



The attitudes, beliefs, and knowledge of female special education teachers toward the use of assistive technology in teaching children with special educational needs and disabilities (SEND) in mainstream primary education in Saudi Arabia

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Abstract

The impact of assistive technologies (AT) on the educational development of students with disabilities has been examined extensively, as have the attitudes of special education teachers regarding the integration of AT into their pedagogical practices. However, there is a significant research gap concerning these topics within the Saudi Arabian context. This study seeks to fill this void by investigating the attitudes, beliefs, and knowledge of Saudi female special education teachers about the utilization of AT in teaching students with disabilities within the mainstream primary education system in Saudi Arabia. A qualitative research methodology was employed, involving three online workshops via Google Meet with female teachers who instruct students with disabilities. These workshops engaged understanding of disabled students, the role of AT in education, and their technological experiences before, during, and after the COVID-19 pandemic. Six teachers participated in each two-hour session. The data revealed insights into their attitudes towards students with disabilities, their knowledge of AT, and the perceived benefits and challenges of using AT.

The findings indicate that the participating teachers possess attitudes and opinions consistent with both the medical and social models of disability. They acknowledge the medical model in categorizing disabilities, influenced by Saudi Arabia's special education system. However, they are more likely to adopt the social model and inclusive educational practices, focusing on removing barriers to enhance disabled students' learning (Oliver, 1990). They noted a disparity between their personal views and the broader school and community environments, which has not yet fully embraced inclusive practices, including the lack of sufficient AT for special education both before and after COVID-19. However, during the pandemic, the Saudi government took great steps to provide learning resources for all students, indicating a capacity for further change.

This research provides a nuanced understanding of the complexities surrounding teachers' attitudes, beliefs, and knowledge about AT. It underscores the necessity of addressing structural barriers and advocating for societal changes to promote inclusive education

practices. The study concludes with recommendations aimed at enhancing AT accessibility and fostering inclusive practices in Saudi Arabia.

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List of Abbreviations

Assistive technology (AT)

Special educational needs and disabilities (SEND).

Individuals with Disabilities Education Improvement Act (IDEIA)

Individualized Education Plan (IEP)

United Kingdom (UK)

Rules and Regulations of Special Education Programmes (RRSEP)

Technological, pedagogical, and content knowledge (TPACK)

Ministry of Education (MoE)

Convention on the Rights of Persons with Disabilities (CRPD)

World Health Organization (WHO)

United Nations (UN)

Coronavirus Disease 2019 (COVID-19)

International Classification of Impairments, Disabilities and Handicaps (ICIDH)

the International Classification of Functioning, Disability and Health (ICF)

Union of the Physically Impaired Against Segregation (UPIAS)

Education for All Handicapped Children Act (EHA)

Individuals with Disabilities Education Act (IDEA)

Interpretative phenomenological analysis (IPA)

Low technology (low-tech)

Medium technology (mid-tech)

High technology (high-tech)

Interactive whiteboards (IWB)

Digital light processing (DLP)

Chapter One: Introduction

1.0 Chapter Outline

This chapter introduces my research, starting with some context about the use of assistive technology (AT) in special education and a description of the research project. It outlines the research aims and objectives, lists the research questions, and offers a justification for conducting this research. The significance of the research is also explained, and the chapter ends by presenting the structure of this thesis, with a brief description of each chapter's content.

1.1 Background on the Use of Assistive Technology in Education

This section includes an overview of AT and its great potential as a tool for education and academic growth, specifically for students with special educational needs and disabilities (SEND).

