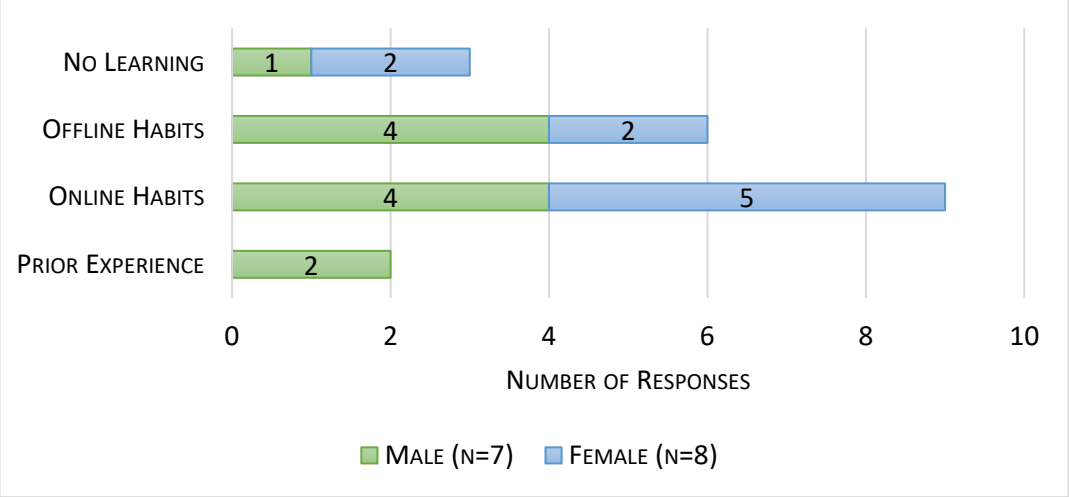


Figure 29: Habit sub-themes by gender

Male participant data favoured all sub-themes of *habit* when compared with female participant data except for the sub-theme of *no learning* which was favoured by female

participants. The sub-theme of *prior experience* was only referenced by male participants (echoing the *positive prior experience* sub-theme of *performance expectancy*). The data indicated that *habit* in a positive sense, that was relevant to the consumption of e-learning, was more relevant to male participants than female participants. The lack of gender difference in the theme-level response results from the theme-level responses including both responses related to offline/online habits as well as an explicit declaration of no learning habits.

Figure 30 shows the *habit* data for younger interviewees, under the age of 35 (n=7), compared with older interviewees, over the age of 35 (n=8). The data shows that younger participants expressed the sub-theme of *online habits* with greater frequency than older participants. Conversely, older participants expressed the sub-themes of *offline habits* and *no learning* habits with greater frequency. These findings are complementary and indicate that learning habits in each age group differ with respect to their preference for e-learning usage such that younger learners have habits akin to e-learning habits. In summary, *habit* was important to learners, who had mainly accumulated *online habits* in their social lives, through the consumption of online news and social media.

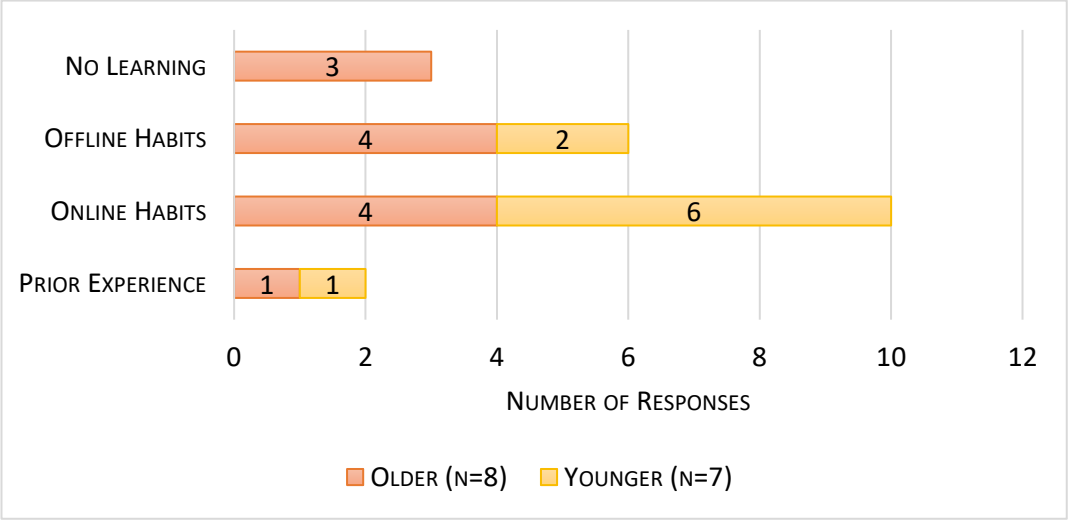


Figure 30: Habit sub-themes by age

6.3. The Role of Social Influence, Hedonic Motivation, and Effort Expectancy

A direct relationship between *social influence* and *behavioural intention* was not observed in the survey data. Instead, the relationship was fully mediated by *performance expectancy*. An explanation for this finding might be found in examining normative and informational influences in the interview data. This section examines the types of *social influence*, as explained by interviewees (n=18, one participant (Female, 42, The Gambia) gave no coded comments on *social influence* and therefore does not appear in the connection maps), that relate to user intention and performance attributes of e-learning.

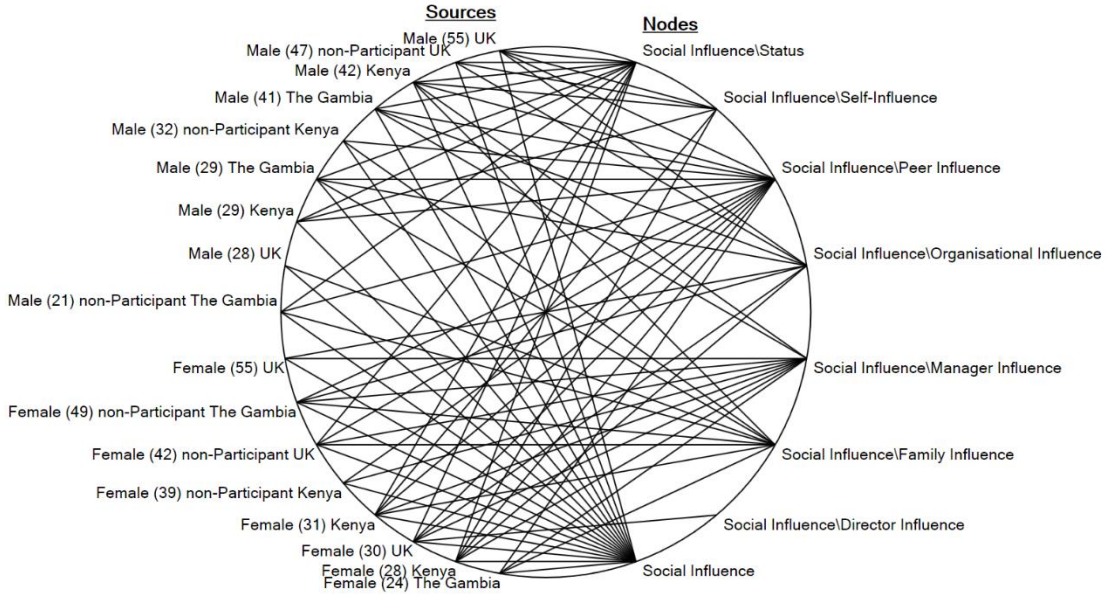


Figure 31: Connection Map: Social Influence, Whole Sample

6.3.1. The Nature of Social Influence in the Study Contexts

Social influence was described in the interview data (n=17, Figure 31) in terms of *peer influence* (n=14), *status* (n=11), *manager influence* (n=10), *family influence* (n=9), and *organisational influence* (n=8). Some interviewees stated that they were their own most important source of influence (*self-influence* n=6) and one interviewee mentioned

director influence (n=1). Peer influence was more important for African workers than for UK workers ($n_{The\ Gambia}$=5, n_{Kenya}=6, n_{UK}=3).

The following excerpts demonstrate a difference in the nature of peer influence: African workers described peer influence as primarily informational, with colleagues describing aspects of the e-learning experience such as the technical mechanisms for gaining access or certificates; UK workers mentioned normative influence arising from group discussions where participants might decide to access e-learning based on whether colleagues have completed it or not. The following example excerpts were coded as "*social influence/peer influence*":

> *"…I also remember the other time I was printing my certificate for good clinical practice, which I've just done recently. One of my colleagues saw my certificate and was like: "Where did you get this one?" Then I said, "Well, there was a link that was sent to me by my line manager about this one." I had just completed the course. And he said, "Can you forward that to me straightaway?" And I did… another colleague of mine… He just wrote an email and said, "This course is good for you guys who are doing community engagement." He forwarded them to us and we did them." – Male (42) Kenya*

> *"They told me that eLearning does not take much of your time, and also, it requires devices like the phone, Internet that you can get the bundles and whatsoever, then you communicate, you know. When you are doing the research, you just go to the Internet. You search everything new, you are getting direct." – Male (29) Kenya*

> *"…we would then go to our tea club for a 20-minute break, and we would say, 'We did this training course', and complained about it, or whatever we wanted to do, and the other people would say, 'Oh, I haven't done that yet.'…" – Male (55) UK*

> *"They told me that eLearning does not take much of your time, and also, it requires devices like the phone, Internet that you can get the bundles and whatsoever, then you communicate, you know. When you are doing the research, you just go to the Internet. You search everything new, you are getting direct." – Male (29) Kenya*

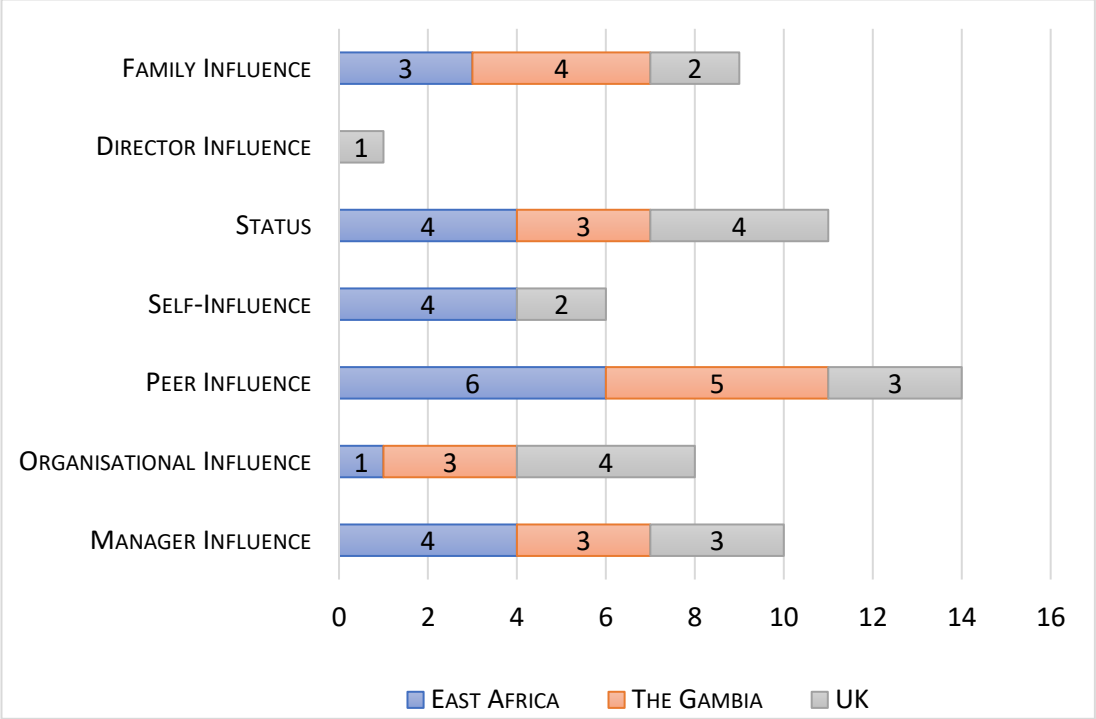


Figure 32: Social influence across country groups (n=17)

Status was important in all three contexts ($n_{The\ Gambia}$=3, n_{Kenya}=4, n_{UK}=4). African interviewees indicated a positive status from the extrinsic outcomes of completing an e-learning course, such as being perceived as more knowledgeable by their peers.

> *"I think e-Learning is really building people up because I think, like most of the people come to get certain information about a certain thing it means they trust in the information that you are giving out to them. I think it really changes status. It has really changed here. I get to learn so many things that I previously didn't know and hadn't gone to school to study them but then by the use of the Internet and everything, I get informed so much. You can argue with a person about a certain thing and like, they know they're equipped. Mentally they are equipped, so it really changes status. People get to respect you so much." – Female (31) Kenya*

UK interviewees indicated the opposite, in that higher status members of the organisation were perceived as exempt from mandatory organisational initiatives that were perceived as operational compliance, and that members who were not 'high status' just had to comply with the request.

> *"…because we're admin support and the scientists are here to carry out the science and everything else is just, kind of, the periphery of that. So, the perception is that they just want to get on with what they have to do and they shouldn't have to do as much…" Female (30) UK*

Manager influence was of equivalent importance across groups ($n_{The\ Gambia}$=3, n_{Kenya}=4, n_{UK}=3). Across all contexts, *manager influence* was in a general sense towards training and the benefits of workplace training, rather than specifically towards a particular e-learning course. African interviewees perceived that their managers encouraged the use of e-learning, and would provide resources where needed to ensure access. UK workers showed a clear gender effect, in that only female workers mentioned *manager influence*, a pattern which was mirrored to some extent in the overall sample (n_{Male} =2, n_{Female}=8). Age moderation of learner perception of *manager influence* was not clearly observed (n_{Older}=4, $n_{Younger}$=6). The following example excerpts were coded as "*social influence/manager influence*":

> *"So according to my coordinator when we had our weekly meeting, he was the one who motivated us and asked us that to all take E-Learning seriously and to take part in it because it's something that's going to benefit us in the future. It's a learning process that's going to add many things and it's going to give us some clue of how to go about in the field because it's related to our field activity." – Female (24) The Gambia*

> *"Because what I know is that also my supervisor knew that I have participated in that course, and the fact that it is voluntary, so I don't know what will come next. But as per them, I feel proud. I feel good. I feel I am the chosen one. Because I entered in the web and it supported me, and I participated in that course. And in that group of mine it is only me who succeeded, so I feel great." – Female (28) Kenya*

"I suppose managers to some extent as well… In whether they promote it, encourage it, make the time for it… See the importance of it." – Female (30) UK

"My coordinator was emphasising that any time let us, if there is any course during our career with [organisation], and it is free, let us do everything…. him and our supervisors, and maybe you during your speech last time…They encouraged that this will pave a long way in strengthening our capacity, giving us more skills, more techniques of doing our job in a better way." – Male (41) The Gambia

Family influence was least important in the UK group and most important in the Gambian group ($n_{The\ Gambia}$=4, n_{Kenya}=3, n_{UK}=2). There was no gender effect, but older workers expressed greater family influence (n_{Male}=5, n_{Female}=4, n_{Older}=6, $n_{Younger}$=3). There was a difference in the type of influence between genders: male participants would receive resources or assistance from their family, female participants indicated that spending time with family was more important and dissuaded them from using e-learning outside of work. The following example excerpts were coded as "*social influence/family influence*":

"I did like the fact that if I had had a really long day at work, and my kids were playing up and everything, that I didn't actually have to hit the books that night. I could just think, "Well, I will do it tomorrow." – Female (42) non-participant UK

"The benefits that I realised more than in the part-time is much of the convenience, the convenience of time, that you can be doing your business as well, and if you have a family you can still be fending for your family and doing eLearning. That convenience is one of the biggest benefits that cannot really be matched with the part-time mode of study." – Male (32) non-participant Kenya

"Yes, my dad, because he's always very keen for my education. So anything that I tell him that has to do with my job or anything that has to do with my education or career he always influence me. He's very keen." – Female (24) The Gambia

"I always think about training but if I think about the money I'm going to use to pay I have my family, my children, my father-in-law. I am the one who is taking care of those people. Do you understand what I'm… My children they are taken care, their father is taking them, some of them are taken care of by me and my bills I take care of them. So if I told about them I can't take my money and pay for an expensive course. I want to learn but I do not have the skill." – Female (49) non-participant The Gambia

Most of the time, here in Africa, sometimes people have a job and the salary is not good. They have another part time here that they go and work for. Sometimes it is also difficult, when your salary cannot sustain you and your family, you have to look for another job. In those two jobs also, if you want to link them together, to have for e-learning, it's very difficult." – Male (21) non-participant The Gambia

Organisational influence was least important for Kenyan workers ($n_{The\ Gambia}$=3, n_{Kenya}=1, n_{UK}=4). Gambian workers reported the influence from a champion that provided information about the e-learning course and the benefits of accessing and using the course; UK workers indicated that e-learning was perceived as a mandated initiative. There was no gender or age difference in perception of organisational influence (n_{Male}=4, n_{Female}=4, n_{Older}=5, $n_{Younger}$=3). With organisational influence, similar to manager and peer influence, the benefits of the e-learning course were emphasised, rather than social norms. The following example excerpts were coded as "*social influence/organisational influence*":

"Yes. [The Champion], always gives us encouragement. All their visits to have this e-learning; to take it seriously because this would help you in future. Help you with your environment; the people you work with. So, I think it's a good project" – Younger Male (28), The Gambia.

"…the e-Learning programme from [The Champion], the 'Ashwin Mehta' programme, they were really supporting that because they were really urging people, 'Please participate in this. It will teach you

more, participate in this.' It's true, a fact. We learned so much from that short time there." – Female (31), Kenya

"…they just asked, they sent it round, "There is this eLearning assessment, can you fill it in?" and in free moments I did it." – Younger Male (28), UK

There was no notable gender or age difference in the occurrence of theme-level *social influence* nodes in the sample (n_{Male}=9, n_{Female}=8, n_{Older}=8, $n_{Younger}$=9). Figure 33 shows the *social influence* sub-theme responses from male and female participants across all country groups (n=15). The only sub-theme of social influence that was referenced equally by the two gender groups was learner perception of *organisational influence* (i.e. n_{Male}=n_{Female}). There was a slight difference in the perception of *family influence* and *peer influence*, such that *family influence* was espoused by more male participants, and peer influence was espoused by more female participants. There was a difference in the perception of *family influence* such that male participants mentioned having to balance e-learning around working to support their families, whereas female participants mentioned balancing spending time with families and e-learning, as demonstrated by the data excerpts earlier in this section.

Participant responses in the sub-themes of status, self-influence, and manager influence showed greater gender differences (Figure 33). Male participants discussed gaining status in their social hierarchy that arose from the use of e-learning was important and that self -influence was important, whereas female participants indicated that manager/director influence was more important. The data indicated that *social influence* was important in different ways to male and female participants, and that while male participants were influenced through their position in their social or organisational hierarchy, either through self-motivation, status or peer position; female participants were influenced by actors in their social environment, such as peers, family, and managers.

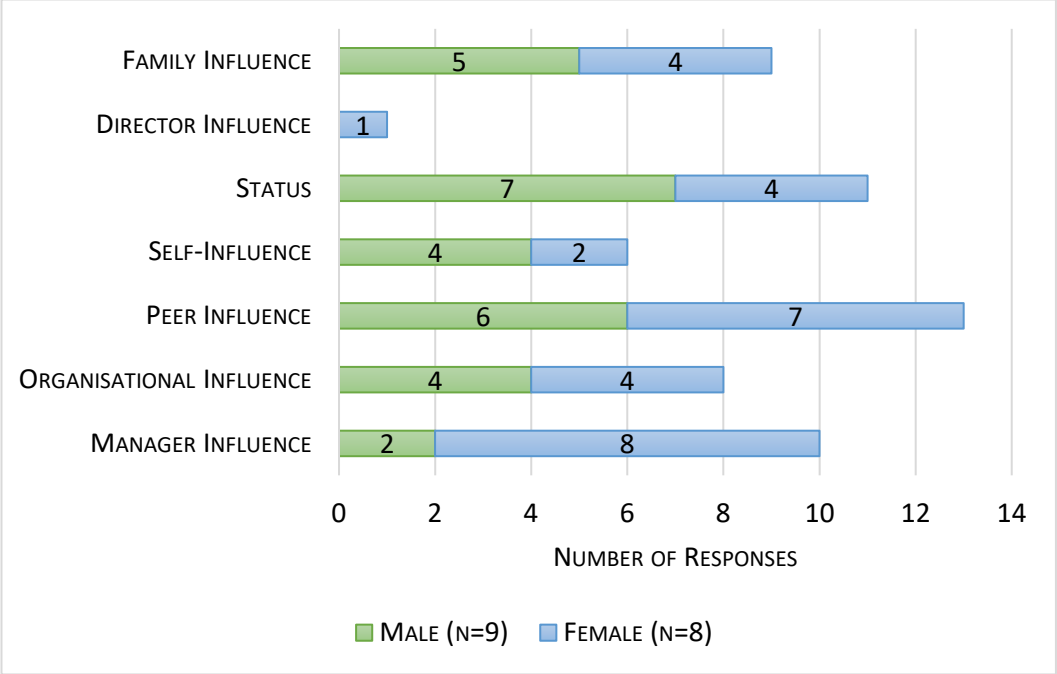


Figure 33: Social influence sub-themes by gender

Figure 34 shows the *social influence* data for younger interviewees, under the age of 35, compared with older interviewees, over the age of 35. The data shows that younger participants expressed the sub-themes relating to referents within the social environment (family influence, status and peer influence) with greater frequency than older participants. Older participants expressed the sub-themes related to the formal hierarchy (*organisational influence* and *manager influence*) to a greater extent than younger participants.

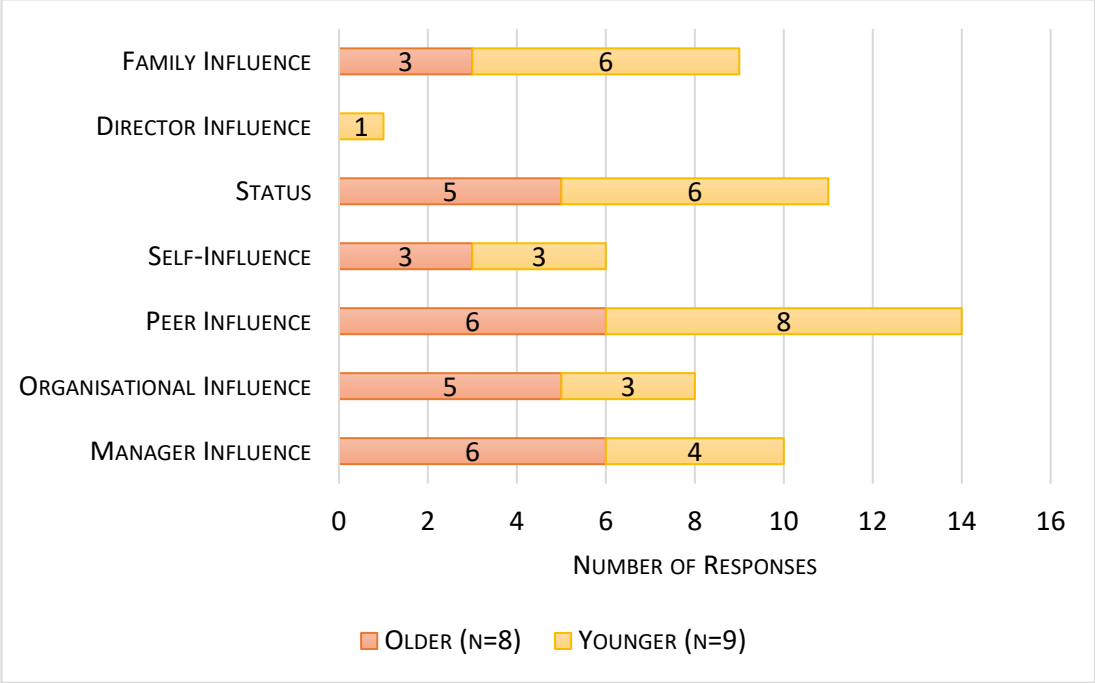


Figure 34: Social influence sub-themes by age

In summary, *social influence* was discussed in all country contexts in the sub-themes: *peer influence*, *status*, *manager influence*, *family influence*, and *organisational influence*. Sub-themes relating to the social environment, such as *peer influence*, *family influence* and *status* were most important to younger workers, and male workers indicated that *status* was important. Female workers reported *manager influence* to be important. *Status* effects differed in African and UK contexts in that African workers described enhanced status from e-learning knowledge outcomes, UK workers described high status individuals being exempt from completing required e-learning. *Family influence* differed between gender groups: females balanced time spent with family members against e-learning time requirements; males balanced time spent providing for the family against time spent learning.

6.3.2. Effort Expectancy was not often discussed

Across all interviews only five participants discussed *effort expectancy*, mostly with respect to ease of use of e-learning (n=5) rather than barriers to use (n=1), or ease of learning (n=0). This lack of data, coupled with the discussions of *facilitating conditions*

(and infrastructure-related effort in African data) as a separately coded theme indicated a possible explanation for the survey finding that there was no direct effect of *effort expectancy* on *behavioural intention*.

6.3.3. Hedonic Motivation acted via Performance Expectancy

Hedonic motivation was described in the interview data (n=13, Figure 35) in sub-themes describing enjoyable aspects of e-learning: *pedagogically stimulating* (n=7), *comfort* (n=5), *interesting* (n=4), and *visually stimulating* (n=4). The comparison of the occurrence of *hedonic motivation* sub-themes in the interview data by country group is shown in Figure 36. In the Gambian group four learners mentioned *hedonic motivation*, primarily in terms of comfort. In the Kenyan group all six interviewees mentioned *hedonic motivation*, describing e-learning as: *pedagogically stimulating* (n=4), *visually stimulating* (n=2), and interesting (n=2). In the UK group four interviewees mentioned *hedonic motivation*, prioritising *comfort* (n=3), and describing e-learning as *visual stimulating* (n=2).

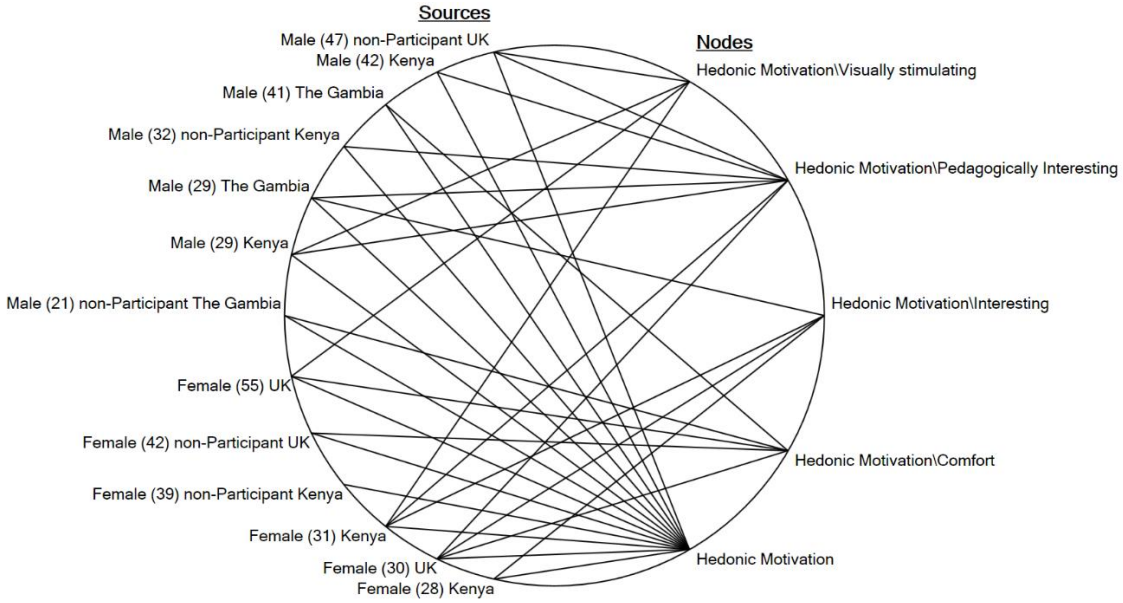


Figure 35: Connection Map: Hedonic Motivation for the whole sample

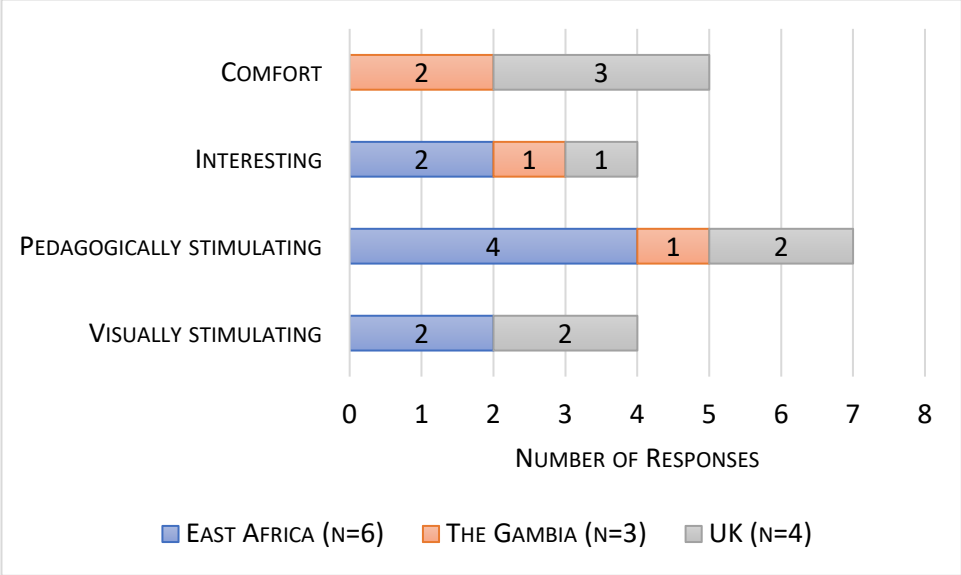


Figure 36: Hedonic motivation across country groups (n=13)

Despite the number of responses coded as themes or sub-themes relating to hedonic motivation, the sub-theme response was low, with the most cited sub-theme (learners describing the enjoyable nature of pedagogic stimulation from e-learning) mentioned by only seven learners.

> *It is enjoyable in that you are using a lesser time doing a big part of information. Like, for the courses you introduced, they were short courses, but with brief information that is good for a person like me. – Female (28) Kenya*

> *"My most interesting thing was the exam or the questions. The questions were able to gauge whether I have actually grasped or understood the content. Then after responding to them, if I found that I got 80% or above, the notion that I was able to get that mark tells me that I understand what these guys are saying; I understand what this course is talking about. I wonder whether I'm giving the right response. When you are in a class and a lecturer or a tutor is explaining so many things to so many brains with different perceptions and different understanding. So you find that the time spent could perhaps be much longer, because the way I understand may, I think, be different from the way you understand. When I ask a*

question, it may stimulate my understanding, as I was saying earlier on." – Male (42) Kenya

Hedonic motivation was primarily mentioned by learners only in the context of being directly asked about *hedonic motivation*. All 13 of the responses in this theme were linked to *performance expectancy*, supporting the survey finding that *hedonic motivation* had an indirect effect on *behavioural intention* via *performance expectancy*. When asked about the enjoyable aspects of e-learning, all participants mentioned performance attributes of e-learning, such as flexibility, instructional design or speed.

"It's quite enjoyable, in terms of you can do it at your own pace, to a certain extent." – Female (42) non-participant UK

"Why is it more enjoyable? It's faster. You know many things compared to the others." – Female (39) non-participant Kenya

"To be much more interested is that, after I was doing the two courses now with health and safety and the diseases courses now, it was like, there were things that, as in you can say someone was just tapping on the right key where I was interested in, yes. So, it is like for the diseases, you can see in the ward so many people come with those diseases, and there was some information which I didn't know, and when at that time I was aware of them." – Female (28) The Gambia

There was minimal gender or age difference in the occurrence of theme-level *hedonic motivation* nodes in the sample (n_{Male}=7, n_{Female}=6, n_{Older}=6, $n_{Younger}$=7). Figure 37 shows the *hedonic motivation* sub-theme responses from male and female participants across all country groups. While both gender groups mentioned the visually stimulating nature of e-learning equally, the sub-themes of comfort and the interesting nature of e-learning were more important to female participants, whilst male participants described the hedonic aspects of e-learning as pedagogically stimulating, linking to the core identified use of e-learning, providing a link to *performance expectancy.*

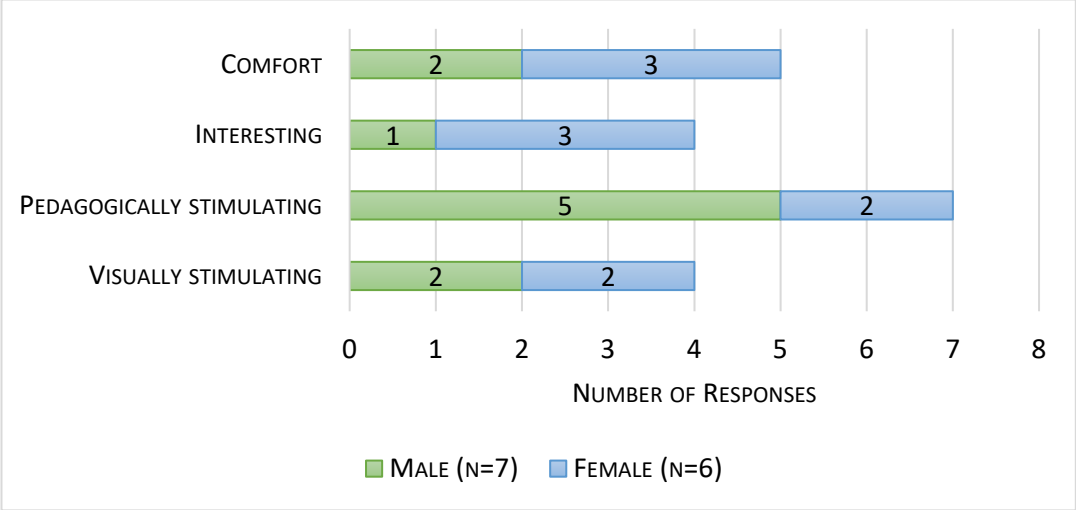


Figure 37: Hedonic motivation sub-themes by gender

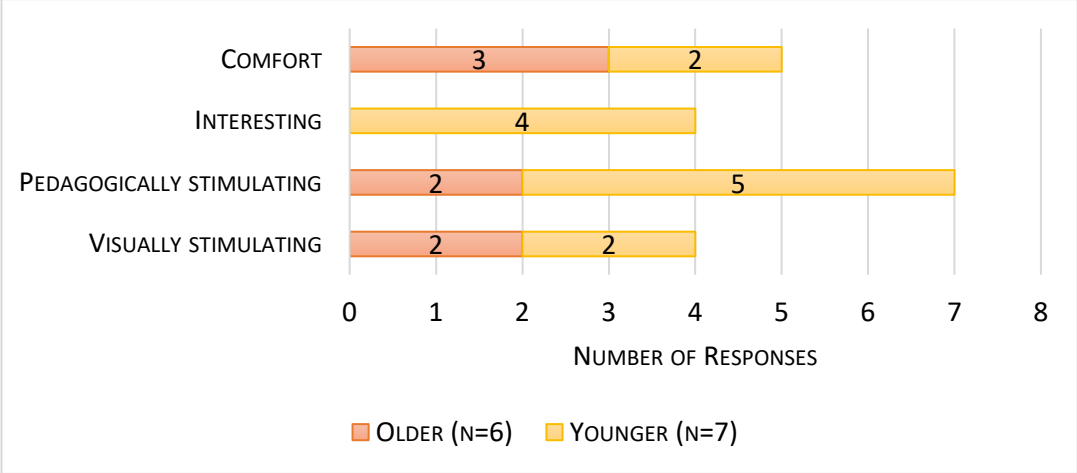


Figure 38: Hedonic motivation sub-themes by age

Figure 38 shows the *hedonic motivation* data for younger interviewees, under the age of 35 (n=7), compared with older interviewees, over the age of 35 (n=6). The data shows that younger participants expressed the sub-themes relating to the interesting and pedagogically stimulating aspects of e-learning with greater frequency than older participants. Older participants expressed greater importance of physical comfort in e-learning compared with younger participants.

In summary, *hedonic motivation* was important to learners, to the extent that they found the pedagogy of e-learning interesting, more so for younger learners. Most participants, when asked about enjoyment, strayed into talking about the performance attributes of the technology that they found most useful.

6.4. Facilitating Conditions was important

Although included neither in the survey nor interview questions, *facilitating conditions* was mentioned by participants. Across the sample, participants indicated that their perception of the infrastructure required to support e-learning was complex, as shown by the complexity of the connection map in Figure 39. Participants discussed the theme of *facilitating conditions* (n=16) with sub-themes of: *organisational support* (n=12), *network access* (n=11), *cost* (n=11), *devices* (n=9), and *time* (n=7), as well as six participants noting *other infrastructure* requirements (n=6).

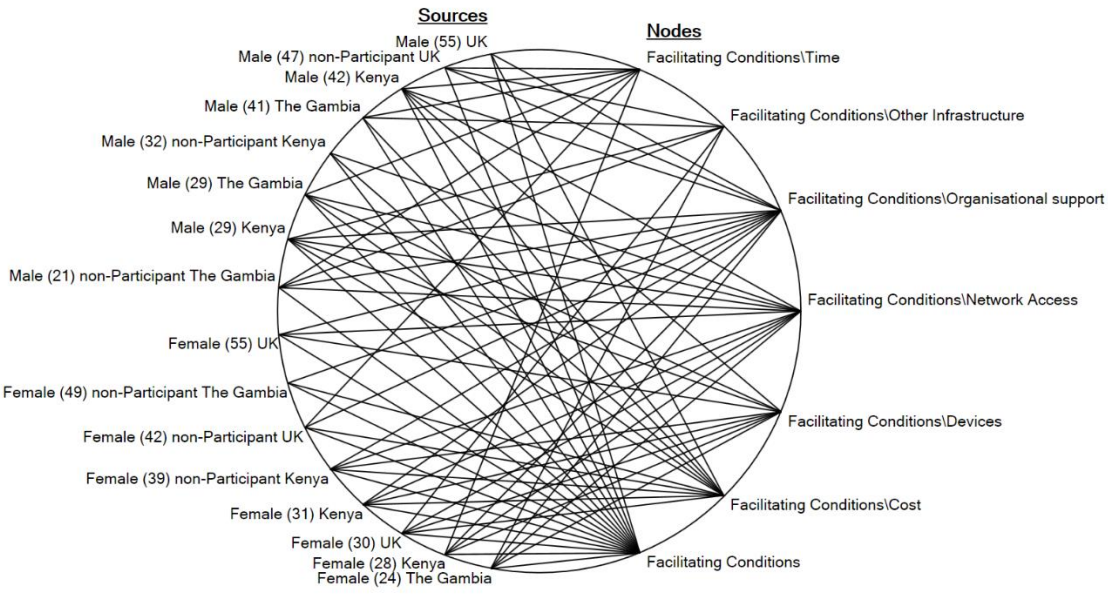


Figure 39: Connection Map: Facilitating Conditions for the whole sample

The comparison of the occurrence of *facilitating conditions* sub-themes in the interview data by country group is shown in Figure 40. In the Gambian group five learners mentioned *facilitating conditions*, with a balanced view across sub-themes. In the

Kenyan group all six interviewees mentioned *facilitating conditions*, prioritising sub-themes: *organisational support* (n=5), *network access* (n=6), *devices* (n=5), and *cost* (n=5). In the UK group five interviewees mentioned *facilitating conditions*, prioritising *organisational support* (n=4), and *other infrastructure* requirements (n=4).

Comparing the data between country groups showed that African workers considered the availability, cost and organisational provision of internet connected devices as a key aspect of their physical environment, whereas UK workers did not consider that network access or device availability were part of their perceived infrastructural needs. Across all contexts workers agreed that there was a degree of organisational support required to facilitate e-learning.

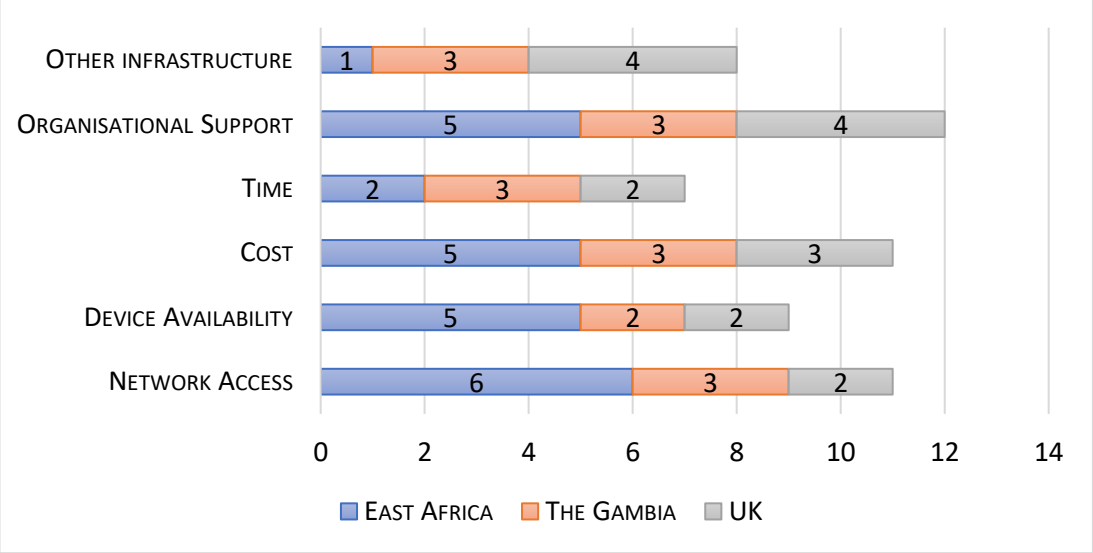


Figure 40: Facilitating conditions across country groups (n=16)

The node of *organisational support* was coded such that it encapsulated worker perception of organisational strategy around e-learning, either in terms of structural support, or in terms of pay and reward. Workers in each context perceived organisational support as slightly different.

Gambian participants discussed the terms and conditions of their employment and how additional study should be formally recognised by their organisations. Other participants noted the holistic support given by their organisations training and ICT departments in conjunction with the line management structure that supported training initiatives. The following example excerpts were coded as "*facilitating conditions/organisational support*":

> *"So, people were not taking it seriously because they are saying when you finish E-Learning what kind of certificate are they going to award you and what would those certificate benefit you in the future. So, people are not seeing maybe E-Learning as something very important or relevant to their course. They are seeing that maybe after doing the E-Learning we are not going to be upgraded or not be able to get anything from it." - Female (24) The Gambia*

> *"I would have to get my line manager's permission, and my line manager is also my skills leader, so he needs to go, "Yes, you definitely need to do that." Then it goes on to L&D, who will then have a think about it." – Female (42) non-participant UK*

> *"Yes, but fieldwork I feel that look at 21 years, it's not 21 days, 21 months but years. You cannot gain anything at [Organisation]. No training you should have, because any appraisal I arrived at, "I want to be trained, more training in the fieldwork" and in fact beyond fieldwork but there was no response. All my appraisals are written there. For the past two years I stopped writing training, my boss even asked me I said, "But what is the use? I've been writing training, training I need IT training, this training, something that could move me ahead, but they are just not doing that for me. They are just leaving me alone, I'm on the same salary. Even if you complain I say to them, "You can meet me, we have the same salary" you can still have the same salary. I'm working with people in the clinic that came just one year, just about a year, they are trying to promote these people. I am still a fieldworker. So, it's painful." – Female (49) non-participant The Gambia*

Network access and connected *devices* were particularly important in the African context, often mentioned together as a necessary and sometimes lacking part of the organisational infrastructure. UK participants, in contrast to African participants, described the abundance of internet-ready devices. The sub-themes of *network access* and *devices* are described in the following data excerpts.

> *"By providing me with the Wi-Fi, the Internet, you see. That one support, because I will not use a lot of your money to get connected to Internet, broadband use and whatsoever. So, if you get the Internet connection, you know, that is a good support." –Male (29) Kenya*

> *"The fact that we are going to use their equipment; that is the laptop, their internet. So as per information, what I know, you can consider a cause and it starts learning, so they are there to support you in terms of the internet, because the internet is okay with them. And space and time. Provided you don't tamper with your job, work, so you are going to do those things very comfortable." – Female (28) Kenya*

> *"It's enjoyable when you have a fast network connection as well. Here in The Gambia, sometimes the network fails and sometimes it is difficult when you are doing some good work and the network is off. You want to load something and there is a problem. It's different compared to others. If there is no network, the other one that is going straightforward. But this one, the network issue, and light is also a problem." – Male (22) non-participant The Gambia*

The UK perspective on infrastructure was different, with each participant having access to their own desk and multiple internet-enabled computing devices.

> *"Sometimes through the phone, sometimes through the laptop, and my PC at work, if I need to look something up at work. Again, even at work I would automatically go to the internet and look for something. I wouldn't, despite the vast library that we have, necessarily go to the library and look what a geological term means. If somebody throws a geological term at me that I don't understand, which happens, I*

wouldn't go to the library and look it up. I would Google it. Yes, at work PC, phone. At home, phone, laptop." – Female (55) UK

Cost as a sub-theme of *facilitating conditions* was important to learners, more so in the African groups than the UK group. The nature of cost differed between groups. In the African groups, interviewees described having to pay for internet access and devices, or to pay to travel to a place where they could access the internet on a device (such as a cyber-café). UK participants noted cost in terms of course fees, paid for by the organisation. The following example excerpts were coded as "*facilitating conditions/cost*":

"Mostly I sacrifice money in getting the Internet and things. I can access Wi-Fi at work but when I'm at home, we don't have Wi-Fi, so I have to buy the bundles. I have to sacrifice so much daily just to pay the bundle. I can pay for monthly maybe or weekly, but I have to use it." – Female (31) Kenya

"Okay, my friend inside [The Organisation] told me that it is good for you to do this eLearning as you are working, you know. Then you get time. The minimum that you get, you can go to the Internet. You get time after your work. Let's say, after your work you can get a place where you go to a cyber [-cafe]. Then you sit, you do your studies, rather than travelling long distances to where the school is, or the college, the institute where it is located, you see. So, it's a bit cheaper, compared to the manual one." – Male (29) Kenya

"Sometimes you have to incur the cost of travelling. For myself, I was supposed to be attending classes for tutorials, at the start of every semester I used to go and meet with the teachers face to face, and that's where I had to pay for my travel. I have to pay for my accommodation for the time I was there. Those were, basically, some of the costs that I had to pay." – Male (32) non-participant Kenya

Although other infrastructure was also discussed as a sub-theme, participants mentioned the availability of electricity in Africa, and of space in the UK. The following data excerpts are for the sub-theme *other infrastructure*:

> *"Electricity, sometimes the light goes off. For one week, it's not normal. You come for classes, and you planned to work, the light will be available. In your class work the light will be off the following morning. That is also a problem. That one is also a problem." – Male (21) non-participant The Gambia*

> *"Most of these portable- the smartphone I've said, the devices I mean, the problem also can be the power. Most of the time, power goes off, and if the power goes off and your battery does not serve for much of the morning, then it becomes a barrier." – Male (29) Kenya*

> *"The problem is, is also having the facilities and the room, like you say, to do that. You've been around site; there are meeting rooms, but we struggled here just now, and the guys in here- It's a big office there. We don't actually have a break-out room or anything." – Male (47) non-participant UK*

There was no notable gender or age difference in the occurrence of theme-level *facilitating conditions* nodes in the sample ($n_{Male}=8$, $n_{Female}=8$, $n_{Older}=8$, $n_{Younger}=8$). Figure 41 shows the *facilitating conditions* sub-theme responses from male and female participants across all country groups (n=16). None of the sub-themes of *facilitating conditions* were equally referenced by the two gender groups (i.e. $n_{Male} \neq n_{Female}$ for all sub-themes). The sub-themes of cost and network access were slightly biased in the perception of male and female participants respectively. Male participant data favoured the sub-theme of *facilitating conditions* relating to time. Female participants favoured the sub-themes of organisational support, and device availability. Figure 42 shows the *facilitating conditions* data for younger interviewees, under the age of 35 (n=8), compared with older interviewees, over the age of 35 (n=8). The data shows that younger participants expressed the sub-themes relating to device and network availability with greater frequency than older participants.