Since the early 1970s, AT has played a significant role in supporting disabled people in their academic and everyday lives (Viner et al., 2020). The early forms of AT included hand tools to help disabled people access food and water, graduating to other forms, such as artificial limbs for arms and legs, mobility devices such as wheelchairs, and print materials such as Braille, which can make written content accessible to individuals with visual impairments (James and Thrope, 1994). The most modern and advanced forms of digital tools and devices include computers, tablets, mobile devices, and projectors that help disabled people in their daily and academic lives (Viner et al., 2020). Advances in technology continue to develop and improve disabled people's lives (Collins and Halverson, 2009). In particular, the use of AT has brought about a significant change in many aspects of life for disabled people, including in the educational sphere (Erdem, 2017). To clarify, in the educational context, there is a strong correlation between the use of AT and its effectiveness as a support for disabled students. AT can aid students with a wide variety of disabilities to function more independently, participate with others in learning activities, and be more successful in achieving their goals (Collins and

Halverson, 2009). Furthermore, AT helps disabled students learn and understand, complete tasks more efficiently and independently, and interact with their peers more actively (Zhou et al., 2012). In addition, AT is used to provide flexible learning environments and experiences for students with disabilities (Sider and Maich, 2014). For instance, students who have difficulty reading texts can use AT to listen to audio books. Thanks to its diverse applicability, the adoption and integration of AT into the educational process, especially for students with disabilities, is becoming a requirement for public schools (Adebisi et al., 2015). In other words, for disabled students to grow, live, and learn in today's digital world, the appropriate educational setting for disabled students requires that schools provide AT. Whether specifically designed or adapted for disabled students, AT enables students to learn in an equally effective educational environment (Lin, 2008; Russo and Osborne Jr., 2013). In line with this, according to Collins and Halverson (2009, p. 1), "The world of education is currently undergoing a massive transformation as a result of the digital revolution". It is clear that education is experiencing a significant transformation, including new pathways for teaching and learning, due to the influence of digital technologies, tools, platforms, and resources. Therefore, the use of AT has become an essential element in supporting disabled students in their educational development, requiring that schools and classrooms inevitably be updated with various kinds of technology and devices for both disabled and non-disabled students (Collins and Halverson, 2009). Furthermore, the influence of this new educational experience and the 'digital revolution' can be clearly recognised as one impact of the Coronavirus Disease 2019 (COVID-19) pandemic that spread across the world in early 2020. For example, online education is now more commonplace and accepted with the use of various types of digital technology, resources, and platforms (Hannam-Swain and Bailey, 2021; Menon, 2022). People around the world have become aware of the significance and benefits of technology and remote work, resulting in communication and interaction becoming more dependent on technology (Lozano-Blasco et al., 2021).

In Saudi Arabia, all stages of education from preschool to university were approved by the Ministry of Education (MoE) to become mandatory online during the COVID-19 pandemic; this required using different applications, educational platforms, and technological tools that were designed specifically to facilitate online teaching and learning for both teachers and students, including disabled students (Ministry of Education, 2020b).

Similarly, alongside the massive change in education and communication brought about by the COVID-19 global pandemic, the conducting and completing of research required reliance on digital technological tools. In other words, the availability of technology at that time proved invaluable in that it allowed this research to proceed effectively and ensured that it stayed on track during this challenging period.

It is clear that AT serves as an essential starting point for the development of education systems that provide equal opportunities for all, including supporting disabled students to learn equally and alongside their non-disabled peers. In fact, digital technology is a common element in today's classrooms and schools and is an integral part of students' lives (Viner et al., 2020). Therefore, including digital technologies, such as computers, laptops, smartphones, and tablet devices, in educational settings significantly enhances learning and participation, makes education more accessible and inclusive, and supports the diverse needs of all students (Fernández-Batanero et al., 2022).

Furthermore, in this 21st century era of digital technology with digital native students and technology integrated into classrooms, teachers are expected to make all students' learning experiences enjoyable, engaging, and successful, including disabled students (Viner et al., 2020). For this to happen, it is important to understand teachers' attitudes, beliefs, professional skills, and knowledge related to AT devices and tools. This understanding can guide the training and support of teachers in their use of AT as an essential part of creating diverse, inclusive, positive, and successful learning environments where all students can participate and learn equally (Lin, 2008). Therefore, this research explored special education teachers'

attitudes, beliefs, and knowledge regarding the use of AT, specifically related to using digital technological tools for teaching disabled students in mainstream schools in Saudi Arabia.