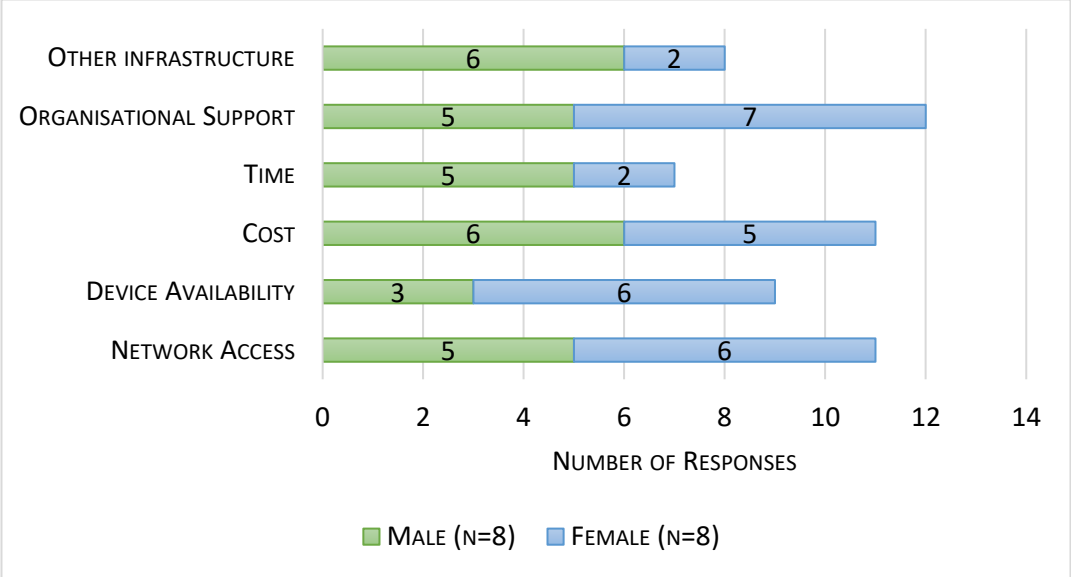


Figure 41: Facilitating conditions sub-themes by gender

Conversely, older participants expressed the sub-themes relating to organisational support, time and cost with greater frequency. These findings are complementary and indicate that the physical aspects of accessing web-based learning versus the intangible requirements of accessing training around work priorities were perceived differently by age groups.

In summary, *facilitating conditions* were discussed in sub-themes *facilitating conditions* (n=16) with sub-themes of: *organisational support* (n=12), *network access* (n=11), *cost* (n=11), *devices* (n=9). The provision of physical infrastructure in terms of network, devices and power was noted by African participants, as well as the provision of organisational support such as certification, promotions and pay. UK workers indicated that space, devices and IT support were important, but not noted as lacking.

6.4.1. Coping with a Lack of Physical Infrastructure

There is no interview data for this section, merely it is an issue that was discovered during fieldwork. In one remote field station (Bansang, The Gambia) fieldworkers were facilitated by their line manager to travel on a series of weekends to the nearby research site (Basse Santa Su, The Gambia) to use the IT equipment (desktop

computers, internet access). The line manager arranged transport and overnight accommodation, and paid the required overtime and night allowances for the workers to complete the e-learning. This case provided a strong message, not only in direct influence from the manager and where his priorities were with respect to e-learning, but also indicated that the line manager was aware of the lack of ICT infrastructure and made provision to address the shortfall.

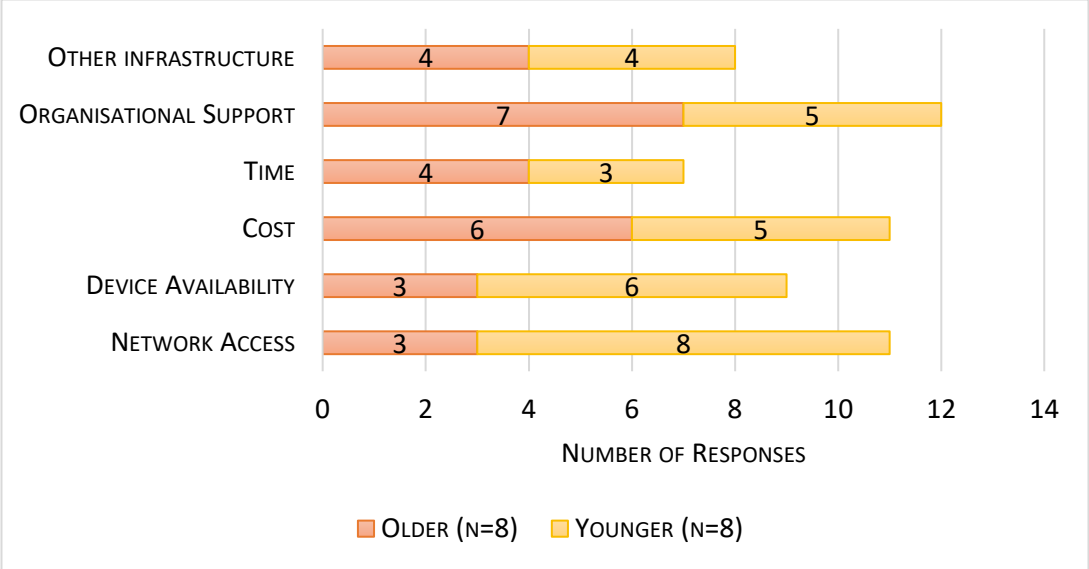


Figure 42: Facilitating conditions sub-themes by age

The provision of allowances from a single line manager raises the possibility of an ethical issue, in that a proportion of workers have been indirectly compensated for their participation in the e-learning course, retaining the voluntariness of participation in the research survey. The example involved approximately 20 staff at the Bansang (The Gambia) location who lacked the facilities and time (within working hours) to complete e-learning during their work time, who participated in the survey, and one participant in the interview data. Their line manager ensured that they had access to facilities and time to complete e-learning. Other line managers at different locations within The Gambia may have employed similar or other strategies to provide facilities and working time and many workers already had access to facilities without such measures. Because the workforce in The Gambia is transient across projects, they work at different locations, and are comparable for the purposes of this study, so this case

does not introduce a confounding issue in repeated measures modelling. Nevertheless, while this is an important case that highlights the lack of *facilitating conditions* in a resource constrained environment, it affects a small proportion of staff, and any potential effects that arose from this case were assumed to be absorbed into the wider data effects.

6.5. Summary of interview findings

Interview data provided some support for the survey findings, but mainly highlighted the complexity of treating quantitative constructs such as *performance expectancy* and *social influence* as unidimensional without supporting qualitative contextual data. *Price value, performance expectancy, social influence* and *facilitating conditions* were described by interview participants within distinct sub-themes that differed in some cases across the three country contexts. Learners in all contexts described the importance of being able to control the time, pace and place where and when they accessed e-learning, and the importance of adequate organisational support. African workers valued the knowledge gained from e-learning, the increased status that came with the knowledge, but wanted formal recognition for increased competence. African learners also determined the cost of e-learning in terms of the underlying infrastructure: with access to internet, power and devices sometimes lacking, they would either need to pay for access, or pay for travel to a place with access. Learners in all contexts needed time to access e-learning and needed to balance this time against competing work and social priorities. There was some support for *hedonic motivation* and *social influence* acting via performance expectancy in that: workers enjoyed extrinsic aspects of e-learning (where e-learning was better and faster in helping to achieve goals); and across *peer, manager and family influence* referents provided information to participants about how e-learning or learning in a general sense was beneficial, without indicating that there was a norm that learners needed to comply with. The data indicated that social influence was more informational than normative.

The next chapter will discuss the findings from the survey and the interview data and draw them together relative to the research question and sub-questions of this thesis.

7. Discussion

The research question concerning the influence of values on adoption in this study was primarily explored through quantitative analysis of survey data. Interviews were used to explore contextual differences in learner perceptions of adoption factors.

The key findings from the data were:

1. The UTAUT2 part of the VETA model was partially confirmed with some significant construct relationships: *price value*, *habit* and *performance expectancy* predicted *behavioural intention* to use e-learning.
    a. *Price value* for learners consisted of time, effort, travel and cost.
    b. *Performance expectancy* for learners consisted of effectiveness and efficiency of e-learning, the certificates and qualifications gained, the improvements in work performance through knowledge gained, and the flexibility to choose the time, place and pace to use e-learning.
    c. Learners online *habits* were gained through social use of the internet and social media.
2. Some UTAUT2 construct relationships within the VETA model were non-significant: *social influence* did not directly predict *behavioural intention*, rather acting via *performance expectancy; effort expectancy* did not predict *behavioural intention*, yet there are known barriers to *ease of use* in the African context; *hedonic motivation* did not directly predict *behavioural intention*, rather acting via *performance expectancy.*
    a. *Social influence* came from peers, managers, and family, as well as the 'champion' and through the status gained from e-learning (in Africa). Organisational influence was stronger in the UK, peer, family and manager influence was stronger in African groups.
    b. *Hedonic motivation* was linked to *performance expectancy* in that learners enjoyed the performance attributes and outcomes of e-learning.
3. Values influenced *behavioural intention* via learner perception of *social influence* and *price value*: learner priority on the value of *achievement* predicted *behavioural intention* to use e-learning via *social influence* and *price value*; learner priority on *hedonism* predicted *behavioural intention* via learner *hedonic motivation*.

4. *Facilitating conditions* were more important for African learners in terms of device availability, network access and power. Gambian learners indicated that formal recognition of e-learning completion in monetary terms was an important factor. UK learners considered the cost of paying privately for qualifications as a factor relating to their perception of e-learning; African learners considered the cost of paying for basic infrastructure such as internet access and devices as a factor relating to their perception of e-learning.

These results are discussed in this chapter in the order outlined above, allowing a discussion around direct predictors of adoption (7.1), indirect and non-significant predictors of adoption (7.2) and the influence of values (7.3) that relates findings to the research questions (4.1) without creating divisions based on the methodology used to collect the data, or the type of data collected. The data also revealed the importance of *facilitating conditions* in Africa which is briefly discussed in section 7.4.

7.1. The UTAUT2 part of the VETA model was partly confirmed

The UTAUT2 part of the VETA model was partially confirmed, in that *behavioural intention* to use e-learning was directly predicted by *performance expectancy*, *price value* and *habit*, but was not directly predicted by the other UTAUT2 variables, as discussed in section 7.2. This section discusses the findings and impact relating to the direct predictive relationships of *performance expectancy* (7.1.1), *price value* (7.1.2) and *habit* (7.1.3) on *behavioural intention* in the context of prior literature. The original UTAUT and UTAUT2 papers explained over 70% of the variance in *behavioural intention* (Venkatesh et al., 2003; Venkatesh et al., 2012). This study was comparable to the prior literature in explaining variation in *behavioural intention* (52-64% in country samples, 74% in the pooled data) but added to the literature by explaining variance in *performance expectancy* (65% in the pooled data), and *price value* (27% in the pooled data).

7.1.1. Performance Expectancy predicted Behavioural Intention

The survey data in this study confirmed that *performance expectancy* predicted *behavioural intention* to use e-learning in The Gambia and the UK but not for East African learners. There was no moderation of this path by gender, age, profession or education. The lack of a statistically significant path for East African learners may arguably be attributed, in part, to the small sample size for the East African cohort for three reasons. Firstly, β(E.Africa) was comparable in magnitude to that of the other country groups and the between-groups analysis showed no significant group differences between country groups, and all demographic groups supported the path relationship. Therefore, arguably, the lack of statistical significance may be due to the small survey sample for East Africa. Secondly, the interview data supported this argument: East African interviewees discussed *performance expectancy* in the same sub-themes, in similar number, to the other cohorts (accounting for the African infrastructure). Thirdly, the few studies conducted in East Africa have found a positive relationship between *performance expectancy* and *behavioural intention* with larger samples (Njuguna et al., 2012; Macharia and Nyakwende, 2009; Karuri et al., 2014). Therefore, although it is possible that the East African survey sample in this study did not perceive usefulness as a predictor of intention to use e-learning, this finding is arguably an artefact of sample size.

The finding that *performance expectancy* predicted *behavioural intention* supported the technology acceptance model and UTAUT (Davis, 1989; Venkatesh et al., 2003) as well as the findings of numerous studies into e-learning adoption across different parts of the world as reviewed by Šumak *et al.* (Šumak, Heričko and Pušnik, 2011), more recent studies of e- and m-learning in both higher education (Dečman, 2015; Hussein et al., 2015) and in workplace contexts (Murillo Montes de Oca and Nistor, 2014; Agudo-Peregrina et al., 2014). This finding similarly supported more recent studies in the sub-Saharan African diaspora (Zainab et al., 2015), but refuted Brown's assertion that the model relationships are reversed in relative importance in the African context (Brown, 2002), implying that the sub-Saharan African environment in terms of expectations of technology utility may have changed over time, aligning more with research in developed nations as infrastructure is developed.

This study did not support the previous literature findings that this path (PE->BI) was moderated by gender and age (Venkatesh, Morris and Morris, 2000; Venkatesh et al., 2003). This study supported others that found no moderating effects arising from demography (Burton-Jones and Hubona, 2006; Antonietti and Giorgetti, 2006; Paechter et al., 2010; Dečman, 2015; Faqih and Jaradat, 2015). Therefore, while the findings from this study do not support the moderation findings from Venkatesh *et al.* 2003, there is a dearth of literature on demographic moderation in technology adoption (Dwivedi et al., 2011; Taiwo and Downe, 2013). This study adds to the literature by providing an alternative view to Venkatesh *et al.* 2003, but more work is needed to elucidate the effects of gender and age on learner perceptions of e-learning usefulness in learner decision-making.

The interview data indicated that across all groups, *performance expectancy* was discussed in terms of learner control, effectiveness of e-learning, quality of education, work performance and efficiency of e-learning. Learners in all contexts valued the flexibility to control how they prioritised e-learning around their other commitments. Interviewees eluded to the benefits of e-learning to their time management, not only in deciding when to access e-learning (such as when there was a natural break in workload), but also the duration of access (learners could choose to spend minutes or hours on e-learning, depending on their schedules). This finding supports prior literature that has found that flexibility (in terms of time, place and pace of access to information) is an important part of student expectations in e-learning (Capper, 2001; Paechter et al., 2010).

Interview data indicated that learner perception of the extrinsic outcomes from e-learning differed by context. The African groups prioritised career progression in a competitive way to ensure financial stability for themselves and their families. The investigation of *hedonic motivation* in The Gambia and Kenya indicated that the factors that learners indicated were enjoyable were primarily the extrinsic motivators that arose from the performance or utility of the technology. This finding, although not directly linked to the operationalized constructs of values, is inseparable from the concept of context, because learners in a context enjoyed the performance outcomes from technology use, potentially for reasons that are entirely contextual (such as the scarce availability of education, the cost of education, and the potential to be promoted or earn

more because of completing e-learning). When viewed in context, this finding relates to Cheng's findings with e-learning in Taiwan: goal-oriented employees view the total engagement with e-learning as enjoyable because it satisfies goals within their organisational context allowing them to increase competence in a manner less taxing than using other methods (Cheng, 2011). This finding also links to Self-Determination Theory in that it is difficult to classify the motivations related to the pursuit of competence as strictly intrinsic or extrinsic (Ryan and Deci, 2000), and it may be pragmatic to consider learner motivation as a concept without trying to subclassify based on the type of motivation (Maldonado et al., 2011).

Within the theme of *performance expectancy*, learners considered the quality of the qualification or certificate that might be gained from e-learning, and how that might positively affect their career position or grade. African learners indicated that they considered the qualification as a benefit, UK interview data indicated that the qualification was secondary to the knowledge gained. This finding partly explains the survey links between the constructs of *price value*, *performance expectancy* and the value of *achievement* for African learners. African learners prioritising the value of *achievement* considered the costs in terms of time, effort and money; tangible proof of achievement (in terms of a qualification or certificate); and the benefits in terms of promotion and pay; which helped determine how useful they perceived e-learning.

The relevance of e-learning in improving professional competence was noted in the sub-theme of *work performance,* which was most important to African workers. To some extent, this can be argued as an artefact of the course content: African workers were fieldworkers, accessing e-learning on fieldwork; UK workers were computer users, accessing e-learning about safe computer use, which might be perceived as relevant only to a part of their work. However, to some extent it can also be argued that this group difference is an artefact of computer usage: African learners gained general ICT skills through computer use (when accessing e-learning), which was useful to their work performance because these transferable skills are scarcer in the African context compared to the UK context.

An aspect of *performance expectancy* was also practical, in the sub-themes relating to the *efficiency* and *effectiveness of e-learning*. Learners noted that e-learning could be an interactive, multi-media experience that could reach many learners in a given period of time across a great range of topics. Despite these advantages, e-learning could be lonely or boring, with a one-to-one relationship with a computer replacing the discourse and feedback of peers and teachers in the educational experience (Garrison et al., 2000; Yang, 2016). Because e-learning was completed at an internet-enabled device, the potential for accessing additional online information in a timely manner allowed learners to increase their professional knowledge in a manner not possible with time- and location-bound classroom training. African workers indicated that there was potential for career advancement through the increased work knowledge and transferable ICT skills that they gained from e-learning: learning to use the tools that allow e-learning access was a useful skill, separable from gaining knowledge from the e-learning content. These advantages supported not only the TAM construct of *perceived usefulness* (Davis, 1989; Davis et al., 1989), and the UTAUT construct of *performance expectancy* (Venkatesh et al., 2003; Venkatesh et al., 2012), but provided a link with *job-fit* through consideration of transferable skills (Thompson et al., 1991), and *relative advantage* through a comparison between technology-enhanced and traditional teaching methods (Moore and Benbasat, 1991).

This study therefore adds to the literature by supporting the predictive influence of *performance expectancy* on *behavioural intention* for e-learning; and by expanding the construct of *performance expectancy* to include aspects of learner control, efficiency and effectiveness, quality of educational outcomes, and work performance.

7.1.2. Price Value predicted Behavioural Intention

The survey data in this study confirmed that *price value* predicted *behavioural intention* to use e-learning in all country and demographic groups. This finding supports previous literature that found a connection between a consideration of cost-benefit, and intention to use a technology (Venkatesh et al., 2012). These results supported previous findings that undergraduate learners in China consider cost and pricing structure when adopting mobile learning (Yang, 2013), and that users of mobile internet usage consider perceived price (Ramirez-Correa et al., 2015).

The finding that learners consider *price value* where there is no direct monetary cost to them is important from two aspects. Firstly, it refutes the assumption that perceived cost is not relevant in an organisational or educational setting (Lewis et al., 2013; Raman and Don, 2013). The workplace environment cannot be reasonably said to be zero-price: perceived value is important, but the perceived cost is not zero (Shampanier et al., 2007). Secondly, the UTAUT2 conceptualises *price value* as a cognitive trade-off based on monetary cost and perceived benefits: since monetary cost to individuals is zero, *price value* must be defined in a different manner that incorporates other types of perceived costs (Venkatesh et al., 2012).

The finding that *price value* predicts *behavioural intention* in a manner that is consistent across contexts supports the idea of a cognitive trade-off without any detail about the factors that drive the decision. Details about the trade-off were found in the interview data. Interviewees across all groups indicated time was a resource in short supply that they needed to manage and spend on competing priorities, such as work and e-learning. Learners also indicated that e-learning was a lower cost option than classroom training when considering their finite resources: e-learning required less travel time, less time to complete modules, was lower financial cost (for data, facilities and travel). However, learning by any means required the expenditure of cognitive effort. Therefore, *price value* was more complex than simple monetary cost. A construct such as *perceived value*, that can incorporate considerations of effort, time, trouble or learning value, may be valuable in an e-learning adoption, or other cases where monetary cost is zero (Ain et al., 2016). Discussed further in 7.4 are the perceived costs related to the technology infrastructure and support, in terms of power supplies, internet connectivity and access to computing devices, which were mentioned by interviewees as aspects of facilitating conditions, but are conceptually and practically linked to the concepts of cost and *price value* (Zainab et al., 2015).

Despite conceptualising *price value* as a cost-benefit trade-off (Venkatesh et al., 2012), the detail of costs and benefits in the trade-off has seldom been investigated in the literature: this study demonstrates that there is a link between the two concepts, both in the survey data and in the interview data. *Price value* predicted *performance expectancy* across groups except for East African learners and learners with a postgraduate level of education. As with *performance expectancy*, it is possible that the

lack of effect in East Africa arises from the lower sample size. Since there was no time element to this study, causality cannot be established within the UTAUT2 part of the model, and the link between *performance expectancy* and *price value* could be in either direction. Conceptually, it can be argued that the technology attributes that learners consider within the construct of *performance expectancy* are benefits and must be weighed against costs which form part of *price value*. Considering the time, effort, travel and cost that are required to access e-learning, and considering the knowledge gained, certificates, promotions, increase in work performance, and the ability to access training in a flexible manner, learners in this study formed their intention to use e-learning. El-Masri and Tarhini mention that *price value* may be a non-significant predictor of intention if users feel that the technology cost is inexpensive: this may be true; however, this explanation does not consider *price value*, rather it considers *perceived cost* (El-Masri and Tarhini, 2017). The literature supports the conceptual overlap: perceived value considers utility and quality; perceived price considers monetary and non-monetary price (Zeithaml, 1988; Kashyap and Bojanic, 2000; Liu et al., 2015). *Price value*, where tested in the literature is not always deemed relevant to e-learning intention, and despite so few studies examining this construct link, the construct and its impact on the model are worth further study (Nguyen et al., 2014)

Price value consistently predicted *behavioural intention* across age and gender in contrast to Venkatesh *et al.*'s findings that demonstrated the relationship was greater for older females (Venkatesh et al., 2012). It is worth noting that this distinction may arise from technology differences between the two studies: the use of organisational e-learning in research organisations does not include a monetary component; the use of mobile internet in Hong Kong includes a personally incurred cost.

This study therefore adds to the literature by supporting the predictive influence of *price value* on *behavioural intention* for e-learning; by expanding the construct of *price value* to include aspects of time, effort, and travel (to a place where facilities are available) as well as the concept of monetary cost already included in the literature.

7.1.3. Habit predicted Behavioural Intention

The survey data in this study confirmed that *habit* predicted *behavioural intention* to use e-learning in The Gambia and the UK but not for East African learners. In contrast to *performance expectancy*, the lack of influence of *habit* for East African workers could not be attributed to sample size.

For the path for *habit* predicting *behavioural intention*, β(E.Africa) was smaller in magnitude to that of the other country groups although the between-groups analysis showed no significant group differences between country groups, and there was a gender difference in the influence of *habit* such that it was only important for male learners. Secondly, the interview data that reflected the nature of learning habits across groups was similar: participants used online sources of news and social media in their social lives, but this does not necessarily indicate an intention to use e-learning, merely a familiarity with online information. Thirdly, the TAM and UTAUT studies conducted in East Africa did not investigate *habit* (Macharia and Nyakwende, 2009; Njuguna et al., 2012; Karuri et al., 2014). Therefore, although the Gambian and UK groups, and the pooled data, supported prior research indicating that *habit* was important in adoption of information system use (Xu, 2014) as well as in e-learning adoption (El-Masri and Tarhini, 2017), this effect was not seen for East African workers, or for female learners.

Interview responses indicated that learners automatically and regularly consumed information through a variety of channels, some of which were technology assisted, but no clear pattern arose regarding the nature of the construct in the understanding of the participant. Interviewees mentioned a range of online learning habits including social media and news sites, but did not talk about device use to any great extent, supporting prior research in the assumption that habits that lead to *behavioural intention* do not necessarily relate to hardware use (Yang, 2013).

This study therefore adds to the literature by supporting the predictive influence of *habit* on *behavioural intention* for e-learning; by making explicit the link between the construct of *habit* and the online habits that learners develop in their social lives.

7.2. Indirect or Non-Significant Predictors of Behavioural Intention

Having discussed the direct predictors of *behavioural intention* in 7.1, partially confirming the UTAUT2 part of the VETA model in the context of this study, it is worth discussing the construct relationships in the VETA model that were expected to be significant (according to the literature) but were not supported by the survey data. This section discusses those relationships, in context of both survey data and interview data.

7.2.1. Effort Expectancy indirectly predicted Behavioural Intention

Effort expectancy was not found to directly influence *behavioural intention* in the pooled sample or in the African groups. *Effort expectancy* was only found to be important for UK learners, and for female learners. Although it is possible that a small effect of *effort expectancy* on *behavioural intention* would pass undetected with a small sample size, the sample size was adequate in this case, indicating that the path is not important in the context of this study. It is worth considering that since the literature corpus that supports the importance *of effort expectancy* and *perceived ease of use* in technology adoption has been predominantly undertaken in developed and transitional economies, that prevailing literature models may apply differently in African contexts[6]. This difference may be due to the resource constraints in African contexts to be considered as part of facilitating conditions (7.4) (Oyadonghan and Eke, 2011; Eke, 2011; Okiki, 2011; Lin et al., 2011; Mtebe and Raisamo, 2014a; Zainab et al., 2015) or due to cultural differences only found for the value of *hedonism* in this study. The non-significance of *effort expectancy* in predicting *behavioural intention* is consistent with some prior research into the adoption and diffusion of e-learning technologies that are not inherently complex (Liao and Lu, 2008; Chen, 2011).

[6] The country of study is typically not noted in meta-analyses and reviews (Ma and Liu, 2004; King and He, 2006; Yousafzai et al., 2007; Dwivedi et al., 2011; Šumak, Heričko and Pušnik, 2011; Taiwo and Downe, 2013; Abdullah and Ward, 2016) but in compiling the literature for this study it was comparatively more difficult to find literature relating to the African continent than developed or transitional contexts.

Across the pooled sample, developing country groups and demographic groups (except for female learners and postgraduates) the effect of *effort expectancy* was fully mediated by *performance expectancy*, confirming the dominant place of the *performance expectancy* construct in the technology adoption literature (King and He, 2006; Šumak, Heričko and Pušnik, 2011; Dwivedi et al., 2011).

The perception that technology is more useful if it is easy to use was included in TAM (Davis, 1989; Davis et al., 1989). Although the mediated path was removed in the UTAUT (Venkatesh et al., 2003), this study confirmed that if effort is deemed to be important at all, it is only via user perception of usefulness. The path between *effort expectancy* and *performance expectancy* was also found to be significant in citizen adoption of e-government in The Gambia, which is a different technology application with a similar population base as the Gambian cohort in this study (Lin et al., 2011). This distinction links to both the path of *effort expectancy* on *behavioural intention* (in that the barrier to use may be low for e-learning), and the contribution of a lack of supporting infrastructure as a barrier in an African context (Tarus et al., 2015).

The inference is that *effort expectancy* only influences adoption where there are perceived or expected difficulties with using a technology. There are three potential ways that this inference can be applied to the findings from this study. Firstly, e-learning technologies (specifically) may not be inherently complex enough to present a barrier to use and therefore *effort expectancy* does not predict *behavioural intention* in the case of e-learning. Secondly, *effort expectancy* might not be relevant to technology adoption in a more general sense, because general ICT skills are present to an increasingly higher degree in workplaces and user interfaces are increasingly homogeneous in operation and appearance, lowering the barrier to use for workplace software technologies. A third possibility is that *effort expectancy* is accounted for elsewhere in the model. *Price value* was shown by the interview data to have an effort component: learners perceiving effort expenditure as a cost is not the same as perceiving a technology as easy to use, but there are comparisons between the constructs that can be drawn through the conceptualisation of effort. *Facilitating conditions* also includes consideration of various barriers to use which can be conceptually linked to effort. Therefore, it is possible that the effects of *effort expectancy* are partially accounted for by *price value* and *facilitating conditions*.

The survey data showed a gender difference in the influence of *effort expectancy* on *behavioural intention* to use e-learning, such that ease of use was important for females across the pooled sample. This path relationship was also confirmed in the UK sample survey data. These findings supports the paradigm of research conducted in developed contexts: females tend to be more strongly influenced by effort and subjective norm (Venkatesh, Morris and Morris, 2000) due to potentially higher levels of anxiety and lower self-efficacy during technology use (Chinyamurindi and Louw, 2010), whereas males tend to be more pragmatic and prioritise usefulness (Ong and Lai, 2006; Padilla-Meléndez et al., 2013). As with other demographic moderation, a gender difference for the influence of *effort expectancy* is not universally agreed in the literature (Ong and Lai, 2006; Wang et al., 2009), but this study provided some support for studies that have found *perceived ease of use* is more important for female technology users (Yuen and Ma, 2002). Despite prior research indicating *effort expectancy* would be more important in determining intention for older workers, no age difference was found in this study (Morris and Venkatesh, 2000).

It is worth considering that if the supporting infrastructure meets some perceived minimum requirement (from the perspective of the learner), there may be no perceived barrier or effort requirement: this idea is worth exploring in future research. An alternative explanation is that, under the endorsement of the organisational and social referent network, learners will find a way to comply with a mandate to use a technology innovation if their world view or culture is one that prioritises compliance with such a mandate. This study therefore adds to the literature by rejecting the predictive influence of *effort expectancy* on *behavioural intention* for e-learning, and by indicating that the influence of *effort expectancy* on *behavioural intention* differs in developed country contexts where much of the literature has been generated.

7.2.2. Hedonic Motivation indirectly predicted Behavioural Intention

Hedonic motivation did not directly predict *behavioural intention* to use e-learning, or via *performance expectancy*. There were complex group effects with this construct that yielded an overall non-significant path in the pooled data. There was a direct effect of *hedonic motivation* on *behavioural intention* for East African learners, an indirect effect via *performance expectancy* for UK learners, no effect for Gambian learners. The direct

path (*hedonic motivation* on *behavioural intention*) was supported for fieldworkers and was moderated by age such that *hedonic motivation* was important to younger learners. The effect of *hedonic motivation* on *performance expectancy* was important for older and female learners, and for postgraduates. This complex picture yielded support for the indirect path in the pooled data. Learners found e-learning more useful if it was enjoyable or interesting but did not intend to use e-learning solely because it was enjoyable. This finding neither supported the original UTAUT2 literature that proposed a direct effect of *hedonic motivation* (Venkatesh et al., 2012), nor did it support prior research in m-learning adoption (Yang, 2013), learner management system adoption (Raman and Don, 2013), or mobile banking (Baptista and Oliveira, 2015). The data supported prior research in social recommender system adoption (Oechslein et al., 2014), learner management system adoption (Ain et al., 2016) and m-banking adoption (Oliveira et al., 2016) that found no significant direct effect of *hedonic motivation* on *behavioural intention* to adopt a technology. The data supported literature that had found an indirect effect of *intrinsic motivation* on *behavioural intention* mediated by *perceived usefulness* in web-based learning with Canadian and Chinese learners (Saadé et al., 2009). This data also supported an indirect effect of *perceived enjoyment* on *behavioural intention* mediated user perception of value in m-commerce, although perceived value includes both performance attributes and relative cost (see section 7.1.2) (Liu et al., 2015).

This finding also confirms the link with previous information systems literature that indicated a user's affective perception of a system may relate to attitude (Thompson et al., 1991; Compeau et al., 1999). The difference between groups in what constituted hedonic motivators could be attributed to the course content rather than the perception of e-learning as a technology, comparing with research in e-commerce that found little difference between individualistic and collectivist societies in hedonic motivators (Evanschitzky et al., 2014). While *hedonic motivation* did not predict *behavioural intention* directly in the pooled data there was a predictive relationship for fieldworkers and for younger workers.

Although learning technologies themselves should not be difficult to use, but certainly the process of learning should be cognitively challenging (Saadé and Bahli, 2005). Previous researchers have found that matching learning difficulty with learner's ability

levels yields hedonic interactions, which may overlap with the concepts of both *hedonic motivation* and *effort expectancy* (Kiili, 2005; Wang et al., 2009), both of which predicted *performance expectancy*.

Interview participants elaborated on the aspects of e-learning they found enjoyable, and for the most part, learners mentioned utility attributes of the technology: learner control, pedagogy and flexibility were important, supporting previously known benefits of e-learning (Capper, 2001; Bouhnik and Marcus, 2006). The African view of enjoying the outputs of the course, indicates that even if survey responses are similar, and model equivalence is satisfied, there is still a fundamental difference in what learners from different cultures or contexts deem to be the inherent worth in a technology. UK learners were unable to describe hedonic attributes e-learning: the course was mandated, and therefore, unless there was a status reason that such a mandate could be ignored, the course would be completed, without enjoyment or engagement being relevant. This difference can be partly explained through the lens of cognitive evaluation theory in that intrinsically motivated behaviour can be linked to competence gained, for example, through using e-learning (Deci et al., 1975).

African learners were extrinsically motivated through mechanisms of identified and integrated regulation, where the primary motivators were extrinsic, but learners integrated available sources of information to make a decision on their participation in the e-learning course (Deci et al., 2001; Chen et al., 2010). UK learners, with greater familiarity and availability of technology, were motivated primarily by compliance with the organisational mandate, towards the external regulation portion of the self-determination continuum. Although the relationships between intrinsic motivation and extrinsic motivation is supported by the interview data from this study, the mediating role of mastery values on this relationship is linked to the cultural concept of *achievement* (Cerasoli and Ford, 2014), which will be discussed in 7.3.2. Examining the interview findings through the lens of Davis's motivational model is possible, with Davis acknowledging that both types of motivation can coexist and differ across different types of technology users, and to restrict our understanding of motivation to the definitions of extrinsic and intrinsic motivation commonly understood within the motivational model is less useful than considering endogenous psychology and how motivation satisfies value outcomes such as intellectual autonomy, gratification and

freedom (Davis et al., 1992; Malhotra et al., 2008). Whichever definition of motivation is used, this study findings supports prior research that online students motivation is influenced by their immediate supportive context (Chen et al., 2010), as well as the more general hypothesis that social context is important in predicting intention (see Section 7.2.3).

Gambian and Kenyan workers described e-learning attributes that they found hedonic. While the aspects of instructional design that were intended for learner engagement were important to learners, utilitarian aspects of e-learning usage were also enjoyable to African workers, such as improving ICT skills, increasing status within their peer group and improving their earning potential.

This study adds to the literature via the mixed methodology by expanding the attributes that learners find hedonic, thereby addressing the limitation of previous studies that explored hedonic and utilitarian predictors of intention (Childers et al., 2001; Ozen and Kodaz, 2012). This study adds to the literature by finding that learner perception of *hedonic motivation* differs by context and might act via *performance expectancy* in workplace initiatives.

7.2.3. Social Influence indirectly predicted Behavioural Intention

Social influence had no direct effect on *behavioural intention* to use e-learning in the pooled survey data: supporting the literature that applies where technology usage is non-mandatory (Venkatesh and Davis, 2000; Teo et al., 2016), contrary to research in higher education where e-learning usage is mandatory (Dečman, 2015; Hussein et al., 2015). *Social influence* was only relevant for younger workers under 35 years of age.

Social influence predicted *performance expectancy* in the UK, East Africa, across all demographic groups, but not for the Gambian group. The presence of this path supports the (relatively few) studies that have indicated that context is important in predicting *behavioural intention* via *performance expectancy* (Gao and Deng, 2012; Rana et al., 2017). This study supports the lack of *subjective norm* influence on

behavioural intention to use MOOCs in China (Zhou, 2016), and the direct influence on perceived usefulness in e-learning adoption (Abdullah and Ward, 2016).

Social influence was described as more complex by African interviewees than UK interviewees: peer, manager and family referents influenced learners primarily by providing information on the benefits of e-learning. African learners perceived that their status would increase from the use of e-learning, UK learners perceived the opposite. Organisational influence from the champion and the project department was important across all contexts: the champion role was strictly informative in the UK, whereas African champions were more involved in persuading participants to access e-learning.

The lack of a direct path, and the presence of an indirect path in the cross-country data between *social influence* and *behavioural intention* indicated that while there was no effect of normative influence, there was an effect of informational influence. The predictive effect of normative influence is arguably represented by the direct path of *social influence* on *behavioural intention*: if *social influence* were primarily normative, then referent opinion would drive intention directly, because people aspire to conform to a perceived social norm, providing a direct link between perceived referent opinion and intention. Informational influence where referents provide information about the attributed of a technology and an individual then uses that information to form an opinion on technology attributes, and then to form their intention, is represented by the mediated path of *social influence* on *behavioural intention* via *performance expectancy*: if *social influence* were primarily informational, then referent influence would directly predict *performance expectancy* because people use their referents to gather information on the utilitarian attributes of e-learning and subsequently form their intention based on the information they have gathered (Kiesler and Kiesler, 1970; Cialdini and Goldstein, 2004). The survey data from this study found that normative influence was less important than informational influence for worker intention with e-learning.

Interview data identified several sub-themes, supporting prior research that indicated that social influence might be a multi-factor construct (Taylor and Todd, 1995c; Nasution, 2007; Holden, 2012). Taylor and Todd proposed that subjective norm was

constructed of peer and supervisor influence, which was supported in this study (Taylor and Todd, 1995c). Nasution proposed that status, image and self-identity were also important parts of *social influence* (Nasution, 2007). This study partly supports this concept: while participants may have experienced referent group effects based on their perceived identity within a reference group, status was only partly important in the sense that Nasution proposed: workers in this study gained status through knowledge; workers in Nasution's study preserved their status by having access to an information system that others did not. Holden's findings that colleagues have both indirect and direct effects whereas supervisors have a more removed influence was supported in this study: supervisors and managers were enablers of technology use, but less influential than referents who interacted with learners directly (Holden, 2012).

The survey finding that *social influence* was informational rather than normative was partly supported by the interview data as participants indicated that the local champion, peers family and managers would endorse the use of e-learning primarily because of the benefits of e-learning (for example, the attributes that were beneficial to their work, the use of technology to gain ICT skills, the performance gains that could be achieved, and the potential for upgrading their knowledge and pay), and participants then made their own decisions on that basis. Champions, managers and family members were important sources of influence in African cohorts, in support of Bandura's proposed importance of role models in learning (Bandura, 1986), the importance of social presence in educational experience (Garrison et al., 2000), the influence of such role models in decision-making (noted in the model of PC utilisation (Thompson et al., 1991)), as well as in the literature for e-learning adoption (McPherson and Nunes, 2006), healthcare adoption (Holden, 2012) and in technology adoption in developing contexts (Arekete et al., 2014; Vélez et al., 2014).

The role of *social influence* also links to organisational culture: Venkatesh *et al.* (Venkatesh and Davis, 2000; Venkatesh et al., 2003) found that in voluntary settings there was no direct link between *social influence* and *behavioural intention*. This study also found no direct link between *social influence* and *behavioural intention*, yet the setting was mandated professional e-learning. Therefore, either, this study contradicts Venkatesh *et al.,* or organisational mandates were perceived as voluntary by learners because there was no punishment or reward associated with completion. This finding

contributes to the literature because the concept of *social influence* has rarely been subjected to scrutiny at this level of dissection between types and sources of influence in technology adoption.

The literature supports the concept of complexity in *social influence*, this study contributes to the literature by elucidating the mechanism for *social influence* to form *behavioural intention* to use e-learning via *performance expectancy*. This study also contributes to the literature by expanding the sub-themes of *social influence*.

7.3. The Influence of Values in the VETA model

7.3.1. The Process of Adding Values to the VETA model

As indicated in the literature review, the integration of Schwartz's operationalized values in UTAUT2 is novel (3.4). There is novelty in using Schwartz's values model over Hofstede's and in using values as second-order predictors of intention rather than as interaction terms in the structural equation model. Therefore, the discussion on the influence of values will first consider lessons learned from the process of integration and model construction (7.3.1) before discussing the findings of the model applied to the data (7.3.2).

Considering the practical difficulties in operationalising Hofstede's dimensions for use at the individual level (Dorfman and Howell, 1988; Oshlyansky et al., 2006), Schwartz's model readily provided operationalised latent variables that could be integrated with other quantitative theoretical models with relative efficacy, confirming Schwartz's wide-ranging body of work (Schwartz and Boehnke, 2004). Validating the structure of values in the African context, although novel, was not related to the research question of this thesis, and therefore was not included here. Given the ecological fallacy and the conceptually tenuous link between group-level cultural values and individual agreement with those values used as a proxy for individual-level cultural measurement, this study demonstrated individual-level model integration in the method and results and adds to the literature by demonstrating a methodology by which to integrate the models.

The measurement model showed that the values of *achievement*, *tradition*, *security*, *conformity*, *power* and *hedonism* were reliable and valid, and could be used as constructs in the VETA model. The formation of values as latent variables added to the methodological debate on whether basic values are distinguishable at a greater level of detail the data in this study showed *conformity* could be partitioned into social (inter-personal) and procedural (rule-based) but *security* (personal and social) formed a single factor. This study added to the literature disagreement on sub-factors in the *conservation* dimension, where studies have found two *security* factors and one *conformity* factor (Beierlein et al., 2012; Cieciuch and Schwartz, 2012) or linked *tradition* and *conformity* factors (Knoppen and Saris, 2009). This ongoing debate indicates that while the model of basic values is reasonably universal, reproducible and uniform partition of basic values into sub-factors remains an area for investigation.

This study adds to the literature by demonstrating a method for adding operationalised values from Schwartz's model to a predictive structural model in the technology adoption domain.

7.3.2. The Placement of Values in the VETA Model

There are few studies that attempt to integrate values with technology adoption, and fewer still that use Schwartz's framework. The primary dimension of culture, individualism vs collectivism (Triandis, 1977) (or, in the context of Schwartz's model, personal vs social focus) is commonly cited as a moderator of adoption (Hofstede et al., 2010; Mortimer, 2015). In this study, the dimension of *self-enhancement* (part of the personal focus dimension) was an important predictor of adoption factors across cohorts, *conservation* (part of the social focus dimension) was less important across cohorts. Of the *self-enhancement* values, this study found that *achievement* was most relevant to e-learning adoption. Therefore, at a macro-level, this study supports the idea that there is a difference between personal- and social-focus in the adoption of personally-targeted learning technologies. However, this study is relatively unique in the placement of values as second-order predictors of intention, rather than using espoused culture as a moderator.

This study theorised *a priori* that values, would be the antecedent of scenario-specific attitudes, which, in the technology acceptance literature, predict *behavioural intention*. The paradigms of and Schwartz and Rokeach; and Ajzen and Fishbein agree that values are beliefs and that beliefs predict attitudes. The data supported the position of values as second-order predictors of intention, via attitude (Rokeach, 1968; Fishbein and Ajzen, 1975a; Schwartz, 1992). Yet, as outlined in the literature review (section 3.3.2), researchers of culturally-augmented technology adoption have included culture as a moderator of relationships between user perception and intention (Srite and Karahanna, 2006; Hoehle et al., 2015). The survey data in this study did not support the literature stance, finding instead second-order predictive effects i.e.: values predicted learner perception of technology or contextual attributes that led to intention to use e-learning technology. Another study examining the values dimensions of *openness to change* and *conservation* with the adoption of online shopping demonstrated that individualistic values such as self-direction and stimulation, and conservation values such as conformity had second order effects on intention to use eBay-type online marketplaces, so this finding is not without precedent (Pahnila et al., 2011). Values were tested in mediating and moderating positions as part of model validation, and no significant effects were found (the data is not reported in this thesis for the sake of brevity). The difference between the culturally-augmented technology acceptance literature and this study may be a difference in the concept of espoused culture and individual values (as described in section 3.3.2), or a difference in the data, but the conclusion is that this study disagrees with the placement of culture as a moderator of the attitude-intention path.

Values were found to be important as second-order predictors, and the values that predict adoption factors depend on the type of technology that is being studied or used. This is a reasonable deduction since user attitude towards a technology depends on the predisposition a user has towards relevant attributes of a technology; and a user's predisposition depends on their worldview (see 3.1). Following this theoretical trajectory, one might propose, for example, that, rather than relying solely on the functional or interface attributes of software, adoption of social networks or virtual team-working might be facilitated by a prior preference for collectivism, or a social focus (Zhao and Srite, 2013; Alkhaldi and Yusof, 2013); the acceptance of cloud computing might be inhibited by a priority for the value of *personal security* and privacy

(Moqbel and Bartelt, 2016); and the acceptance of online gaming might relate to social *conformity* and *hedonism* values (Arenas-Gaitán et al., 2017). The findings of this study, despite differing from the literature in the placement of values in the decision-making model, is theoretically grounded in this placement (Tams et al., 2012). The remainder of this section (7.3.2) relates the influence of *self-enhancement* and *conservation* values in the data of this study to the literature landscape that formed the foundation for this study. This study adds to the literature by demonstrating the position of values as antecedents to user perception and attitude in technology adoption and decision models.

7.3.3. The Influence of Values in the VETA Model

7.3.3.1. The Influence of Self-Enhancement Values in the VETA Model

The dimension of *self-enhancement* influenced: *price value* such that individuals with a preference for self-interest perceived educational technology as worth the cost; and *social influence*, such that individuals who placed priority on self-interest perceived that referents in their social environment endorsed the use of educational technology. *Self-enhancement* had no influence on *performance expectancy*. A priority on the value dimension *openness to change* predicted *hedonic motivation* such that individuals who prioritised *hedonism* perceived educational technology as interesting.

The higher-order value of *self-enhancement* deconstructs into *achievement* and *power* sub-values. The value of *achievement* was most important in predicting learner perception of *social influence* in the survey data. This finding supports the social component of the definition of the value of *achievement* (personal success through demonstrating competence according to social standards) (Schwartz and Bardi, 2001), as well as linking to the concept of gaining mastery through achievement as a motivation for learning (Schwartz, 1999). Further explanation of the link between *achievement* and *performance expectancy* as an indirect path can be discussed through the lens of self-determination theory (Ryan and Deci, 2000; Deci et al., 2001). There was an indirect link between *achievement* and *performance expectancy* via *social influence* in both African groups, where interview data suggested that there were performance-based outcomes (such as certification, knowledge gained from e-learning,

career and promotion prospects, and status as a knowledgeable peer) that arose from completing e-learning. African interview data also indicated that these aspects were enjoyable to learners, implying that the separation between extrinsic and intrinsic motivation is complex in these contexts. These performance outcomes were largely absent in the UK interviews, where there was a direct link between *achievement* and *performance expectancy* in the survey data. These findings indicate that interpersonal structures that produce feelings of competence within learners might work with tangible rewards in the African groups to motivate learners in a manner that is largely absent in the UK group.