Prensky's (2001) Digital Natives concept suggests that young people who grow up with technology are naturally fluent in technology and are naturally comfortable using it. However, being born in the digital age does not automatically equate to digital proficiency; rather, technological skills depend on access, exposure, and learning experiences rather than just age.

According to Bennett et al. (2008), this assumption is questionable, as there is little evidence to support it and it overlooks the diversity of young people's experiences with technology. It also fails to consider those with cognitive disabilities, attention disorders, or limited access to digital resources. As a result, by ignoring these variations, the framework becomes overly simplistic and potentially exclusionary.

Furthermore, research in disability studies supports this point; Macdonald and Clayton (2012), for example, found that access to AT is shaped by structural barriers such as poverty, inaccessible design, and limited digital literacy, meaning that many disabled people remain excluded from the benefits of digital participation. This aligns with what is described as digital exclusion (Macdonald and Clayton, 2012). This challenges the assumption that growing up in the digital era automatically guarantees equal access to technology, especially for disabled people.

1.2 Research Aims and Objectives

The main aim of this research is to explore the attitudes, beliefs, and knowledge of female special education teachers in Saudi Arabia regarding the effectiveness of using AT in teaching, with a particular focus on students experiencing special needs and disabilities in their primary education setting.

To achieve this overarching aim, six practical objectives were formulated: 1) to identify and evaluate the existing literature in the area of AT, 2) to recruit at least six Saudi female special education teachers who work with disabled students in primary schools, 3) to plan and conduct three online workshops with these teachers, 4) to collect data during the workshops in line with the research questions, 5) to analyse the generated data using the thematic analysis approach, and 6) to share the results and make recommendations to improve the use of AT in this setting.

1.3 Research Questions

Research questions are devised early in the research process to guide the research and help it stay focused on the main points. For this study, five research questions were created to direct the research process:

1. According to Saudi special education teachers' beliefs, what is the role of AT in teaching students with SEND in primary schools?
2. According to Saudi special education teachers, what, if any, types of AT are available and used for students with SEND in primary schools?
3. From the perspectives of Saudi special education teachers, what, if any, obstacles exist to the use of AT in their SEND classrooms?
4. Based on the experiences of Saudi special education teachers, in what ways is the use of AT facilitated in their SEND classrooms?
5. What approaches and support strategies would enable Saudi special education teachers to implement AT more fully as assistance tools in their SEND classrooms?

In response to the research questions, this study makes significant contributions, particularly in Saudi Arabia. It is the first study to use workshops as a qualitative method to explore teachers' beliefs, attitudes, and knowledge about AT in this context. Additionally, it highlights how both the medical and social models of disability shape teachers' perspectives and practices, though they tend to align more with the social model.

Furthermore, this research identifies a critical lack of AT availability and support in mainstream Saudi schools, which creates challenges for both teachers and students, leading to increased academic difficulties and negatively impacting educational success. It emphasizes the need for policy revisions, particularly the Rules and Regulations of Special Education Programmes to explicitly include AT devices and services as essential components and sufficient AT resources are provided in classrooms.

Finally, this study contributes to the discussion on social and academic inclusion, revealing that disabled students often experience limited social interaction and acceptance due to a lack of awareness about disability rights. The self-contained special education classrooms within mainstream schools can further isolate these students, restricting their opportunities for meaningful engagement with peers. By advocating for inclusive learning environments, this research underscores the importance of creating spaces where disabled and non-disabled students can learn and interact together, fostering both educational success and social acceptance.

1.4 Justification for this Research

In this section, it is vital to justify my personal motivations and experiences for conducting this research topic and to share my prior experience.