Achievement affected both *social influence* and *price value* but not *performance expectancy*, providing the clearest finding from this study: the value of *achievement* predicted e-learning adoption through *social influence* and *price value*. Learners who placed a higher priority on *achievement* as a life-goal perceived a stronger influence from referent others in their social environment, and perceived e-learning as worthwhile compared with the cost incurred. In Schwartz's values continuum, *achievement* is situated within the dimension of *self-enhancement* concerned with the demonstrating personal competence according to social standards (Schwartz, 1992), and as such, was hypothesised to predict *social influence* (see section 4.2) because individual-level perceptions of social constructs (such as status and prestige), were expected to link with individual-level priorities over achievement and power. The data supported the *a priori* rationale with *achievement* predicting *social influence* in the survey data.

Power had little effect on the VETA model in the survey data. The separacy between *power* and *achievement* has been noted by Schwartz since his early research. *Power* and *achievement* differ in the abstract relation to everyday life: achievement can be directly related to personal competence at the individual level; power is abstractly related to status within the social hierarchy (Schwartz, 1992; Schwartz and Boehnke, 2004). Although this separacy led Schwartz to combine *power* and *achievement* into the higher order *self-enhancement* dimension, it was not possible to create an invariant combined variable within this study's data to test the influence of the higher order dimension on the adoption decision. Schwartz's theoretical distinction between *power* and *achievement* was supported in this study: *achievement* predicted *social influence* whereas *power* did not. This relationship supported the idea that direct normative or

status effects were not perceived by learners, rather tangible outcomes were important through: achievement according to the standards of the reference group resulted from greater knowledge from using e-learning, and, potential status, pay and career benefits were perceived as tangible outcomes (partly discussed in 7.2.3).

Interview data supported this separacy between *power* and *achievement*, as well as the group difference between fieldworkers and non-fieldworkers in the influence of *power* on *price value*. African (primarily fieldworker) respondents discussed e-learning within *achievement*-biased sub-themes such as: being perceived as knowledgeable within their organisation according to the standards of competence within the organisation; and the potential to demonstrate personal success through job-based promotions and career advancement through increased competence. UK (primarily computer user) respondents used different themes, such as complying with an organisational mandate, and higher status individuals (who had greater knowledge) not needing to comply with such mandates, implying lower importance on the value of *achievement*. The survey data also indicated that there was a country difference in the importance of *achievement*, acting via *price value* and *social influence* in the African groups, and via *performance expectancy* in the UK group. These findings directly relate to Schwartz's and Rokeach's empirical research on the value of *achievement* as a fundamental survival value (Rokeach, 1973; Schwartz, 1992), supporting Inglehart and Welzel's findings that societies move away from survival values through economic development (Inglehart and Welzel, 2005). These findings also support Bagchi and Kirs' argument that developed and developing nations differ in the influence of *achievement* with respect to ICT usage (Bagchi and Kirs, 2009).

Relating these findings to the research of Srite and others (exploring the influence of culture, espoused at the individual level, on the technology acceptance model) is not trivial, since much of the research has focussed on Hofstede's dimensions, as detailed in the literature review (chapter 3.3.2). To compare Schwartz's values at the individual-level (Schwartz et al., 2012) with Hofstede's dimensions at a group-level (Hofstede, 1984), the values must first be compared with Schwartz's group-level culture model (Schwartz, 1994a), which is isomorphic with Schwartz's individual-level model (Fischer et al., 2010). Schwartz's dimension of *self-enhancement* aligns with the Schwartz's group-level cultural domain of mastery, facilitating a comparison with the prior literature

based on Hofstede's dimensions (Schwartz, 1994b; Ng et al., 2007). Hofstede's group-level model and Schwartz's group level model have been compared for overlap, yielding a method of comparison between this study and technology adoption studies that use espoused versions of Hofstede's group-level values (Steenkamp, 2001; Ng et al., 2007). From Steenkamp's work, Schwartz's mastery domain positively aligns with Hofstede's masculinity vs femininity dimension (Steenkamp, 2001). Therefore, examining the literature for effects of Hofstede's *masculinity vs femininity* dimension provides a proxy for the lack of literature examining Schwartz's self-enhancement dimension on technology adoption.

Srite and Karahanna's examination of Hofstede's *masculinity vs femininity* dimension on technology adoption found a significant moderating effect between subjective norms and *behavioural intention* (Srite and Karahanna, 2006). This study supports those findings in that *achievement* interacted with the *social influence* construct in the adoption model. Udo and Bagchi found that Hofstede's power distance interacted with *performance expectancy*, which would correspond to a positive association between conservation values and *performance expectancy*, which was not supported in this study (Udo and Bagchi, 2011). Nistor *et al*. proposed (based on Venkatesh's research (Venkatesh and Zhang, 2010)), that *masculinity vs femininity* would correlate with *performance expectancy*. While a theoretical link with *masculinity vs femininity* was proposed as an explanation for UTAUT model differences between Romanian and German professionals (Nistor et al., 2014), the authors could not find a significant relationship (at $p<0.05$) in their data when *masculinity vs femininity* was included in a structural model (Nistor et al., 2013). This study therefore agreed with Nistor *et al.* in that the data from this study could not find the analogous direct relationship between self-enhancement (*achievement*) and *performance expectancy*. This finding also resonates with previous studies that indicate that a learner's perception of education in the form of learning expectancies are more important than *performance expectancy*: learning expectancies can arise from a learner's attitude towards *achievement* (Chen, 2011). It is therefore possible that *achievement* is important in the adoption of any initiative in an educational setting because learners are focussed on *achievement* in a general sense.

The value of *achievement* had an effect on *social influence*, indicating that learners perceive that referent others in their social environment endorse e-learning more where the learner prioritises the demonstration of personal competence in such a social environment. Prevailing cultural or organisational standards that prioritise ambition or success can therefore enable a learner to leverage e-learning to gain social approval by such standards. Combining the findings for both *power* and *achievement* supports prior findings that e-learners prioritise personal success over a sense of belonging to an e-learning community (Hernandez et al., 2011).

The dimension of *self-enhancement* strongly interacted with the primary predictor of *behavioural intention*, *price value*. Considering the personal costs and extrinsic benefits of e-learning, a higher value was attributed to e-learning where individuals placed a higher priority on achievement and dominance in an organisational setting. Individuals who were focussed on career progression, knowledge acquisition and skills enhancement evaluated the benefits from e-learning positively and were willing to incur the perceived costs in time and effort to gain these benefits. Learners therefore determined the worth of e-learning relative to their ability to achieve personal success and competent performance through using e-learning, as measured by organisational or social standards, included in Schwartz's definition of *achievement* (Schwartz, 2012). Because *price value* implies an inherent cost-benefit evaluation, the ability of e-learning to assist in performance gains is relative to the perceived sacrifice or effort that is made by the learner to use e-learning as an antecedent to perceived value (Zeithaml, 1988).

In the Gambian group, the importance of *achievement* linked to *performance expectancy* via *social influence* and *price value* in the survey data, demonstrating a significant indirect path. The interview data supported this finding, elaborating that while the achievement of performance goals was indicated as important by participants, many of the goals were mediated by some manner of social pressure. Workers could be perceived as knowledgeable by their co-workers, thus enhancing their status in their reference group, or, they could compete with their peers more effectively for career promotions or pay upgrades. These tangible performance outcomes were described as socially mediated extrinsic motivators that arose from achievements with e-learning, supporting the quantitative finding that the indirect path

from *achievement* to *performance expectancy* mediated by *social influence* was significant.

Greater priority on the value of *power* was associated with greater perception of *social influence* indicating that concepts such as social recognition for completing e-learning, and maintaining organisational status are important when considering the value of e-learning. Particularly important is that *power* implies self-interest and a sense of dominance at the expense of group-interests, implying that there might a competitive nature to the value consideration that a learner undergoes in organisational learning. Since this path was not present or minor, the inference is that learner perception of *achievement* was not a zero-sum game, and the accumulation of knowledge in the group was considered important. This is unsurprising in an organisational setting, because organisational development and subsequent performance is linked to highly performing groups more readily than to highly performing individuals. *Power* was more important in African groups than in the UK group, indicating a link with collectivist cultures, and suggesting that learner perception of referent others may include concepts such as social recognition, professional image, prestige and status, supported by interview data (Rucker et al., 2012).

Masculinity is often linked with and material goods, social status and the ongoing search for development opportunities (Hofstede et al., 2010). Although gender had no influence on the model, either through direct predictive influence on intention or through multi-group analysis, the prevalence of stereotypical masculine characteristics such as competitive and aggressive pursuit of goals, aligns with Schwartz's *power* value. The influence of gender roles on learning and technology use is through perceived self-efficacy, learners in Gambia indicated boredom and loneliness were factors, learners in Kenya indicated anxiety was a factor (Hergatt et al., 2013). Previous research has found that the effect of *social influence* on *behavioural intention* is stronger for feminine groups, which would translate in this model to *power* dominance being a weaker predictor of *social influence* (Venkatesh, Morris and Ackerman, 2000).

7.3.3.2. The Influence of Conservation Values in the VETA Model

Relating the findings of this study to Hofstede, *collectivism* has been proposed to be related to *subjective norms* and *social influence* in much of the relevant literature (Linjun, 2003; Srite and Karahanna, 2006; Udo and Bagchi, 2011; Zhao and Srite, 2013; Hoehle et al., 2015; Kwak et al., 2015; Du, R., Liu, L., Straub, D. W., & Knight, 2016; Lu et al., 2017). Using Steenkamp's analysis to link Hofstede's cultural dimensions to Schwartz's individual values as described in 7.3.3.1, and relating the models to the values relevant to this study, *collectivism* relates to societally-focussed values in the *conservation* quadrant of Schwartz's model, namely: *conformity*, *tradition* and *security*.

This study found, in the survey data, that *tradition* (in the *conservation* dimension, as a proxy for *collectivism*), did not have a direct influence on *performance expectancy*, but acted via *social influence*. The same result was found with collectivist workers' acceptance of email in China and alluded to by Straub *et al.*: a possible explanation is that workers in collectivist cultures may resist the performance attributes of a technology until a social consensus is formed about those attributes (Straub et al., 1997; Linjun, 2003). Indeed, African interview participants in this study discussed informational influence from actors in their social network, which is congruent with the concept of a community deciding on the usefulness of technology attributes before individuals form attitudes. Although UTAUT studies are conducted from a quantitative perspective without dissecting normative and informational influence, studies have seldom managed to find a direct link between collectivist or social focus and normative influence: including the findings from the survey and interview data in support of the prior literature, it may be more accurate to identify an indirect link (Lai et al., 2016). The mean values for *conformity* and *social influence* in the cross-country data indicated that while *conformity* was given a lower importance in the UK, *social influence* was neutral in the UK compared to being positive in African groups.

The rationale that conforming to procedural mandates to participate in e-learning would be preferable to individuals who prioritise a stable organisational culture was not supported. There were no relations with any adoption factors with individual preferences for *security* (such as job or career security linked with performance

expectancy). There are two possible explanations for this, either: respondents did not link the completion of e-learning with concepts such as job security or procedural compliance; or respondents made such a link, but in their organisations the compliance requirements were minor, rendering the link non-significant. This idea links to the idea that although this was a mandatory organisational initiative, learners perceived it as a loose mandate, with attributes of voluntary adoption (7.2.2).

Learner compliance, participation, and attrition with educational technology, from traditional distance education to MOOCs, has been widely commented upon, making it difficult to perceive the usage of educational technology to completion as truly mandatory from a learner perspective. Rather learner intention is more important, which links back to the founding principles of this research: investments in educational technology are only worthwhile if learners use the technology, and the drivers for learner intention are complex, no matter whether the technology use is mandated or not (Breslow et al., 2013; Onah et al., 2014; Morris, 2014). The qualitative data supported this ethos: no respondents in any cohort or demographic category indicated that e-learning was forced upon them in a manner that pursued procedural compliance, instead, respondents indicated informational influence and belief conversion, as discussed in section 7.2.2. This reasoning indicates that the link between individual preferences for *conformity* in a formal sense and *social influence* in a normative sense, or procedural compliance was not expected to manifest, which the data supported.

Comparing these results to previous literature: Schwartz's *conservation* values are linked to Hofstede's *power distance* (Steenkamp, 2001; Ng et al., 2007). These values link to e-learning usability, and may have low impact on the adoption model in general if adequate support from trainers and champions is present (Downey et al., 2005). Interviewees across all groups indicated that there was adequate support, even if the requirement for adequacy differed, which may have rendered the influence of conservation values null. Srite and Karahanna's oft-cited paper reported a confusing link between power distance and subjective norms in the adoption model: norms from people in positions of authority differed from norms from others (Srite and Karahanna, 2006). There was no attempt in this study to separately analyse data from persons who were deemed to be formal or informal influential referents and those who might be

influenced by these referents: there may be a difference in the effects of the value of *conformity* that must be subject to further study.

7.3.3.3. The Influence of Hedonism in the VETA Model

Openness-to-change was found to have a significant effect on the construct of *hedonic motivation*. This was expected due to the overlap in concepts: persons who prioritise enjoyment and intrinsic value as a life-goal can be expected to place a greater emphasis on the enjoyment of e-learning when making decisions on adoption. Deconstructing the higher-order value into *hedonism* and *stimulation* sub-values showed that both sub-values had an influence on motivation. *Hedonic motivation* was predicted by the value of *hedonism* in African groups. There is a degree of conceptual overlap between the value priority individuals place on the existence of pleasure in their lives, and the perception that e-learning is pleasurable. Individuals who believe that enjoyment is important are likely to find e-learning enjoyable because they find enjoyment in whatever they do. This is difficult to refute, since there is no survey data from people who did not participate in e-learning.

Hedonism was important only for East African fieldworkers, and not for the Gambian sample overall, the UK sample, or learners with higher levels of education. These findings supported previous research that indicated that developed nations tended not to link *hedonism* to ICT use because of the prevalence of ICT (Bagchi and Kirs, 2009), and the more general understanding that high income, highly educated and young users have higher use of ICT, predicted by satisfaction but not necessarily by *hedonism* (Rogers, 1995). However, the influence of intrinsic motivation remains unclear, with playfulness, flow and enjoyment being important in predicting intention in some applications, such as health (Koivisto and Hamari, 2014; Cocosila and Turel, 2016) and learning (Martocchio and Webster, 1992; Padilla-Meléndez et al., 2013). Immersive or hedonic technologies, or technologies with hedonic attributes, such as e-learning, can be expected to have hedonic predictors of intention (Childers et al., 2001), indicating that learners who had greater experience with e-learning did not find the technology to have hedonic attributes, and the unique media characteristics that lead to audio-visual engagement were not enjoyable in the UK group.

The finding that a person who thinks that enjoyment is important perceived e-learning as enjoyable calls into question a lot of the literature on motivation. How important is it to construct an e-learning application, an e-learning course, or an educational technology in a manner that prioritises learner engagement in the instructional design? What engages learners if their perception of engagement is largely part of their worldview, and not, as prior literature indicates, something that we can control through instructional or technology design?

7.4. Facilitating Conditions

The influence of *facilitating conditions* on e-learning adoption was not included in the survey or interview data but was mentioned explicitly as an important consideration by African workers. The physical infrastructure in terms of device availability, power, broadband availability, and organisational support was described by participants in a similar manner to other work in the African diaspora (Tarus et al., 2015), supporting a broad picture of resource-constraints that is known to be important in African technology projects (Baptista and Oliveira, 2015). Although it has been suggested that *facilitating conditions* manifests effects via *effort expectancy* in resource-constrained environments such as sub-Saharan Africa, the VETA model did not support this assertion (Brown, 2002; Musa, 2006; Kumar and Samalia, 2015). The interview data found that the relationship between *facilitating conditions* and e-learning adoption is potentially more context-specific and complex than originally proposed in the UTAUT model (Dwivedi et al., 2011). Support and barriers in the work environment are known to influence motivation (Olivier, 2006), potentially via *performance expectancy* in developing country contexts (Rana et al., 2016), and can be perceived as ‘costs’ to learners (Zainab et al., 2015).

Various coping strategies were employed by organisations to overcome the lack of technical infrastructure, but these strategies inevitably introduced a time pressure: learners needed to balance work priorities to access facilitating infrastructure in a manner that did not affect work outcomes. This led to the tactics of staying late after work, returning on weekends to access computing and internet facilities, travelling to access internet facilities, or paying to have those facilities at home (an aspect of price value, discussed in 7.1.2).

With participants indicating a broad range of infrastructural issues across the contexts of this study, with differing coping strategies, it is difficult to argue that *facilitating conditions* in UTAUT and UTAUT2, as a construct with up to four survey items, can have significant predictive value if there is no consideration of context. This study added to the literature by demonstrating the complex and context-specific nature of *facilitating conditions* that might not be completely captured as a context-free latent variable in a structural model.

7.5. Limitations

7.5.1. Limitations in the Survey Method

To incorporate both UTAUT2 and Schwartz's values survey exposed participants to many survey questions, which not only led to some participants failing to complete the UTAUT2 part of the survey (incomplete data was discarded during data cleaning), but also potentially contributed to participant fatigue. Conversely, it was not possible to measure everything, and factors such as quality of life; technology availability in a participant's household; prior employment, or prior educational setting were likely to be additional confounding factors. Particularly, variables such as income, climate and GNP were not included in this study: although these variables potentially influence national culture (Steenkamp, 2001), the link to individual-level decision-making at the learner-technology interface was difficult to make *a priori*. Participants indicated in interviews that they had varying levels of ICT expectation in their private lives, and future studies should investigate the effect of such expectation on adoption.

7.5.2. Limitations in the Interview Method

The original intent of interview questions was to explore the contextual differences in variables that were not part of the original technology acceptance model (Davis, 1989; Davis et al., 1989): *social influence*, *price value*, *habit* and *hedonic motivation*. Reflecting on the interview data, particularly with African participants stating that extrinsic e-learning outcomes were enjoyable, it would have been useful to explore differences in *performance expectancy* and *effort expectancy* between cohorts, as well as the barriers presents to participants when bridging the gap between intention and use. It would have also been useful to explore in greater depth the sources and types

of influence, mapping more closely with the informal and formal organisational and social hierarchy in different cohorts, mirroring Holden's study into *social influence* in e-health adoption in a developed context (Holden, 2012). A significant weakness in the study design is that the interview questions did not capture values in the study contexts, which meant that there was no interview data to relate to the survey findings for the outer part of the VETA model (Figure 13).

7.5.3. Generalisability of findings

The findings of this study indicate that, in the populations tested, that the null hypothesis (that there is no influence of values on adoption) can be rejected for certain values. However, whether this finding is generalizable to other populations depends on additional arguments. Firstly, the populations from which the samples were drawn were not random, but purposively determined based on a combination of *a priori* deduction from the values literature (the literature proposes that there is a values distance between UK and Africa), the literature gap (there is a lack of cross-cultural, vocational research in technology adoption applied to professional education and the African diaspora), and a technology opportunity (there was funding available for the implementation of e-learning in willing organisations). Therefore, inferring that these findings can be generalised to other populations must be done with some caution.

Secondly, the countries chosen may not be representative of their regions. The Gambia may represent West Africa to an extent, given studies in Nigeria (Folorunso et al., 2006; Eze et al., 2013; Tarhini et al., 2015) and Cameroon (Fonchamnyo, 2013) on technology adoption. Similarly, Kenya might be considered representative of East Africa: the UTAUT paradigm seems applicable to the contexts of West Africa and East Africa (Njuguna et al., 2012; Lule et al., 2012; Nganga and Munjiru, 2013; Muriithi et al., 2016). Thirdly, the populations in this study were workers in health research organisations. Compared to cultural studies that use culturally heterogeneous but geographically homogeneous student populations (Srite and Karahanna, 2006; Udo and Bagchi, 2011; Tams et al., 2012), this study used geographically disparate populations each of which were homogeneous with respect to nationality, and therefore findings may be generalised to those populations more readily. However, in the case of African countries, it is likely that workers participating in the study had a greater level of

income and quality of life than much of their respective national populations, and therefore it is difficult to argue (without additional research) that their values are representative of their nation as a whole. As well as income, workers in these organisations have been exposed to a level of technology availability, training availability and support that would not be available in an analogous study in the native population of the study contexts. It is also impossible to ignore the potential colonialism arising from working for, for example, a UK organisation in The Gambia, and how such dynamics might affect the values of workers. Therefore, this study adds to the literature in a manner that can be generalised with some caveats.

7.5.4. Lack of samples in certain cohorts

There was a lack of samples in the East African sample, particularly from the Ugandan cohort, and in the UK Antarctic cohort. Both of these limitations were due to the lack of an available local champion to run the day-to-day practicalities of the implementation project. The integration of technology in teaching can fail even when the infrastructure and training are in place if sufficient time (Teo et al., 2008), leadership and leadership endorsement are lacking, or if heavy workloads or administrative burdens prove to be barriers to carefully planned implementation (Gülbahar, 2007). The successful implementation in three organisations that yielded samples for this study had a local champion for the e-learning course, had the explicit endorsement of the leadership in each organisation, and the support of the local implementation department. In these organisations sufficient time was given to ensure that the local champion and the training department were familiar with the intervention and committed to deploying e-learning in their areas.

This comparative success and failure has implications for future research into e-learning as well as the adoption of other technologies. Organisations that support such initiatives are likely to exert a certain organisational influence through the creation of an organisational norm. Organisations that do not support such initiatives will not provide adequate research samples, therefore the data is always likely to be biased to some extent. Similarly, organisations that do not have available infrastructure are unlikely to be fertile for successful adoption research, yielding similar bias.

7.5.5. Practical Implications

This study has important practical implications for practitioners wishing to develop and implement e-learning in different contexts. Companies that operate across multiple geographical regions may be tempted to create e-learning courses that can be used across their organisation, under the assumption that a common organisational culture will yield common views on e-learning. However, this study confirms others that demonstrate that values and culture have a bearing on how users perceive and use technology. Designers and implementing managers should investigate and try to understand the cultural drivers in the environment before launching a technology-enhanced learning initiative, if such investments are to be adopted, used and expected to provide a return on investment.

This study demonstrates that the underlying infrastructure for e-learning cannot be taken for granted in each context, and that the lack of infrastructure, or barriers in supporting infrastructure, can affect users in very specific and tangible ways. Implementing managers need to ensure that they understand the constraints of the infrastructure, and put mitigating strategies in place within their project budgets to ensure that learners have appropriate access to premises, information, skills, devices and networks. It is important that implementing managers understand the potential costs to learners in terms of time and effort, alongside the benefits that lead to learning value, and design implementation programmes accordingly.

The predictive effect of the value of *achievement* on *price value* also has important practical implications. E-learning can be used as a tool for organisations to deliver training that needs to be delivered for a wide variety of reasons that are useful to the business. However, the perception of the learner in what is deemed useful to the outcomes that are relevant at an individual level (such as salary, promotion, peer status, time saving around work priorities) must be considered carefully by designers and managers of e-learning if implemented e-learning programmes are to be successfully adopted. What learners perceive as useful outcomes must be aligned with the stated outcomes of an e-learning programme for it to succeed.

7.6. Chapter Summary

The data from this study partially supported UTAUT2: *performance expectancy, price value*, and *habit* predicted *behavioural intention* in support of the main body of technology adoption literature; *effort expectancy*, *social influence*, and *hedonic motivation* predicted *behavioural intention* via *performance expectancy* rather than directly, contrary to the primary UTAUT2 literature. This partial support was consistent with other studies in the African diaspora that have found technology adoption literature partly applies in the African context (Baptista and Oliveira, 2015). Although this study's findings only partially support the primary UTAUT and UTAUT2 studies, the literature as applied to numerous fields of technology has not consistently found the full range of predictive effects when testing the model. This study therefore adds to the growing body of literature in partial support of the prevailing theoretical paradigm. This study extended the UTAUT2 through the addition of values as predictors of user perception. This study found that a learner's priority on self-enhancement through their own achievement was important in determining their perception of whether the behaviour of using e-learning was endorsed by their reference group, and whether the balance of cost and benefit was perceived as worthwhile. The next and final chapter will conclude the thesis, summarise the contribution and limitations of the study, propose next steps and implications for practise in the cross-cultural implementation of workplace e-learning.

8. Conclusions

8.1. The Literature Landscape before this Study

In the context of professional or adult education in multinational organisations a deeper understanding of the factors that drive learner adoption of e-learning facilitates the delivery of effective and appropriate educational technology initiatives. The literature landscape before this study included: studies that have contributed to technology-agnostic TAM and UTAUT2 model development; studies that have used the TAM/UTAUT2 paradigm to determine learner adoption of various technologies involved in the learner experience; studies that have compared adoption between groups using Hofstede's modified cultural model to augment TAM/UTAUT2 models. This study sought to address the gap in the literature: using Schwartz's model of values at an individual level in the UTAUT2 model to investigate e-learning adoption in the context of sub-Saharan Africa and the UK.

This thesis developed and introduced the VETA model, validated the model with survey data, and demonstrated contextual differences in cross-country application of e-learning with interview data. Through validation, this study found that although *performance expectancy* influenced *behavioural intention* to use e-learning in both developing and developed contexts, it was not the only driver. The main drivers in the context of this study were *price value,* and *habit*. Comparing UTAUT and UTAUT2, this study found that the consumer-oriented attributes were more important than the contextual or technological attributes indicated by TAM and UTAUT2, with the primary variables of the smaller models being explained through newer variables.

8.2. Answering the Research Questions

The discussion above adds to the literature by increasing the generalisability, applicability and usefulness of technology acceptance models through: the addition of values to technology adoption models; the exploration of contextual variation between sub-Saharan Africa and the UK; and the investigation of technology adoption in frontline worker populations. However, the study was conducted in pursuit of a research question regarding the influence of values on e-learning adoption. As a

summary to this chapter the research questions, sub-questions and objectives for this study are briefly and sequentially answered in the context of the results and discussion presented above. The overarching research question was: *how do values influence e-learning adoption in organisations?* Using the context of professional e-learning for fieldworkers and computer users in The Gambia, East Africa and the UK, the study found that values influenced adoption through indirect pathways in the VETA model, acting via user perception of technology and context attributes. This study therefore adds to the literature by: adding values to the UTAUT2 model and creating the VETA model; placing values as antecedents to learner perception of adoption predictors; exploring which values are relevant to technology adoption; finding that values of *achievement*, *power*, *tradition* and *hedonism* act as antecedents to *price value* and *social influence* in the UTAUT2 model.

8.2.1. Which Values are Important in Determining Educational Technology Adoption?

This research question was supported by the sub-question: *which values are important in determining e-learning adoption?* Values in the dimension *self-enhancement* and *conservation* were important in determining adoption. Within the self-enhancement dimension *achievement* was the value that was important in determining adoption. *Achievement* acted via *social influence* and *price value* such that learners perceived that e-learning was worthwhile and socially endorsed where *achievement* was a cultural priority. *Power* and *tradition* acted via *social influence* for Gambian workers such that learners perceived endorsement of e-learning where *power* and *tradition* were cultural priorities. *Hedonism* acted via *hedonic motivation* in the model, which increased *perceived usefulness* such that learners found e-learning enjoyable where pleasure was a cultural priority, which increased learner perception of usefulness.

8.2.2. How do Social Influence, Price Value, Hedonic Motivation and Habit vary with Context?

This research question was supported by the study objectives: *to determine whether there are differences in adoption factors in developing and developed country contexts.* *Social influence*, as proposed *a priori*, was an important mediator of the relationship between values and the adoption model. *Social influence* was constructed of different

source and types of influence in African and UK cohorts. African participants gained informational influence from champions and peers, with some normative influence from peers, managers and their families. UK participants had comparatively less influence other than the organisational mandate to complete training. Status effects also differed between cohorts, with African participants perceiving e-learning as a route to higher status, whereas UK participants perceived that high-status members of their organisation would be exempt from such mandates.

8.2.3. How does the Explanatory Power of the VETA model compare with UTAUT2?

This research question was supported by the study objectives: *to increase the explanatory power of UTAUT2 by exploring the influence of values on the model; to determine whether there are differences in UTAUT2 constructs in developing and developed country contexts.* The explanatory power of the model was comparable with the rest of the literature. While few studies have been able to match the explanatory power of TAM, UTAUT and UTAUT2 reported in the original studies, the UTAUT2 core of the VETA model in this study was comparable in predicting learner intention. The addition of values to the model, without any direct paths to *behavioural intention*, did not increase the variance explained in *behavioural intention*. Instead values explained variance in *performance expectancy, social influence, price value* and *hedonic motivation.* The explanatory power of the model in a qualitative sense was enhanced by this study by expanding *price value, performance expectancy, social influence* and *facilitating conditions* in context.

8.2.4. Does UTAUT2 apply in sub-Saharan Africa

This research question was supported by the study objective: *to validate UTAUT2 in a sub-Saharan African professional education context.* This study demonstrated that UTAUT2 in an African context partially applies to a sub-Saharan African professional context.

8.3. The Contribution of this Study

This research contributed to the literature in several important ways. Firstly, through the development and validation of the VETA model, this study is amongst the first to theorize and empirically evaluate the influence of Schwartz's values continuum to further understand the place of culture and values in technology acceptance. The influence of culture and values on technology acceptance is currently of interest (Tams et al., 2012; Zhao and Srite, 2013; Kwak et al., 2015), yet much of the literature in the area of culture and technology acceptance uses Hofstede's values, espoused at the individual level, using four (Srite and Karahanna, 2006; Leidner and Kayworth, 2006) or five of Hofstede's values (Hoehle et al., 2015). Secondly, this study theorises and evaluates the place of values as a predictor of user perception and attitude, rather than as a moderator of the relationship of perception on intention.

This study contributes to the literature by completing a cross-country comparison of technology adoption between sub-Saharan Africa and the UK which has seldom been attempted (Udo and Bagchi, 2011), demonstrating that although there are minor differences in applicability, the UTAUT2 core of the VETA model is partially supported across contexts and reflects much of the variance in learner intention. This study contributes to the literature by extending the generalisability of UTAUT2 in workplace contexts in sub-Saharan Africa. This study contributes to the technology adoption literature by confirming the factors that construct the predictors of *performance expectancy* in UTAUT2, demonstrating that there are mediated effects between *hedonic motivation*, *social influence*, *price value* and *intention*. This study expanded on the variability of UTAUT2 constructs through interview, finding that *social influence*, *price value* and motivation are perceived differently by learners in different contexts.

8.4. Next Steps

The next steps for research fall into three broad categories: expanding the underlying factors that predict learner intention; expanding the technologies and populations that the VETA model applies to; exploring the effects of context, values and culture.

Firstly, the factors that predict intention were different across contexts. Further research is needed to qualitatively evaluate the scope of these differences and relate these contextual differences into the development of a scale that can be used to capture the complexity of *social influence* in terms of for peer, manager, and champion influence; status; external influence and self-influence, to see what the relative influences are in different contexts and different technologies. Similarly, the concept of *price value* in contexts where different costs and benefits are manifest requires further investigation. The literature review and discussion highlighted that researchers regularly exclude *price value* from organisational or educational UTAUT research, on the basis that where a technology is provided free of monetary cost, price value can be removed from the model. This study demonstrated that cost can be more than monetary, including time and effort, and benefits are similarly complex. Further research is needed to explore the place of *price value* in situations where the monetary cost is zero.

Secondly, the context of this study was governed by an initial proposal for organisations to participate in this project had approximately thirty organisations in different countries in sub-Saharan Africa that conducted health or demographic surveillance research using fieldworkers, of which three organisations had capacity to participate within the timescale of this study. However, this study does not capture the broad variation in culture, context, or values in sub-Saharan Africa, and further research across the diaspora is needed to capture this variation. The physical infrastructure in terms of e-readiness differed across African and UK contexts, and further work is needed to examine the impact of infrastructure on e-learning adoption. The organisational context, as already noted in terms of strategy and institutional readiness also varied across contexts: the influence of institutional strategy on e-learning and general technology adoption also warrants further investigation (Ifinedo, 2005; Schreurs and Al-Huneidi, 2012; Watkins et al., 2014).

Finally, this study used Schwartz's individual-level values as a measure of culture. Aside from adoption research, measurements of culture in sub-Saharan Africa are much less numerous than measurements in other contexts, and further research is needed to explore the applicability of the tools generated by cultural researchers

Hofstede, Schwartz, Hall and Triandis, amongst others, to the context of sub-Saharan Africa.

8.5. Summary

Research on the cultural and group forces that influence technology adoption intention is limited. The intention of this research was to integrate Schwartz's Theory of Human Values with the Unified Theory of the Acceptance and Use of Technology to determine factors that make a learner predisposed towards perceptions of e-learning, thereby influencing their intention to use the technology. This study contributed to the literature through the development and validation of the *Values-Enhanced Technology Adoption* (VETA) model, the application of the model in diverse contexts, and the qualitative deconstruction of adoption factors in those contexts. This research therefore summarised the direct, indirect and total effects of values on the predictors of intention to use e-learning, and the contextual factors that contributed towards learner decision-making with e-learning. Values relating to self-enhancement were found to influence learner intention to use e-learning via learner perception of social norms and technology attributes.

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10. Appendix 1: Survey Instruments

10.1. UTAUT2 Question Set

Survey Item	Question/statement
Please indicate your opinion on each statement:	
Performance Expectancy (Davis, 1989; Venkatesh et al., 2003; Venkatesh et al., 2012)	
PE1	I find e-learning useful in my daily life
PE2	Using e-learning helps me accomplish things more quickly
PE3	Using e-learning increases my productivity
Effort Expectancy (Davis, 1989; Venkatesh et al., 2003; Venkatesh et al., 2012)	
EE1	Learning how to use e-learning is easy for me
EE2	My interaction with e-learning is clear and understandable
EE3	I find e-learning easy to use
EE4	It is easy to become skillful at e-learning
EE5	Using e-learning is as easy as using any other systems I have previously used
Social Influence (Venkatesh et al., 2003; Nasution, 2007; Venkatesh et al., 2012)	
SI1	People who are important to me think that I should use e-learning
SI2	People who influence my behaviour think that I should use e-learning
SI3	People whose opinions that I value prefer that I use e-learning
SI4	My organization supports the use of e-learning
SI5	I use e-learning because of the proportion of my co-workers who use e-learning
SI6	People in my organization who use e-learning have a high profile
SI7	Having e-learning is a status symbol in my organization
SI8	Using e-learning strengthens my position and influence in my organisation
Facilitating Conditions (Venkatesh et al., 2003; Venkatesh et al., 2012)	
FC1	I have the resources necessary to use e-learning
FC2	I have the knowledge necessary to use e-learning

FC3	E-learning is compatible with the other technologies I use
FC4	I can get help from others when I have difficulties using e-learning
Habit (Venkatesh et al., 2012)	
HAB1	The use of e-learning has become a habit for me
HAB2	I am addicted to the use of e-learning
HAB3	I must use e-learning
Hedonic Motivation (Venkatesh et al., 2012)	
HM1	Using e-learning is fun
HM2	Using e-learning is enjoyable
HM3	Using e-learning is very entertaining
Price Value (Venkatesh et al., 2012; Chunxiang, 2014)	
PV1	Compared to the effort I need to put in, e-learning is beneficial for me
PV2	Compared to the sacrifice I need to make, e-learning is worthwhile for me
PV3	Overall, e-learning is good value
Behavioural Intention (Davis, 1989; Venkatesh et al., 2003; Venkatesh et al., 2012)	
BI1	I intend to continue using e-learning in the future
BI2	I will always try to use e-learning in my daily life
BI3	I plan to continue to use e-learning frequently
Self-reported Usage Behaviour	
U1	How often do you use e-learning:

10.2. Portrait Values Questionnaire (PVQ-5X)

Survey Item	**Question/statement (Male version is shown. Depending on gender selected on the first page of the survey, either a male or female version is presented. The items are the same, pronouns are replaced.)** (Schwartz et al., 2012)
Here we describe some people. Please read each description and think about how much each person is or is not like you. Select the option that shows how much the person in the description is like you. How much like you is this person?	

Self-direction	
SDT1	Being creative is important to him
SDT2	It is important to him to form his own opinions and have original ideas
SDT3	Learning things for himself and improving his abilities is important to him
SDA1	It is important to him to make his own decisions about his life
SDA2	Doing everything independently is important to him
SDA3	Freedom to choose what he does is important to him
Stimulation	
ST1	He is always looking for different things to do
ST2	Excitement in life is important to him
ST3	He thinks it is important to have all sorts of new experiences
Hedonism	
HE1	Having a good time is important to him
HE2	Enjoying life's pleasures is important to him
HE3	He takes advantage of every opportunity to have fun
Achievement	
AC1	He thinks it is important to be ambitious
AC2	Being successful is important to him
AC3	He wants people to admire his achievements
Power	
POR1	Having the feeling of power that money can bring is important to him
POR2	Being wealthy is important to him
POR3	He pursues high power and status
POD1	He wants people to do what he says
POD2	It is important to him to be the most influential person in any group
POD3	It is important to him to be the one who tells others what to do
Face	
FAC1	It is important to him that no one should ever shame him
FAC2	Protecting his public image is important to him
FAC3	He wants people always to treat him with respect and dignity
Security	
SEP1	He avoids anything that might endanger his safety
SEP2	His personal security is extremely important to him

SEP3	It is important to him to live in secure surroundings
SES1	It important to him that his country protect itself against all threats
SES2	He wants the state to be strong so it can defend its citizens
SES3	Having order and stability in society is important to him
Tradition	
TR1	It is important to him to maintain traditional values or beliefs
TR2	Following his family's customs or the customs of a religion is important to him
TR3	He strongly values the traditional practices of his culture
Conformity	
COR1	He believes he should always do what people in authority say
COR2	It is important to him to follow rules even when no one is watching
COR3	Obeying all the laws is important to him
COI1	It is important to him to avoid upsetting other people
COI2	He thinks it is important never to be annoying to anyone
COI3	He tries to be tactful and avoid irritating people
Humility	
HU1	He tries not to draw attention to himself
HU2	It is important to him to be humble
HU3	It is important to him to be satisfied with what he has and not to ask for more
Benevolence	
BED1	It is important to him to be loyal to those who are close to him
BED2	He goes out of his way to be a dependable and trustworthy friend
BED3	He wants those he spends time with to be able to rely on him completely
BEC1	It's very important to him to help the people dear to him
BEC2	Caring for the well-being of people he is close to is important to him
BEC3	He tries always to be responsive to the needs of his family and friends
Universalism	
UNC1	Protecting society's weak and vulnerable members is important to him
UNC2	He thinks it is important that every person in the world have equal opportunities in life
UNC3	He wants everyone to be treated justly, even people he doesn't know

UNN1	He strongly believes he should care for nature
UNN2	It is important to him to work against threats to the world of nature
UNN3	Protecting the natural environment from destruction or pollution is important to him
UNT1	He works to promote harmony and peace amongst diverse groups
UNT2	It Is important to him to listen to people who are different from him
UNT3	Even when he disagrees with people, it is important to him to understand them

10.3. Demographic Questions

Survey Item	**Question/statement**
Demographic Questions	
DEM1	Are you (Male/Female)?
DEM2	How old are you? (Under 20, 20-24, 25-29, 30-34, 35-39, 40-49, 50-59, 60 or over)?
DEM3	How many years of formal school education or equivalent did you complete, starting with Primary School (10 years or less; 11 years; 12 years; 13 years; 14 years; 15 years; 16 years; 17 years; 18 years or more)?
DEM3a	What is the highest level of post-secondary education you have completed (Vocational Diploma or equivalent; Bachelors Degree or equivalent; Masters Degree or equivalent; PhD or equivalent)?
DEM4	How many years work experience do you have (less than 1 year, 1-2 years, 2-5 years, more than 5 years)?
DEM5	What is your nationality (pick from list)?

11. Appendix 2: Interview Questions

Study participants who complete surveys will be invited to participate in a 30-minute interview based on the following questions:

Introduction

- Introduce the study and the researcher
- Who are you, how old, what do you do, how did you get here?

Social Influence

- Whose opinion influences your behaviour towards e-learning?
- How does the organisation support your use of e-learning?
- How do your peers influence your use of e-learning?
- How does the use of e-learning affect your status?

Hedonic Motivation

- What makes e-learning enjoyable?
- How is e-learning more or less enjoyable than other forms of learning?
- How important is it to you that e-learning is fun?

Habit

- What are your current learning habits?
- Why would you change those habits?
- What are the barriers to changing your habits?
- How might e-learning become part of your regular routine?

Price Value

- What effort or sacrifice do you need to make to use e-learning?
- How does this compare to the effort or sacrifice you need to make to use existing learning methods?
- What benefits do you get from using e-learning?
- How does this compare to the benefits get from existing learning methods?

12. Appendix 3: Ethics Approvals

12.1. Example Participant Information

Participant information was given online (for surveys) and face-to-face in hard copy (for interviews). The following pages show the documents given to participants.

Cultural Variation in the Acceptance and Use of Educational Technology (November 2016)

1. Informed Consent Documents

The following information is a duplicate of that which is available online within the e-learning module.

1.1.Introduction to the survey

Welcome

This survey asks about your experiences of e-learning. Your responses will be combined with those of others to help inform your institution about user experience of workplace e-learning. This will help improve future support for e-learning. The results are also used for research into the adoption of educational technology for a PhD. Your survey results are anonymised and cannot be tied to your name.

Many thanks for your participation;

Ash Mehta, Corporate Lead: E-learning

Data Protection

All data collected in this survey will be held securely. Individual results are confidential. The survey has been structured to not identify any individuals when reporting their results. The full anonymised dataset will be used for research purposes, and may be used in publication of research findings.

Notes for completion

If a question does not apply to you, or you cannot offer any opinion on it, then please leave blank.

The questionnaire should take **around 10-15 minutes** to complete. Please note that it is not possible to return to a page once it has been completed. When you arrive at the **final 'thank you' page**, you will know that your responses have been recorded on our database.

Where "course" is used in the questionnaire, this refers to your e-learning course e.g. "Level 3 Fieldwork Course (The Gambia)".

After some sections you will be asked for any further comments on the issues covered, to enable staff to gain a better understanding of what has gone well and what has worked less well. **Please do not identify yourself or other individuals (including staff) in your comments.**

Once you click 'continue' you will be directed to the first section of the survey.

1.2.Information for participants

Introduction

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

Aims of the study

Research into the acceptance and use of educational technology is being undertaken for the purposes of a PhD. The question being explored is: "how does the acceptance and use of educational technology vary with culture?" The educational technology is e-learning with an online learning network. Comparison studies are being completed with other research organisations in the UK and Africa to determine differences and similarities in how people working in research organisations use and adopt e-learning in their workplace training.

Why have I been chosen?

You have been selected to take part in this research as you are an employee of [redacted] and you will be participating in e-learning as part of your workplace training. All employees enrolled on this e-learning course will be asked to participate.

What the study involves

The research method is to complete an online survey which will take you around 10-15 minutes. The survey will be displayed on the next screen, and you will need to click on "continue" to submit your survey answers. You will be offered this survey before you complete e-learning, your survey results along with your interaction with the e-learning course will be anonymised before it is accessed.

The research method will be mixed to include:
- An online survey accompanying the e-learning available to all participants
- One-to-one interviews with a small number of participants
- Usage data for e-learning and the learning network

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be able to access this information at any time, but each survey will only be available to you once. You can still withdraw at any time without it affecting any benefits that you are entitled to in any way. You do not have to give a reason.

Will I be recorded, and how will the recorded media be used?

Audio recordings will only be made if you participate in an interview. Audio recordings made during this research will be used only for analysis. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings. Your name will not be recorded.

Taking care of your data

The survey will be completed online and automatically anonymised. You are reminded not to include any information that could identify you in any way. The consent form asks

for your consent for the use of quotations or any audio recordings from interviews. All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be individually identified in any reports or publications. All data will be securely stored and will be destroyed 10 years after the completion and publication of the research.

What will happen to the results of the research?

The results of this study will be used for my PhD, to write research papers and conference presentations. You will not be able to be individually identified in any reports or publications. The results of the research will be available to you at the project end.

Contact

Thank you for reading the information sheet. If you have any questions or would like any of the information above to be clarified you can contact the local project officer, [redacted]. You can also contact the project leader Ashwin Mehta, [redacted]

12.2. Example Consent Form (Interviews)

The following consent form was used for interviews. The consent form for surveys analogous (with reference to survey data instead of interview data) but completed online.

Consent to take part in research project: Cultural Variation in the Acceptance and Use of Educational Technology – November 2016

	Add your initials next to the statements you agree with
I confirm that I have read and understand the information sheet 'Cultural Variation in the Acceptance and Use of Educational Technology' dated November 2016 explaining the above research project and I have had the opportunity to ask questions about the project.	
I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline.	
I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research. I understand that my responses will be kept strictly confidential.	
I give my consent for the use of quotations taken from interviews to be used and included in any publications or conferences.	
I give my consent for the interviews to be recorded and recordings stored and transcribed for the purposes of the study.	
I give permission for members of the research team to have access to my assessments results for MRC Fieldworker e-learning levels 1, 2 and 3.	
I agree for the data collected from me to be used in relevant future research.	
I agree to take part in the above research project and will inform the lead researcher should my contact details change.	

Name of participant	
Participant's signature	
Date	
Name of lead researcher [or person taking consent]	
Signature	
Date*	

*To be signed and dated in the presence of the participant.

12.3. University of Leeds Approval

Performance, Governance and Operations
Research & Innovation Service
Charles Thackrah Building
101 Clarendon Road
Leeds LS2 9LJ Tel: 0113 343 4873
Email: ResearchEthics@leeds.ac.uk

UNIVERSITY OF LEEDS

Ashwin Mehta
School of Education
University of Leeds
Leeds, LS2 9JT

ESSL, Environment and LUBS (AREA) Faculty Research Ethics Committee
University of Leeds

23 October 2014

Dear Ashwin

Title of study: **Cultural Variation in the Acceptance and Use of Educational Technology**
Ethics reference: **AREA 14-018**

I am pleased to inform you that the above research application has been reviewed by the ESSL, Environment and LUBS (AREA) Faculty Research Ethics Committee and following receipt of your response to the Committee's initial comments, I can confirm a favourable ethical opinion as of the date of this letter. The following documentation was considered:

Document	Version	Date
AREA 14-018 UoL_Ethical_Review_Form_V4.docx	2	07/10/14
AREA 14-018 UoL Ethics Committee Letter.docx	1	07/10/14
AREA 14-018 UoL_Fieldworker Consent Form V2.docx	2	07/10/14
AREA 14-018 UoL_Fieldworker_Participant_information_sheet_-_research v2.docx	2	07/10/14
AREA 14-018 Cultural Variation in the Acceptance and Use of Educational Technology - Interview and Focus Group Questions.docx	1	07/10/14
AREA 14-018 Cultural Variation in the Acceptance and Use of Educational Technology - Response to Ethics Committee Comments.docx	1	07/10/14
AREA 14-018 Cultural Variation in the Acceptance and Use of Educational Technology - Survey Question List.docx	1	07/10/14
AREA 14-018 Cultural Variation in the Acceptance and Use of Educational Technology - Usage data.docx	1	07/10/14
AREA 14-018 fieldwork-ra-template-jan2010-web-v Ashwin Mehta FINAL.doc	1	05/09/14

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval, including changes to recruitment methodology. All changes must receive ethical approval prior to implementation. The amendment form is available at http://ris.leeds.ac.uk/EthicsAmendment.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited. There is a checklist listing examples of documents to be kept which is available at http://ris.leeds.ac.uk/EthicsAudits.