Before my current career as a lecturer at a university in Saudi Arabia, I was a special educational teacher teaching disabled students in primary education. I have long believed that AT is a valuable tool to support and improve students' learning and development in their academic and social lives. It is my opinion that modern educational tools, such as interactive whiteboards, tablets, and reading pens, are needed in primary schools, as these can effectively support disabled students in their learning and interaction and can help them learn new skills and acquire knowledge. In addition, I learned from informal discussions with other special education teachers that they also believe in the importance of including AT in their teaching approaches for disabled students due to its significant positive impact. Taken

together, these ideas led me to conclude that more research is needed into AT as a tool for supporting these students. In 2019, I took the Inclusive Approaches and Curriculum module while studying for my master's degree in the United Kingdom. This module covered the services, facilities, and items of AT for supporting disabled students, and it encouraged me towards further research into how AT can be an incredible support and bring about effective changes for these students, not just in their learning environment and academics, but also in their lifelong social and personal development. I specifically considered how this could benefit students in Saudi Arabia. In summary, my experiences teaching and studying have inspired me to conduct this research on special education teachers' perspectives and attitudes towards the use of AT in teaching disabled students. A more detailed reflection on my positionality and its influence on the research process can be found in the methodology chapter.

As revealed by the literature review, many countries have acknowledged and emphasised that AT and special education teachers' attitudes, beliefs, and knowledge relating to its use and application have become important elements in the field of special education (Wehmeyer et al., 2008; Alharbi, 2018). In this context, 'special education' means specific education and instruction designed for students who have physical, cognitive, language, or learning disabilities such that they require special educational services, teaching methods, and strategies (Zigmond and Kloo, 2017). For example, the Disabled Student Allowance programme, started in the United Kingdom in 1993, encourages research on technologies to enhance and support the performance of students with disabilities in different tasks and skills (Maor et al., 2011). Furthermore, the Kingdom of Saudi Arabia has established multiple laws to ensure that all students, including those with disabilities, have access to free and appropriate education (Aldabas, 2015). Saudi Arabia's Disability Code, established in 2000, states that all students with disabilities have the right to be taught in mainstream schools alongside their peers without disabilities and have the right to access high-quality education and free medical, psychological, and social services (Alquraini, 2011). The Saudi Ministry of Education has made significant efforts to strengthen their support for the education of students

with disabilities by focusing on having computers in the classrooms and using AT to aid teaching and learning (Alotaibi and Almalki, 2016). However, many disabled students enrolled in mainstream primary schools in Saudi Arabia still have difficulty accessing and using AT due to outdated and limited equipment, which can increase their academic difficulties and negatively impact their educational success (Van Laarhoven and Conderman, 2011; Aldabas, 2015). Furthermore, Al-Rubiyeh (2010) states that students with disabilities in Saudi Arabia need more elaborate, specific, and comprehensive legislation and policies that focus on and demonstrate their rights and needs for AT. In comparison, the United States Individuals with Disabilities Education Improvement Act (IDEIA) of 2004 requires that AT tools and services be considered whenever a multidisciplinary team develops an individualized education plan (IEP) for a student with a disability. Such a requirement reflects the importance and support given to the use of AT to benefit the teaching process and learning environment, which improves the academic performance and life skills of students with disabilities.

Even though numerous studies have been conducted on the use of AT with students with disabilities in Western countries such as the United States and the United Kingdom (UK), very little information or research is available on the same issue in the Saudi Arabian context (Al-Rubiyeh, 2010; Alfaraj and Kuyini, 2014). The mandatory integration of AT into Saudi Arabian schools has already brought about a significant improvement in learning for students with disabilities, but further research is still needed to make greater gains. Additionally, although numerous studies have examined how AT can influence the learning development of students with disabilities, few of these studies have focused on the perspectives of the special education teachers themselves (Rufus et al., 2015; Wood et al., 2017). According to Alotaibi and Almalki (2016), there has been limited research in Saudi Arabia regarding special education teachers' attitudes, beliefs, knowledge and use of AT in the classroom to enhance the outcomes of students with disabilities. Almethen (2017) reported that special education teachers can feel uncomfortable and have varying perceptions about the use of AT while teaching students with disabilities due to having previously experienced certain challenges.

Consequently, further investigation into their attitudes, beliefs, and knowledge relating to the use of AT in the classroom is necessary to better understand these challenges, with the ultimate goal of better supporting students with disabilities in their learning.

In summary, these two aspects of AT research, relating to special education teachers' perspectives on AT in Saudi Arabia, clearly require further investigation. Therefore, this project endeavours to fill these gaps by investigating these overlapping aspects more deeply.