12.4. The Gambia Government/MRC Joint Ethics Committee Approval

The Gambia Government/MRC Joint
ETHICS COMMITTEE

C/o MRC Unit: The Gambia, Fajara
P.O. Box 273, Banjul
The Gambia, West Africa
Fax: +220 – 4495919 or 4496513
Tel: +220 – 4495442-6 Ext. 2308
Email: ethics@mrc.gm

18 December 2014

Mr Ashwin Mehta
Corporate E-learning
MRC, UK
Swindon, SN2 1FL

Dear Mr Mehta

SCC 1403v2, Cultural Variation in the Adoption and Use of Educational technology

Thank you for submitting your response letter addressing the issues raised by The Gambia Government/MRC Joint Ethics Committee at its meeting held on 31 October 2014.

Your responses to the queries raised are quite satisfactory. I am happy to give Chair's approval for this project to proceed.

With best wishes

Yours sincerely

Mr Malamin Sonko
Chairman, Gambia Government/MRC Joint Ethics Committee

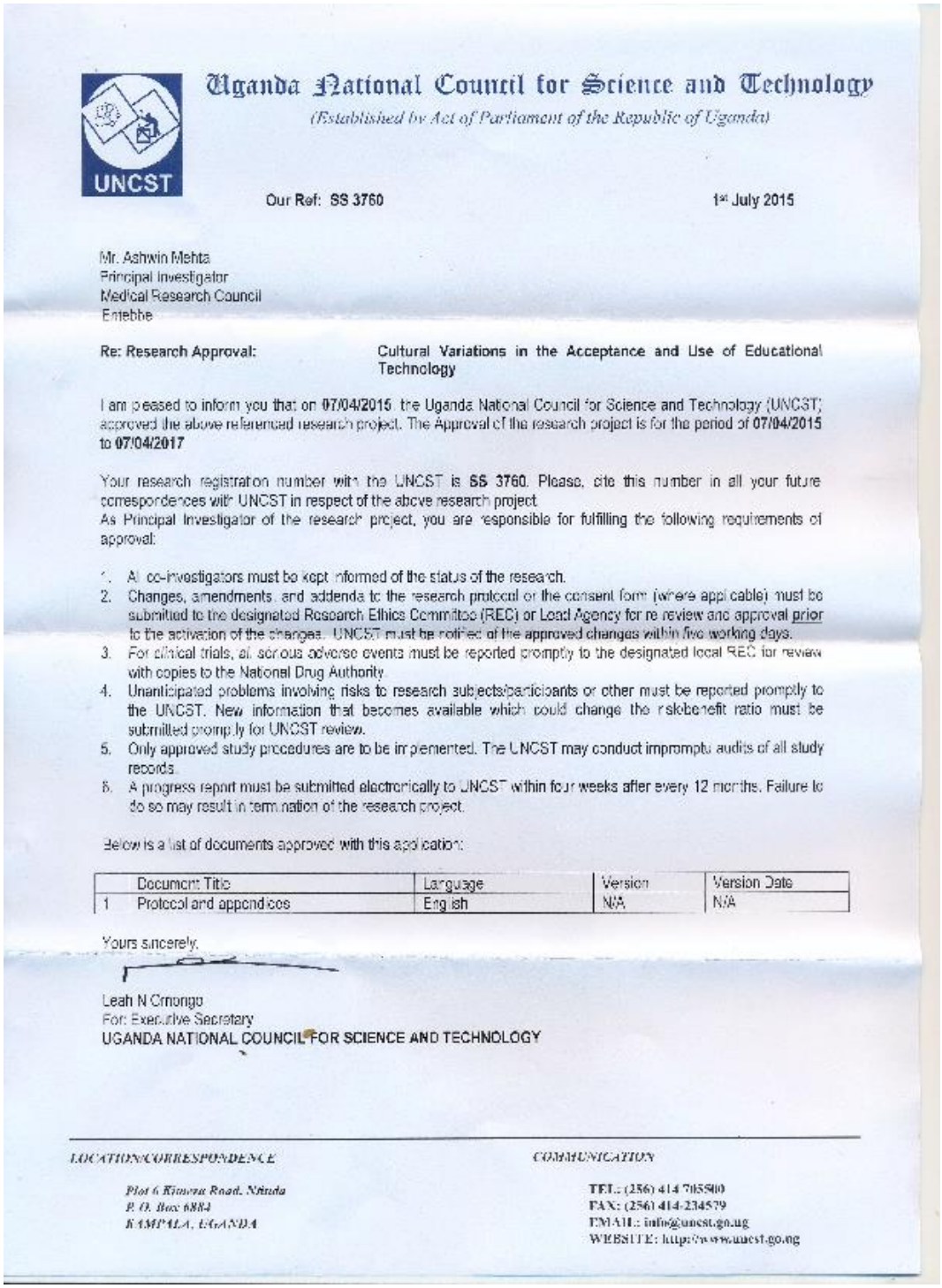
Documents submitted for review:-

- Response letter
- SCC approval letter – 20 October 2014
- SCC reply letter – 8 October 2014
- SCC application form, version 2.0 – 15 October 2014
- Informed consent document
- List of proposed questions

The Gambia Government/MRC Joint Ethics Committee:

Mr Malamin Sonko, Chairman
Professor Ousman Nyan, Scientific Advisor
Ms Naffie Jobe, Secretary
Mrs Tulai Jawara-Ceesay
Dr Ahmadou Lamin Samateh
Dr Roddie Cole
Prof. Umberto D'Alessandro
Dr Stephen Howie
Dr Kalifa Bojang
Dr Ramatoulie Njie
Dr Momodou L. Waggeh
Dr Siga Fatima Jagne

12.5. Uganda National Council for Science and Technology Approval



Uganda National Council for Science and Technology

(Established by Act of Parliament of the Republic of Uganda)

UNCST

Our Ref: SS 3760 1st July 2015

Mr. Ashwin Mehta
Principal Investigator
Medical Research Council
Entebbe

Re: Research Approval: **Cultural Variations in the Acceptance and Use of Educational Technology**

I am pleased to inform you that on **07/04/2015** the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **07/04/2015** to **07/04/2017**

Your research registration number with the UNCST is **SS 3760**. Please, cite this number in all your future correspondences with UNCST in respect of the above research project.
As Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the research protocol or the consent form (where applicable) must be submitted to the designated Research Ethics Committee (REC) or Lead Agency for re review and approval prior to the activation of the changes. UNCST must be notified of the approved changes within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local REC for review with copies to the National Drug Authority.
4. Unanticipated problems involving risks to research subjects/participants or other must be reported promptly to the UNCST. New information that becomes available which could change the riskbenefit ratio must be submitted promptly for UNCST review.
5. Only approved study procedures are to be implemented. The UNCST may conduct impromptu audits of all study records.
6. A progress report must be submitted electronically to UNCST within four weeks after every 12 months. Failure to do so may result in termination of the research project.

Below is a list of documents approved with this application:

	Document Title	Language	Version	Version Date
1	Protocol and appendices	English	N/A	N/A

Yours sincerely,

Leah N Ormongo
For: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

LOCATION/CORRESPONDENCE

Plot 6 Kimera Road, Ntinda
P. O. Box 6884
KAMPALA, UGANDA

COMMUNICATION

TEL: (256) 414 705500
FAX: (256) 414-234579
EMAIL: info@uncst.go.ug
WEBSITE: http://www.uncst.go.ug

12.6. KEMRI, Kenya Approval

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840-00200 NAIROBI - Kenya
Tel: (254) (020) 2722541, 254 (020) 2713349, 0722-205901, 0733-400003 Fax (254) (020) 2720030
Email: director@kemri.org info@kemri.org Website: www.kemri.org

KEMRI/RES/7/3/1 **May 06, 2016**

TO: **ASHWIN MEHTA,**
PRINCIPAL INVESTIGATOR

THROUGH: **DR. BENJAMIN TSOFA,**
THE DIRECTOR, CGMR-C,
KILIFI

DIRECTOR
CENTRE FOR GEOGRAPHIC MEDICINE
RESEARCH, COAST

Dear Sir,

RE: **SERU PROTOCOL NO. KEMRI/SERU/CGMR-C/037/3238 (*RESUBMISSION OF INITIAL SUBMISSION*): THE INFLUENCE OF VALUES DIMENSIONS ON THE ACCEPTANCE AND USE OF EDUCATIONAL TECHNOLOGY *(VERSION 4.0 DATED 25TH APRIL 2016)***

Reference is made to your letter dated 25 April 2016. KEMRI/Scientific and Ethics Review Unit (SERU) acknowledges receipt of the revised study protocol on 29 April 2016.

This is to inform you that the Committee notes that the issues raised during the 249th C meeting of the KEMRI/Scientific and Ethics Review Unit (SERU) held on 24th March 2016, have been adequately addressed. Consequently, the study is granted approval for implementation effective this day **6th day of May 2016** for a period of one year. Please note that authorization to conduct this study will automatically expire on **5th May, 2017.** If you plan to continue data collection or analysis beyond this date, please submit an application for continuation approval to SERU by **24th March 2017.**

You are required to submit any proposed changes to this study to SERU for review and the changes should not be initiated until written approval from SERU is received. Please note that any unanticipated problems resulting from the implementation of this study should be brought to the attention of SERU and you should advise SERU when the study is completed or discontinued.

You may embark on the study.

Yours faithfully,

DR. EVANS AMUKOYE,
ACTING HEAD,
KEMRI/SCIENTIFIC AND ETHICS REVIEW UNIT

WELLCOME TRUST RESEARCH PROGRAMME
P. O. Box 230
12 MAY 2016
DIRECTORS OFFICE
KILIFI

13. Appendix 4: Coding Scheme

Node	Definition	Sub-node	Definition
Performance Expectancy	The performance benefits from e-learning	Effectiveness	E-learning is better/worse in achieving learning outcomes than offline methods because of: e.g. multi-media capabilities; reduction in content ambiguity; range of content, reduction of interference or distraction, lack of peer interaction.
		Efficiency	E-learning is quicker/slower/cheaper than other methods: e.g. time spent to convey concepts; to understand content; just-in-time delivery of information; on-demand learning; removing delays in the learning process;
		Knowledge Quality	A belief that e-learning provides information that is superior/inferior to that from offline methods
		Learner Control	Better/worse learner control of the e-learning experience: pace; time spent on objectives; repeating modules; reading speed, flexibility in location
		Prior Experience of Utility	Participant has used e-learning before and remembered the usefulness/lack of usefulness of prior e-learning
		Work Performance	E-learning helps/hinders work performance. The participant is more knowledgeable, more skilled, more confident at work as a result of e-learning, work is safer
		Education Quality	The extrinsic transferrable benefits from completing e-learning: e.g. gaining qualifications; certificates; value to the participant's CV; ICT skill; eligibility for promotion; eligibility for application outside the organisation

Effort Expectancy	Using e-learning is low effort or easy	Easy to Learn	Content is easier to learn than offline content
		Easy to Use	Navigating any part of the technology is easy/difficult: e.g. the PC, Windows, the internet, the LMS, the course navigation
Facilitating Conditions	The supporting infrastructure required for learning	Cost	Financial investment by the organisation (Head Office, Local Unit, Local Managers) in any aspect of e-learning (instructional design, infrastructure, travel or overtime bursaries)
		Devices	Device availability (PCs, Laptops, tablets, phones)
		Network	Network or telephony availability (2G, 3G, 4G, Wi-Fi, LAN, Broadband)
		Organisation	Availability of policy support for skills and development: salary, promotion opportunities, job descriptions, contracts, rewards or punishments, appraisals, certificates
		Time	Time required to train: prioritising work, time management, interruptions, time poverty, lack of time, time pressure, time not allowed, using personal time, using work time.
		Other	Other infrastructure not mentioned (generate additional codes if a particular item is frequently mentioned): e.g. power, travel, vehicles, accommodation
Social Influence	The opinion of significant others in the	Director Influence	The perception that senior actors in the organisational context endorse/reject e-learning: Head Office; Directors; Senior Managers; PIs
		Family Influence	The perception that actors outside the organisational context endorse/reject e-learning: spouse; siblings; children; parents; cousins; friends outside work

	social context	Manager influence	The perception that actors in the immediate formal hierarchy of the organisation endorse/reject e-learning: line manager, supervisor, senior team members
		Peer influence	The perception that equivalent actors in the professional context endorse/reject e-learning: team members; comparable professionals within the organisation; comparable professionals outside the organisation
		Status	Using e-learning changes user status: those who use e-learning have a greater status; those who have a greater status do not use e-learning
		Subordinate influence	The perception that actors more junior in the organisational hierarchy endorse/reject e-learning: subordinates, students, interns, apprentices
		Self-Influence	Participant states that they make their own mind up; they are not influenced by others
		Organisational Influence	Influence from members of a training or operational department who want the participant to complete training for some defined reason. Different from organisational facilitating conditions which are tangible extensions
Hedonic Motivation	The intrinsic pleasure, fun or enjoyment that arises from e-learning	Comfort	Completing training by e-learning is enjoyable because it is low physical effort
		Interesting	E-learning is enjoyable because of cognitive stimulus: the content is interesting; participants enjoy learning;
		Visually Stimulating	The e-learning is graphically pleasing, visually or aesthetically pleasurable.
Price Value		Concentration	There is a cognitive burden: the participant mentions a perceived effort cost

	The cost-benefit analysis conducted by learners	Cost/Money	Using e-learning has a direct or indirect financial cost to the learner: they must pay for data, they have bought a laptop, they pay travel costs
		Effort	There is some practical effort in using the course
		Time	The learner sacrifices their time to use e-learning
		Travel	The learner must travel a distance to access the internet, and therefore e-learning
	The regularity or automaticity of learning methods	Offline	The participant regularly uses offline methods of information discovery: e.g. newspapers, books, magazines, talking to friends, family and colleagues
		Online	The participant regularly uses online methods of information discovery: e.g. news feeds, social media, YouTube
		Prior Experience	The participant uses e-learning regularly at the workplace

14. Appendix 5: Cross-Country Study – Supporting Data

The data was tested for reliability and validity according to conventional thresholds for this kind of research. The data met the thresholds indicated in section 4.3.3.6 as follows: Composite Reliability were between .71 and .95, and AVE were all between .51 and .85 and greater than squared latent variable correlations indicating adequate convergent validity and internal consistency (Table 20 to Table 23). For the data tables in 0, diagonal elements (bold) are the square root of AVE; off-diagonal elements are latent variable correlations. For discriminant validity, diagonal elements should be greater than off-diagonal elements. Item cross-loadings were strongest by 0.1 or greater on respective latent variables (Table 24 to Table 27). HTMT ratios were all below 0.9, indicating discriminant validity between latent variables (data not shown). Inner and outer VIFs were all below 5 indicating that multi-collinearity was not present (data not shown). Therefore, the psychometric properties of the measurement model were sufficient to proceed with path analysis in the structural model.

14.1. Cross-Country Study: Reliability, Validity and Descriptive Statistics

14.1.1. The Gambia

Table 20: The Gambia - Reliability, Validity and Descriptive Statistics

	CR	AVE	Mean	SD	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC	0.77	0.63	5.08	0.84	**0.79**												
BI	0.91	0.76	6.15	0.75	0.30	**0.87**											
CO	0.79	0.56	5.32	0.70	0.36	0.22	**0.75**										
EE	0.88	0.59	5.91	0.74	0.23	0.35	0.10	**0.77**									
HAB	0.90	0.75	5.08	1.36	0.38	0.63	0.22	0.48	**0.87**								
HE	0.80	0.50	4.66	0.89	0.37	0.10	0.14	0.22	0.30	**0.71**							
HM	0.83	0.71	5.14	1.35	0.18	0.37	0.23	0.34	0.43	0.24	**0.84**						
PE	0.86	0.67	6.21	0.65	0.33	0.59	0.26	0.50	0.63	0.27	0.37	**0.82**					
PO	0.80	0.51	3.72	1.04	0.43	-0.03	0.07	0.17	0.27	0.49	0.12	0.21	**0.72**				
PV	0.92	0.80	6.16	0.77	0.25	0.66	0.30	0.42	0.59	0.16	0.46	0.61	0.16	**0.89**			
SE	0.83	0.55	5.50	0.53	0.54	0.32	0.57	0.23	0.27	0.31	0.25	0.33	0.27	0.42	**0.74**		
SI	0.93	0.68	5.16	1.33	0.37	0.51	0.28	0.29	0.58	0.18	0.29	0.47	0.17	0.50	0.26	**0.82**	
TR	0.83	0.63	4.94	0.90	0.36	0.18	0.33	0.20	0.30	0.31	0.13	0.37	0.27	0.27	0.41	0.34	**0.79**

14.1.2. East Africa

Table 21: East Africa - Reliability, Validity and Descriptive Statistics

	CR	AVE	Mean	SD	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC	0.79	0.66	4.77	0.90	**0.81**												
BI	0.90	0.75	6.00	0.79	0.24	**0.87**											
CO	0.85	0.65	4.96	0.93	0.48	0.26	**0.81**										
EE	0.90	0.65	5.85	0.80	0.31	0.59	0.28	**0.81**									
HAB	0.88	0.70	4.39	1.41	0.28	0.52	0.26	0.58	**0.84**								
HE	0.83	0.57	4.35	1.01	0.32	0.27	0.10	0.37	0.38	**0.75**							
HM	0.89	0.81	5.48	1.09	0.09	0.73	0.28	0.53	0.45	0.37	**0.90**						
PE	0.91	0.77	6.09	0.80	0.25	0.64	0.20	0.75	0.48	0.30	0.55	**0.88**					
PO	0.84	0.56	3.40	1.12	0.51	0.22	0.35	0.17	0.31	0.45	0.12	0.11	**0.75**				
PV	0.92	0.79	6.05	0.76	0.21	0.68	0.14	0.56	0.33	0.18	0.65	0.59	0.01	**0.89**			
SE	0.84	0.56	5.39	0.65	0.52	0.34	0.42	0.45	0.47	0.30	0.28	0.30	0.38	0.28	**0.75**		
SI	0.90	0.61	4.92	1.21	0.46	0.53	0.41	0.46	0.53	0.15	0.48	0.54	0.30	0.41	0.36	**0.78**	
TR	0.84	0.63	4.25	1.22	0.26	0.04	0.44	0.13	0.14	0.08	-0.01	0.02	0.37	-0.04	0.38	0.22	**0.80**

14.1.3. UK

Table 22: UK - Reliability, Validity and Descriptive Statistics

	CR	AVE	Mean	SD	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC	0.84	0.72	3.46	1.06	**0.85**												
BI	0.87	0.69	4.39	0.99	0.09	**0.83**											
CO	0.84	0.65	4.27	0.94	0.14	-0.04	**0.80**										
EE	0.93	0.73	5.33	0.91	0.00	0.48	-0.07	**0.86**									
HAB	0.82	0.61	2.58	1.18	-0.04	0.50	-0.21	0.21	**0.78**								
HE	0.88	0.66	4.26	0.83	0.28	0.14	0.11	0.25	0.14	**0.81**							
HM	0.93	0.88	3.70	1.17	0.09	0.42	-0.05	0.32	0.32	0.23	**0.94**						
PE	0.92	0.78	4.59	1.01	-0.02	0.59	0.02	0.36	0.45	0.13	0.44	**0.89**					
PO	0.83	0.55	2.49	0.80	0.52	0.23	-0.09	0.12	0.19	0.28	0.17	0.10	**0.74**				
PV	0.90	0.75	4.71	0.86	0.14	0.60	-0.01	0.47	0.39	0.22	0.49	0.53	0.13	**0.87**			
SE	0.90	0.69	4.20	0.94	0.30	0.12	0.40	0.04	-0.01	0.12	0.06	0.12	0.17	0.06	**0.83**		
SI	0.88	0.55	3.41	0.88	0.15	0.35	-0.09	0.14	0.36	-0.01	0.17	0.44	0.06	0.29	0.14	**0.74**	
TR	0.91	0.77	3.07	1.22	0.24	-0.03	0.23	-0.07	-0.01	0.09	0.06	0.03	0.12	0.00	0.49	0.20	**0.88**

14.1.4. Pooled Sample

Table 23: Pooled Cross-Country Sample - Reliability, Validity and Descriptive Statistics

	CR	AVE	Mean	SD	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC	0.83	0.72	4.49	1.17	**0.85**												
BI	0.94	0.83	5.55	1.16	0.55	**0.91**											
CO	0.87	0.68	4.90	0.95	0.50	0.38	**0.83**										
EE	0.91	0.67	5.71	0.85	0.31	0.54	0.19	**0.82**									
HAB	0.92	0.79	4.12	1.71	0.53	0.73	0.37	0.49	**0.89**								
HE	0.82	0.54	4.46	0.91	0.42	0.30	0.24	0.35	0.39	**0.74**							
HM	0.88	0.78	4.76	1.44	0.42	0.63	0.34	0.45	0.57	0.34	**0.89**						
PE	0.94	0.83	5.66	1.10	0.52	0.78	0.38	0.56	0.71	0.36	0.61	**0.91**					
PO	0.87	0.63	3.25	1.12	0.66	0.43	0.34	0.28	0.51	0.46	0.38	0.44	**0.80**				
PV	0.95	0.85	5.67	1.04	0.52	0.79	0.37	0.54	0.67	0.32	0.66	0.75	0.40	**0.92**			
SE	0.92	0.73	5.06	0.92	0.66	0.56	0.60	0.34	0.51	0.34	0.45	0.55	0.51	0.54	**0.86**		
SI	0.94	0.71	4.55	1.41	0.56	0.64	0.40	0.39	0.67	0.28	0.49	0.64	0.43	0.61	0.48	**0.84**	
TR	0.91	0.76	4.19	1.35	0.57	0.43	0.50	0.25	0.48	0.31	0.36	0.47	0.50	0.43	0.63	0.49	**0.87**

14.2. Cross-Country Study: Item Cross-Loadings

14.2.1. The Gambia

Table 24: The Gambia – Item Cross-Loadings

	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC2	**0.73**	0.23	0.30	0.20	0.22	0.28	0.09	0.24	0.26	0.22	0.55	0.21	0.40
AC3	**0.85**	0.25	0.28	0.18	0.36	0.30	0.18	0.28	0.40	0.19	0.34	0.36	0.19
BI1	0.26	**0.86**	0.20	0.31	0.47	0.09	0.29	0.52	-0.07	0.61	0.31	0.41	0.19
BI2	0.24	**0.86**	0.18	0.26	0.56	0.13	0.35	0.49	0.05	0.52	0.27	0.42	0.12
BI3	0.28	**0.91**	0.19	0.35	0.61	0.05	0.34	0.55	-0.06	0.60	0.26	0.50	0.17
COI1	0.10	0.04	0.57	-0.04	0.08	-0.08	0.12	0.04	-0.06	0.08	0.16	0.10	0.03
COI2	0.31	0.17	**0.82**	0.12	0.19	0.18	0.13	0.23	0.08	0.21	0.43	0.25	0.24
COI3	0.31	0.22	**0.83**	0.06	0.19	0.10	0.26	0.23	0.06	0.31	0.57	0.24	0.34
EE1	0.23	0.29	0.14	**0.78**	0.36	0.07	0.28	0.33	0.05	0.28	0.18	0.13	0.10
EE2	0.27	0.32	0.12	**0.84**	0.40	0.20	0.30	0.47	0.12	0.39	0.24	0.28	0.19
EE3	0.07	0.23	0.02	**0.84**	0.32	0.12	0.23	0.38	0.10	0.28	0.12	0.10	0.12
EE4	0.15	0.33	0.06	**0.70**	0.47	0.19	0.20	0.38	0.21	0.36	0.20	0.33	0.23
EE5	0.16	0.15	0.00	0.65	0.25	0.28	0.29	0.33	0.19	0.26	0.13	0.26	0.13
HAB 1	0.28	0.53	0.19	0.49	**0.86**	0.32	0.44	0.57	0.27	0.56	0.22	0.48	0.16
HAB 2	0.39	0.53	0.20	0.40	**0.90**	0.28	0.40	0.58	0.27	0.46	0.23	0.49	0.30
HAB 3	0.31	0.58	0.20	0.36	**0.85**	0.20	0.29	0.50	0.18	0.51	0.25	0.53	0.31
HE1	0.28	0.10	0.20	0.17	0.24	0.61	0.11	0.23	0.28	0.19	0.24	0.15	0.19
HE2	0.35	0.04	0.22	0.15	0.20	0.68	0.04	0.20	0.57	0.15	0.34	0.14	0.23
HE3	0.24	0.05	0.01	0.17	0.28	**0.87**	0.26	0.17	0.41	0.08	0.14	0.11	0.28
HM1	0.08	0.17	0.11	0.20	0.18	0.23	**0.73**	0.16	0.11	0.19	0.12	0.08	0.03
HM3	0.19	0.40	0.25	0.34	0.47	0.20	**0.94**	0.41	0.10	0.51	0.26	0.34	0.16
PE1	0.33	0.52	0.27	0.39	0.53	0.14	0.34	**0.83**	0.15	0.50	0.23	0.41	0.27
PE2	0.20	0.42	0.20	0.45	0.43	0.24	0.35	**0.79**	0.23	0.53	0.30	0.31	0.36
PE3	0.27	0.51	0.17	0.40	0.59	0.28	0.23	**0.84**	0.13	0.48	0.27	0.43	0.28