1.5 Significance of this Research

Although numerous studies have examined how AT influences the learning development of disabled students, and other studies have focused on special education teachers' attitudes and beliefs towards the use of AT, to date no other research study has been undertaken to consider and explore both of these areas in the Saudi Arabian context. Therefore, this research was conducted using a qualitative approach designed with three online workshops. The aim was to develop a critical understanding of the significance of integrating AT in the teaching and learning environment to support disabled students from the perspective of special education teachers in mainstream schools. It was also designed to explore special education teachers' experiences, beliefs, and knowledge related to AT integration in the teaching and learning of disabled students. In particular, teachers' experiences of AT before, during, and after the COVID-19 pandemic, different types of AT educational platforms, and strategies and tools were discussed, with an additional focus on the benefits and challenges of using AT. The underlying motivation and significance of this research is to identify improvements and provide suggestions and recommendations for policymakers.

1.6 Thesis Structure

While it is difficult to find a single universally accepted thesis structure (Cone and Foster, 2006; Bryman, 2012; Wellington, 2015), it is crucial for researchers to explain and justify their research process, including "how the research was done, what was studied and why, the main claims put forward and the evidence for them" (Wellington, 2015, p. 292). This thesis consists

of nine chapters, starting with an abstract and concluding with references and appendices. Chapter One gives an overview and background information about the research topic. It addresses the research aims and objectives, the research questions, the justifications for conducting this research, the significance of the research, and finally the thesis structure. Chapter Two describes the Saudi context within which the research was conducted. It describes the education system in Saudi Arabia, with a specific focus on the education of disabled people and its historical development. It also discusses the two main Saudi policies and regulations relating to disabled people: the Disability Code and the Rules and Regulations of Special Education Programmes (RRSEP). It also presents the recent status of special education and ongoing improvements in the special education field. Chapters Three and Four include the literature review. Chapter Three covers multiple topics related to the concept of disability, such as the differing definitions, perspectives, and debates on disability. It also examines the medical and social theoretical frameworks related to disability, their implications for the field of special education, and the key differences between these two frameworks. It explores the language of disability, particularly the concepts of person-first versus disability-first language. The topic of the complexity of labelling in education and the corresponding challenges and opportunities are also critically discussed. Chapter four, the second part of the literature review, focuses on the complexity of the concepts of beliefs, attitudes, and knowledge and the power of attitudes in shaping perspectives. It also explores teachers' perspectives on the integration and use of AT in their classrooms and discusses the influence of teachers' attitudes and skills on AT integration in the classroom. It provides a historical overview of AT policies and regulations for disabled students. The conceptualization and classification of AT are also covered, and it concludes with an overview of some videoconferencing tools. Chapter Five describes the research methodology, methods used, and the research participants. It starts with an explanation of my positionality as a researcher and a description of the journey of the research in terms of how and why the data are generated, recorded, transcribed, and translated. It explains the challenges and difficulties encountered during the data collection and analysis stages. It also addresses the pilot

research and the thematic analysis method used for data analysis, with descriptions of the six steps that were followed for this research. Chapter Five ends with discussions of trustworthiness in qualitative research and ethical considerations. Chapters Six, Seven, and Eight detail the findings and analysis data, organised by the major themes and their related subthemes, each with the relevant data accordingly presented. These chapters also link to the literature review and the technological pedagogical content knowledge (TPACK) theoretical framework. Chapter nine, the final chapter of this thesis, synthesises and summarises the main points discussed throughout this research. It presents the key findings and the contributions of this research. It includes multiple sections covering a self-reflective account, specific recommendations for the Saudi MoE, the limitations of this study, and suggestions for future research.

1.7 Chapter Summary

This introductory chapter lays the groundwork for the following eight chapters. It provides background information about the research topic and gives the research aims and objectives. It lists the research questions and offers the justifications and significance for conducting this research. Finally, it concludes with the structure of the thesis.