POD 3	0.35	-0.04	0.00	0.11	0.16	0.39	0.00	0.11	0.61	-0.02	0.09	0.09	0.13
POR 1	0.21	-0.07	-0.03	0.09	0.17	0.34	0.04	0.14	**0.78**	0.10	0.11	0.15	0.15
POR 2	0.40	0.04	0.13	0.18	0.26	0.41	0.13	0.21	**0.86**	0.22	0.34	0.13	0.28
POR 3	0.31	-0.10	0.06	0.10	0.16	0.35	0.14	0.07	0.58	-0.01	0.13	0.11	0.20
PV1	0.20	0.57	0.29	0.37	0.53	0.17	0.48	0.53	0.17	**0.89**	0.44	0.44	0.28
PV2	0.25	0.58	0.27	0.33	0.51	0.15	0.40	0.52	0.17	**0.90**	0.33	0.48	0.22
PV3	0.22	0.62	0.24	0.42	0.55	0.12	0.37	0.59	0.09	**0.90**	0.38	0.41	0.23
SEP 2	0.51	0.22	0.39	0.14	0.25	0.40	0.26	0.26	0.25	0.24	**0.73**	0.21	0.30
SEP 3	0.41	0.29	0.45	0.17	0.20	0.18	0.19	0.25	0.20	0.29	**0.75**	0.19	0.31
SES 2	0.41	0.25	0.45	0.21	0.20	0.22	0.12	0.26	0.19	0.38	**0.77**	0.19	0.32
SES 3	0.22	0.17	0.41	0.16	0.13	0.09	0.14	0.18	0.16	0.36	0.70	0.17	0.28
SI1	0.31	0.53	0.26	0.27	0.48	0.14	0.20	0.44	0.05	0.46	0.24	**0.88**	0.27
SI2	0.35	0.47	0.23	0.25	0.53	0.15	0.28	0.42	0.19	0.47	0.28	**0.89**	0.32
SI3	0.32	0.43	0.23	0.24	0.52	0.16	0.27	0.45	0.15	0.49	0.26	**0.87**	0.36
SI6	0.29	0.32	0.17	0.17	0.37	0.16	0.18	0.26	0.11	0.27	0.08	**0.73**	0.18
SI7	0.32	0.33	0.31	0.17	0.43	0.20	0.19	0.33	0.16	0.33	0.24	**0.73**	0.28
SI8	0.26	0.40	0.19	0.33	0.52	0.12	0.29	0.40	0.19	0.39	0.14	**0.82**	0.25
ST2	0.31	0.11	0.17	0.16	0.12	0.66	0.13	0.23	0.30	0.13	0.37	0.18	0.18
TR1	0.21	0.05	0.19	0.12	0.19	0.23	0.10	0.16	0.19	0.13	0.25	0.15	**0.70**
TR2	0.32	0.17	0.27	0.09	0.23	0.12	0.09	0.33	0.21	0.25	0.35	0.29	**0.80**
TR3	0.29	0.18	0.29	0.26	0.27	0.38	0.14	0.33	0.24	0.24	0.35	0.32	**0.87**

14.2.2. East Africa

Table 25: East Africa – Item Cross-Loadings

	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC2	**0.90**	0.28	0.45	0.42	0.31	0.36	0.16	0.31	0.37	0.27	0.55	0.38	0.17
AC3	**0.71**	0.05	0.32	-0.01	0.11	0.12	-0.06	0.03	0.52	0.01	0.25	0.39	0.30
BI1	0.22	**0.88**	0.19	0.51	0.36	0.17	0.59	0.56	0.15	0.60	0.17	0.32	-0.05
BI2	0.29	**0.82**	0.35	0.50	0.50	0.22	0.60	0.51	0.24	0.58	0.46	0.59	0.23
BI3	0.10	**0.89**	0.14	0.51	0.49	0.32	0.69	0.59	0.18	0.59	0.26	0.45	-0.07
COI1	0.45	0.21	**0.84**	0.25	0.20	-0.01	0.23	0.23	0.18	0.13	0.32	0.35	0.30
COI2	0.29	0.22	**0.81**	0.21	0.22	0.14	0.37	0.12	0.36	0.15	0.34	0.36	0.45
COI3	0.44	0.20	**0.76**	0.20	0.22	0.14	0.04	0.11	0.34	0.04	0.37	0.27	0.32
EE1	0.28	0.32	0.15	**0.79**	0.46	0.34	0.32	0.59	0.07	0.51	0.33	0.29	0.03
EE2	0.32	0.51	0.19	**0.87**	0.45	0.36	0.39	**0.71**	0.12	0.51	0.43	0.31	0.12
EE3	0.23	0.52	0.30	**0.88**	0.47	0.37	0.49	0.65	0.16	0.49	0.33	0.35	0.07
EE4	0.22	0.43	0.20	**0.80**	0.44	0.25	0.47	0.56	0.04	0.46	0.38	0.41	0.12
EE5	0.19	0.57	0.26	0.65	0.51	0.14	0.44	0.45	0.31	0.29	0.36	0.52	0.20
HAB 1	0.14	0.34	0.18	0.51	**0.75**	0.33	0.32	0.32	0.13	0.29	0.39	0.31	0.03
HAB 2	0.24	0.34	0.21	0.51	**0.89**	0.35	0.30	0.39	0.23	0.18	0.41	0.47	0.19
HAB 3	0.29	0.56	0.24	0.46	**0.87**	0.30	0.46	0.47	0.35	0.33	0.40	0.51	0.12
HE1	0.41	0.31	0.13	0.40	0.42	0.53	0.10	0.39	0.27	0.18	0.29	0.35	0.13
HE2	0.27	0.20	0.03	0.17	0.26	**0.81**	0.21	0.15	0.44	0.13	0.20	-0.01	0.14
HE3	0.36	0.18	0.22	0.18	0.41	**0.74**	0.19	0.15	0.43	0.01	0.27	0.19	0.19
HM1	0.00	0.58	0.11	0.48	0.36	0.42	**0.89**	0.48	0.06	0.51	0.17	0.29	-0.10
HM3	0.17	**0.72**	0.39	0.47	0.45	0.24	**0.91**	0.51	0.16	0.65	0.33	0.56	0.09
PE1	0.31	0.57	0.09	**0.72**	0.46	0.23	0.39	**0.88**	0.07	0.57	0.32	0.46	0.02
PE2	0.23	0.58	0.24	0.59	0.32	0.24	0.45	**0.88**	0.09	0.49	0.23	0.41	-0.02
PE3	0.11	0.53	0.19	0.64	0.49	0.31	0.61	**0.87**	0.13	0.48	0.23	0.54	0.06
POD 3	0.34	0.02	0.28	0.09	0.14	0.27	0.04	0.07	**0.74**	-0.12	0.18	0.16	0.28

POR 1	0.25	0.23	0.05	0.08	0.20	0.47	0.18	0.10	**0.70**	0.08	0.11	0.08	0.09
POR 2	0.50	0.18	0.29	0.13	0.21	0.26	-0.06	0.05	**0.82**	0.04	0.40	0.34	0.33
POR 3	0.35	0.21	0.33	0.19	0.34	0.44	0.30	0.15	**0.75**	0.01	0.30	0.21	0.31
PV1	0.13	0.58	0.07	0.40	0.22	0.13	0.53	0.49	-0.01	**0.90**	0.14	0.36	-0.04
PV2	0.16	0.64	0.14	0.54	0.37	0.17	0.61	0.57	0.04	**0.91**	0.33	0.41	0.01
PV3	0.26	0.59	0.15	0.55	0.28	0.16	0.57	0.51	-0.01	**0.85**	0.25	0.32	-0.07
SEP 2	0.28	0.21	0.29	0.32	0.45	0.23	0.14	0.21	0.36	0.14	0.69	0.25	0.36
SEP 3	0.34	0.23	0.26	0.33	0.18	0.33	0.32	0.25	0.32	0.25	**0.77**	0.19	0.27
SES 2	0.45	0.34	0.31	0.38	0.34	0.14	0.21	0.13	0.29	0.26	**0.75**	0.26	0.20
SES 3	0.48	0.26	0.37	0.34	0.42	0.22	0.19	0.28	0.21	0.19	**0.79**	0.34	0.30
SI1	0.43	0.45	0.33	0.36	0.42	0.13	0.39	0.50	0.31	0.44	0.23	**0.84**	0.09
SI2	0.38	0.41	0.31	0.39	0.47	0.22	0.41	0.51	0.27	0.36	0.37	**0.85**	0.13
SI3	0.42	0.61	0.41	0.50	0.53	0.25	0.58	0.60	0.26	0.50	0.38	**0.86**	0.21
SI6	0.31	0.25	0.26	0.33	0.39	0.02	0.17	0.23	0.13	0.05	0.23	0.69	0.21
SI7	0.32	0.30	0.25	0.19	0.32	-0.10	0.22	0.15	0.15	0.13	0.25	0.69	0.18
SI8	0.26	0.30	0.31	0.27	0.26	-0.02	0.30	0.29	0.23	0.19	0.15	**0.72**	0.30
ST2	0.17	0.22	0.02	0.38	0.26	**0.88**	0.42	0.28	0.31	0.20	0.24	0.09	-0.03
TR1	0.15	-0.11	0.26	0.05	0.12	0.02	-0.09	0.01	0.20	-0.09	0.24	0.15	**0.80**
TR2	0.28	0.13	0.47	0.15	0.10	0.06	0.05	0.03	0.37	-0.01	0.38	0.24	**0.90**
TR3	0.15	0.01	0.21	0.10	0.15	0.24	0.01	0.02	0.33	0.04	0.22	0.05	0.68

14.2.3. UK

Table 26: UK – Item Cross-Loadings

	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC2	**0.95**	0.09	0.14	0.02	-0.07	0.27	0.07	-0.02	0.53	0.15	0.29	0.16	0.28
AC3	**0.74**	0.06	0.10	-0.05	0.02	0.18	0.10	0.00	0.31	0.07	0.22	0.08	0.08
BI1	0.09	**0.85**	-0.08	0.55	0.39	0.12	0.37	0.45	0.14	0.65	0.08	0.23	0.01
BI2	0.08	**0.74**	0.01	0.18	0.41	0.06	0.27	0.40	0.23	0.29	0.10	0.19	-0.06
BI3	0.06	**0.90**	-0.02	0.41	0.46	0.16	0.39	0.61	0.22	0.51	0.13	0.42	-0.04
COI1	0.13	0.00	**0.90**	0.02	-0.18	0.18	-0.04	0.05	-0.03	0.03	0.26	-0.10	0.15
COI2	0.06	-0.04	**0.75**	-0.15	-0.04	0.00	0.01	0.02	-0.07	-0.07	0.33	-0.05	0.20
COI3	0.15	-0.08	**0.76**	-0.12	-0.28	0.01	-0.08	-0.06	-0.18	-0.03	0.47	-0.07	0.26
EE1	0.02	0.49	-0.06	**0.91**	0.22	0.20	0.34	0.39	0.14	0.43	-0.02	0.14	-0.13
EE2	-0.07	0.47	-0.05	**0.91**	0.16	0.17	0.26	0.35	0.06	0.38	-0.02	0.15	-0.11
EE3	0.08	0.43	-0.03	**0.93**	0.19	0.29	0.28	0.35	0.14	0.46	0.07	0.13	-0.05
EE4	-0.03	0.32	-0.11	**0.75**	0.13	0.24	0.09	0.17	0.08	0.27	0.08	0.00	-0.03
EE5	0.00	0.32	-0.07	**0.76**	0.19	0.18	0.38	0.21	0.08	0.48	0.11	0.13	0.06
HAB 1	0.03	0.53	-0.24	0.31	**0.90**	0.19	0.34	0.49	0.27	0.48	0.00	0.35	0.00
HAB 2	-0.09	0.30	-0.12	0.06	**0.78**	0.12	0.28	0.28	0.13	0.16	0.01	0.26	0.02
HAB 3	-0.10	0.26	-0.06	0.02	0.64	-0.05	0.05	0.21	-0.06	0.16	-0.07	0.18	-0.06
HE1	0.16	0.07	0.10	0.17	0.20	**0.84**	0.20	0.20	0.18	0.23	0.18	0.05	0.17
HE2	0.36	0.13	0.16	0.14	0.08	0.69	0.03	0.03	0.14	0.20	0.25	-0.02	0.13
HE3	0.15	0.11	0.07	0.25	0.07	**0.84**	0.16	0.04	0.26	0.06	0.07	-0.06	0.04
HM1	0.10	0.44	0.01	0.32	0.25	0.20	**0.95**	0.46	0.15	0.52	0.05	0.12	0.04
HM3	0.06	0.33	-0.11	0.28	0.35	0.23	**0.92**	0.35	0.17	0.38	0.07	0.20	0.06
PE1	0.04	0.46	-0.03	0.20	0.40	0.09	0.39	**0.83**	0.00	0.38	0.08	0.34	-0.02
PE2	-0.05	0.55	0.06	0.34	0.38	0.07	0.38	**0.92**	0.12	0.54	0.15	0.42	0.05
PE3	-0.03	0.55	0.01	0.40	0.43	0.20	0.39	**0.90**	0.13	0.49	0.09	0.40	0.03
POD 3	0.44	0.21	-0.14	0.17	0.17	0.28	0.17	0.14	**0.90**	0.15	0.11	0.03	0.10

POR 1	0.37	0.00	0.05	0.01	0.10	0.10	0.01	0.02	0.62	0.01	0.20	0.05	0.15
POR 2	0.31	0.20	0.01	0.01	0.14	0.12	0.12	0.03	**0.70**	0.11	0.15	0.01	0.06
POR 3	0.60	0.15	-0.03	-0.01	0.13	0.27	0.13	-0.01	**0.72**	0.01	0.18	0.15	0.12
PV1	0.09	0.47	0.04	0.41	0.33	0.26	0.47	0.40	0.14	**0.86**	0.13	0.19	0.05
PV2	0.11	0.50	-0.01	0.27	0.30	0.15	0.35	0.45	0.03	**0.84**	0.02	0.26	-0.02
PV3	0.14	0.59	-0.05	0.53	0.38	0.17	0.46	0.52	0.17	**0.89**	0.02	0.29	-0.02
SEP 2	0.20	0.09	0.23	-0.03	-0.06	0.02	-0.02	0.05	0.21	-0.04	**0.79**	0.09	0.35
SEP 3	0.28	0.09	0.39	0.03	0.04	0.08	-0.03	0.11	0.09	0.10	**0.83**	0.07	0.32
SES 2	0.25	0.10	0.35	0.06	0.02	0.17	0.10	0.14	0.14	0.06	**0.91**	0.18	0.51
SES 3	0.31	0.13	0.36	0.04	-0.10	0.09	0.12	0.08	0.16	0.06	**0.77**	0.06	0.38
SI1	0.01	0.27	-0.10	0.25	0.16	0.10	0.16	0.38	-0.06	0.27	0.11	**0.76**	0.09
SI2	0.10	0.29	0.02	0.23	0.16	0.04	0.05	0.36	-0.03	0.29	0.09	**0.76**	0.14
SI3	0.05	0.39	-0.13	0.21	0.26	-0.07	0.08	0.40	0.01	0.30	0.01	**0.82**	0.05
SI6	0.14	0.12	-0.12	-0.14	0.35	-0.09	0.09	0.24	0.08	0.05	0.14	0.67	0.23
SI7	0.14	0.19	-0.04	-0.09	0.35	-0.10	0.18	0.25	0.10	0.13	0.17	**0.72**	0.25
SI8	0.25	0.23	-0.03	0.06	0.35	0.06	0.20	0.30	0.18	0.19	0.15	**0.71**	0.20
ST2	0.34	0.17	0.10	0.23	0.09	**0.86**	0.22	0.10	0.27	0.24	0.05	-0.03	0.01
TR1	0.22	-0.01	0.22	-0.06	0.00	0.07	0.05	0.03	0.13	0.02	0.47	0.24	**0.95**
TR2	0.21	-0.03	0.17	-0.09	-0.02	0.08	0.08	0.02	0.11	-0.02	0.35	0.12	**0.85**
TR3	0.21	-0.06	0.23	-0.05	-0.02	0.11	0.02	0.00	0.05	-0.03	0.49	0.10	**0.83**

14.2.4. Pooled Data

Table 27: Cross-Country Pooled Sample – Item Cross-Loadings

	AC	BI	CO	EE	HAB	HE	HM	PE	PO	PV	SE	SI	TR
AC2	**0.92**	0.58	0.49	0.34	0.52	0.40	0.44	0.54	0.61	0.55	0.68	0.52	0.59
AC3	**0.76**	0.30	0.33	0.15	0.34	0.30	0.25	0.28	0.49	0.27	0.38	0.41	0.33
BI1	0.46	**0.89**	0.30	0.54	0.60	0.26	0.53	0.67	0.32	**0.74**	0.45	0.51	0.36
BI2	0.54	**0.90**	0.40	0.41	0.69	0.27	0.58	0.70	0.45	0.67	0.56	0.60	0.42
BI3	0.51	**0.94**	0.35	0.51	**0.71**	0.30	0.60	**0.77**	0.40	**0.74**	0.53	0.64	0.40
COI1	0.35	0.27	**0.78**	0.15	0.23	0.15	0.23	0.28	0.20	0.26	0.38	0.26	0.31
COI2	0.43	0.36	**0.86**	0.18	0.38	0.23	0.32	0.36	0.35	0.34	0.52	0.39	0.47
COI3	0.45	0.32	**0.84**	0.14	0.29	0.20	0.27	0.30	0.27	0.32	0.58	0.33	0.44
EE1	0.26	0.43	0.15	**0.85**	0.40	0.25	0.36	0.45	0.18	0.44	0.24	0.26	0.14
EE2	0.32	0.53	0.21	**0.89**	0.46	0.33	0.41	0.56	0.27	0.52	0.33	0.38	0.27
EE3	0.24	0.43	0.15	**0.89**	0.38	0.29	0.37	0.46	0.21	0.45	0.26	0.27	0.18
EE4	0.28	0.46	0.16	**0.78**	0.46	0.30	0.35	0.45	0.25	0.46	0.34	0.39	0.27
EE5	0.14	0.29	0.06	0.65	0.28	0.24	0.34	0.29	0.20	0.32	0.19	0.30	0.14
HAB 1	0.45	0.67	0.28	0.51	**0.89**	0.39	0.53	0.65	0.46	0.64	0.44	0.57	0.39
HAB 2	0.51	0.64	0.36	0.44	**0.92**	0.38	0.54	0.64	0.49	0.57	0.49	0.63	0.49
HAB 3	0.45	0.65	0.34	0.37	**0.86**	0.27	0.45	0.59	0.41	0.57	0.43	0.59	0.42
HE1	0.39	0.31	0.26	0.30	0.40	**0.80**	0.29	0.40	0.37	0.36	0.36	0.32	0.33
HE2	0.20	0.03	0.10	0.12	0.12	0.61	0.01	0.05	0.34	0.08	0.14	0.02	0.12
HE3	0.20	0.10	0.08	0.20	0.23	**0.72**	0.20	0.11	0.35	0.07	0.13	0.10	0.18
HM1	0.21	0.40	0.16	0.32	0.31	0.26	**0.83**	0.39	0.22	0.42	0.24	0.24	0.14
HM3	0.48	0.67	0.39	0.45	0.64	0.32	**0.94**	0.65	0.42	0.69	0.50	0.56	0.44
PE1	0.55	**0.73**	0.36	0.48	0.67	0.30	0.58	**0.91**	0.42	0.69	0.53	0.59	0.45
PE2	0.43	0.70	0.36	0.52	0.59	0.30	0.55	**0.91**	0.40	0.69	0.49	0.55	0.42
PE3	0.44	**0.71**	0.33	0.53	0.67	0.38	0.55	**0.91**	0.39	0.67	0.47	0.61	0.42
POD 3	0.48	0.26	0.19	0.21	0.32	0.36	0.21	0.29	**0.74**	0.21	0.29	0.26	0.33

POR 1	0.40	0.25	0.18	0.16	0.33	0.33	0.24	0.28	**0.77**	0.26	0.31	0.27	0.30
POR 2	0.60	0.44	0.36	0.26	0.48	0.39	0.34	0.42	**0.85**	0.43	0.52	0.41	0.47
POR 3	0.58	0.37	0.31	0.23	0.45	0.39	0.39	0.37	**0.82**	0.31	0.43	0.38	0.44
PV1	0.47	**0.71**	0.36	0.49	0.61	0.32	0.63	0.67	0.38	**0.93**	0.52	0.56	0.43
PV2	0.49	**0.73**	0.36	0.46	0.62	0.29	0.60	0.70	0.38	**0.93**	0.50	0.59	0.41
PV3	0.48	**0.74**	0.32	0.56	0.62	0.28	0.59	**0.71**	0.35	**0.92**	0.47	0.54	0.37
SEP 2	0.53	0.44	0.47	0.26	0.45	0.32	0.36	0.43	0.47	0.39	**0.82**	0.40	0.52
SEP 3	0.55	0.47	0.52	0.28	0.41	0.28	0.36	0.46	0.42	0.46	**0.86**	0.38	0.51
SES 2	0.60	0.53	0.53	0.32	0.47	0.30	0.42	0.52	0.45	0.52	**0.89**	0.46	0.59
SES 3	0.56	0.48	0.53	0.29	0.41	0.27	0.39	0.46	0.41	0.47	**0.85**	0.41	0.55
SI1	0.46	0.59	0.32	0.38	0.55	0.26	0.42	0.59	0.31	0.57	0.41	**0.86**	0.36
SI2	0.45	0.53	0.31	0.36	0.56	0.27	0.40	0.54	0.34	0.53	0.40	**0.86**	0.39
SI3	0.47	0.61	0.33	0.40	0.60	0.26	0.46	0.61	0.36	0.60	0.42	**0.88**	0.42
SI6	0.43	0.43	0.30	0.23	0.52	0.18	0.33	0.44	0.33	0.37	0.35	**0.79**	0.37
SI7	0.51	0.52	0.40	0.24	0.58	0.21	0.39	0.49	0.40	0.47	0.45	**0.82**	0.47
SI8	0.50	0.54	0.35	0.34	0.58	0.21	0.44	0.54	0.42	0.50	0.41	**0.85**	0.46
ST2	0.35	0.25	0.18	0.29	0.26	**0.80**	0.28	0.27	0.36	0.27	0.27	0.19	0.20
TR1	0.38	0.23	0.36	0.15	0.31	0.22	0.21	0.29	0.33	0.25	0.47	0.33	**0.84**
TR2	0.60	0.50	0.51	0.24	0.50	0.26	0.40	0.52	0.51	0.48	0.63	0.51	**0.89**
TR3	0.46	0.34	0.41	0.25	0.41	0.34	0.28	0.37	0.42	0.36	0.53	0.39	**0.88**