Chapter Two: The Context of the Research

2.0 Introduction

The previous chapter provides a broad context for undertaking this research on the attitudes, beliefs, and knowledge of female special education teachers towards the use of AT in teaching disabled students in mainstream primary education in Saudi Arabia. It outlines the overall purpose and objectives of the research, presents the questions that guide this research, and outlines the structure of this thesis. Following that general overview, this chapter delves into several themes specifically related to conducting this research in the context of the Saudi education system. This is essential, as this context is still rarely seen in the literature and may be unfamiliar to other researchers in the field. The five topics covered here are 1) an overview of the education system in Saudi Arabia and the three main education levels; 2) an examination of the evolution of special education in Saudi Arabia and the educational placement of disabled students in this context; 3) a review of the Saudi policies and regulations regarding disabled individuals, including the Disability Code and the Rules and Regulations of Special Education Programmes (RRSEP), which are the two main legislative acts that support disabled individuals in obtaining free and appropriate education and guarantee the right of disabled individuals in various aspects of life; and 4) an overview of the present-day special education system in Saudi Arabia.

2.1 Overview of the Education System in Saudi Arabia

The Kingdom of Saudi Arabia, the largest Arab country in the Middle East, was founded in 1932 and occupies about 80% of the Arabian Peninsula (Alahmari, 2017). Prior to the establishment of the Kingdom, educational opportunities were limited to a few schools located mainly in urban areas, but alongside the growth of nationhood, educational access also expanded in both rural and urban areas (Battal, 2016). In other words, Saudi Arabia, seeing education as a tool to prepare the nation's future generations, gives it great attention and importance (Al-Mousa, 2010). In 1953, the Ministry of Education (MoE) was established to be responsible for education and to provide the necessary support and services (Deraney and

Abdelsalam, 2012). The main roles of the MoE are: 1) to establish and monitor the standards and systems of education for both public and private education and maintain a high quality of education for both male and female students; 2) to provide free and appropriate education through primary, intermediate, and secondary education programmes, whether as general or special education for disabled students; and 3) to provide free textbooks and transportation (e.g., buses) to students at all levels (Aldakhil, 2017). Furthermore, it is important to note that the education system in Saudi Arabia is segregated based on gender for both students and teachers, which means that some schools and classes are established for males only, while other schools are for females only (Alrashidi and Phan, 2015). This segregation is due to cultural rules and mores (Almutairy et al., 2015), but an equally high quality of education is provided for both genders (Taylor and Albasri, 2014). In other words, the education system in Saudi Arabia is designed to provide equitable and consistent education to all students across the country, following a standardised curriculum.

There are two main categories of education in Saudi Arabia, both of which include disabled students: 'general education' and 'higher education'. General education refers to mandatory education that begins at the age of six; it starts with six years of primary school, followed by three years of intermediate school and three more years of secondary school, ending when the student is 18 years of age. Higher education refers to any educational activities undertaken after finishing the general level (Aldakhil, 2017). This research only includes the general education levels, particularly the primary education of disabled students in mainstream schools.

With this brief overview of the Saudi education system as a starting point, the following section covers the historical stages of special education in Saudi Arabia and its evolution in more detail.

2.2 The Evolution of Special Education and Educational Placement in Saudi Arabia

This section provides a comprehensive and in-depth review of the historical perspective and development of special education in Saudi Arabia from 1958, when special education was first put into use, until the present time.

Historically, there is no evidence of the existence of formal schools for disabled individuals prior to 1958. At that time, disabled individuals did not receive any kind of formal education; instead, their education was undertaken in a variety of ways, driven by the preferences and responsibilities of their families and parents (Al-Ajmi, 2006). For instance, some families sent their children to other Arab countries, such as Egypt and Jordan, to learn via special education for most of the school year (Al-Mousa, 1990), while other families chose to homeschool their children in basic skills, such as reading and writing (Alquraini, 2013). Two years later, in 1960, official education for disabled students was first organised, and the first special education schools supported by the MoE were opened. For example, the Al-Noor Institute was established in the city of Riyadh to serve students labelled with blindness by providing educational and training services, including training in using Braille for academic and vocational purposes (Al-Mousa, 2010; Aldabas, 2015). Subsequently, other institutes were gradually formed over the years to serve students with a wider variety of disabilities (Aldabas, 2015). For instance, in 1962, the Administration of Special Education was established under the MoE to offer educational services to disabled students and determine their education placement options. Accordingly, in 1964, the MoE established two institutes in Riyadh for deaf students called the Al-Amal Institutes, which had the mission of teaching sign languages and meeting the specific needs of hearing-impaired students. Following this, the first institute established for the education of students with intellectual disabilities was opened in 1971 in Riyadh, with the aims of teaching and providing training to students with intellectual disabilities, and supporting the development of social behaviour, communication, and daily life skills (Al-Hamli, 2008). In addition, these institutes provide residential services for students with intellectual disabilities. Since then, institutes of this type for students with various disabilities

have become increasingly widespread throughout Saudi Arabia (Al-Mousa, 2005, 2010). Accordingly, as the number of these institutes increased and spread across the Kingdom of Saudi Arabia, the students enrolled also increased significantly (Al-Mousa, 2010).

In 1984, the first successful educational experiment in the Arab world took place in the city of Hufuf, in the eastern region of Saudi Arabia. The goal was to see the effects of the education of disabled students, specifically those with visual impairments, in mainstream schools (Al-Mousa, 2010). The MoE asked special education teachers to teach a group of blind students in mainstream classrooms using the Braille system (Al-Hamli, 2008). This experiment of integration of disabled students in mainstream schools marked the beginning of a shift toward inclusive education (Al-Shammari and Al-Jaber, 2017). Following this, in 1987, the groundwork was laid for the creation of disability rights legislation aimed at recognizing and defining disabilities and outlining assessment and diagnostic procedures (Alquraini, 2011). In 1989, the kindergarten on the campus of King Saud University in Riyadh was opened to accept students with visual, hearing, and intellectual disabilities (Al-Mousa, 2010).

Significant further development in Saudi special education occurred in the decade 1990–2000. For instance, beginning in 1990, educational services were provided to students with learning disabilities in mainstream schools via the use of resource rooms. Such services were not available before 1990, as there was limited understanding of learning disabilities and how to effectively teach disabled students. Equally as important as the growing number of options for the education of disabled students, the educational placement of disabled students was also changing from being in separate schools to having special classrooms within mainstream schools and employing teachers specifically trained for special education (Aldabas, 2015).

Another significant development that occurred was the official inclusion of disabled students with different types of disabilities in mainstream schools in Saudi Arabia. The MoE introduced this official placement using two possible models: 1) using a mainstream classroom with resource room special education support, and 2) using a self-contained special education

classroom within a mainstream school. To clarify, when using the first model of the mainstream classroom with resource room support, disabled students, specifically those with learning disabilities, spend most of the school day in the mainstream classroom alongside non-disabled students, learn the same curricula, and complete the same assignments as their non-disabled peers with some adaptations and modifications to meet each student's specific needs. They are taken to the resource room for time with a special education teacher to benefit from specialised instruction and meet their educational and social requirements, with the understanding that a maximum of 50% of their school day is spent outside the mainstream classroom (Alquraini, 2010). When the second model of a self-contained classroom is used, disabled students receive education and spend most of the school day in a separate classroom within a mainstream school; they are taught only by special education teachers, and they learn special curricula with individualised assignments and plan (Ministry of Education, 2001). Special education facilities using both of these models continued to be opened in selected mainstream schools throughout the decade. In the first model, disabled students have lessons with both mainstream and special education teachers, but in the second model, they receive their educational services only from special education teachers despite being in mainstream schools (Al-Mousa, 2010).

This reflects the concept of inclusion in Saudi Arabia, encompassing both partial and full inclusion (Alquraini, 2012). Partial inclusion refers to the model of a mainstream classroom with resource room special education support, while full inclusion refers to a self-contained special education classroom within a mainstream school. In the Saudi context, what is referred to as 'inclusion' often aligns more closely with 'integration' as defined in the wider literature. However, there has been considerable debate in the academic literature regarding the terminology and understanding of inclusion and integration (Hassanein, 2015). According to scholars of disability studies and inclusive education, the terms 'integration' and 'inclusion' are not the same, and they emphasize the importance of distinguishing between them rather than conflating them (Goodley, 2011, 2017). For instance, the term 'integration' in the special

education context is understood as a deficit term (Slee, 2001), whereas ‘inclusion’ indicates a policy of empowerment and justice; as a result, “inclusion is therefore a response to special education and integration” (Goodley, 2011, p.141). Applying this to the current state of Saudi special education, the integration of disabled students within mainstream schools with special education provision in Saudi Arabia leans more towards the concept of integration. However, some improvement and progress toward inclusive education have occurred, as will be seen later in this chapter; it is hoped that full inclusion will gradually be achieved, alongside other positive changes in educational services. Further developments in disability understanding and policy are required for disabled students to achieve true and full inclusion with non-disabled students in academic and social environments.

Following the enactment of the Disability Code and the RRSEP in 2000 and 2001, respectively, Saudi Arabia signed the United Nations Convention on the Rights of Persons with Disabilities (CRPD) in 2008, which also aims to describe and set out guidelines for the rights of disabled students to lifelong inclusive education (Al-Mousa, 2010). In Article 24(b) – Education, the CRPD states, “persons with disabilities can access an inclusive, quality and free primary education and secondary education on an equal basis with others in the communities in which they live” (United Nations, 2006).

In alignment with the above objectives of the CRPD, Al-Mousa (2010, p.10), highlighted both the progress and the challenges within Saudi Arabia. He acknowledged that there have been successful initiatives in inclusive education driven by systematic approaches and political support, as he mentioned “due to its widespread reach, the systematic kind of work it followed, and the political support it received”. However, he also emphasised that Saudi Arabia still requires significantly more effort to fully achieve a comprehensive inclusive education system across the country, which is also the case in many other countries.

A summary of the historical development of the education of disabled students in Saudi Arabia is shown in Table 2-1.

Table 2-1. A summary of the evolution of special education in Saudi Arabia*

Event	Location	Year	Intended for
Opening of the Al-Noor Institute	Riyadh	1960	Students with visual disabilities
Establishment of the Administration of Special Education	Riyadh	1962	Students with all types of disabilities
Opening of the Al-Amal Institutes	Riyadh	1964	Students with hearing disabilities
Founding of the Institute of Intellectual Education	Riyadh	1971	Students with intellectual disabilities
The introduction of disabled students into mainstream schools	Eastern region	1984	Students with visual disabilities
The first enactment of disability legislation	Nationwide	1987	
The opening of a kindergarten serving disabled students on the King Saud University campus	Riyadh	1989	Students with all types of disabilities
The introduction of special education into mainstream schools via the use of resource rooms	Nationwide	1990	Students with learning disabilities
Official inclusion in mainstream schools Special education programmes within selected mainstream schools Full-time self-contained classroom model of special education implemented in mainstream schools	Nationwide	1990 until now	Students with different types of disabilities

*Adapted from Aldabas (2015)

Overall, this section describes the development and improvement of special education in Saudi Arabia to reach the current level of support for disabled students in their education. Even though the educational system for Saudi disabled people has evolved significantly, further development is required for more inclusive educational practices and the greater inclusion of disabled students alongside their nondisabled peers in a variety of academic and social environments.

Building on this discussion, the following section presents the policies and regulations of the Saudi government regarding disabled people that are currently in effect in the 21st century.

2.3 Saudi Policies and Regulations Regarding Disabled People

Two main pieces of legislation have been enacted in Saudi Arabia to ensure the rights of disabled people. These are called the Disability Code and the RRSEP. In order to have a fuller

picture of the factors that affect the lives and education of disabled people and students in particular in Saudi Arabia, each of these laws needs to be examined in detail.

2.3.1 The Disability Code

The Disability Code was passed in 2000 as the first legislation for disabled people in Saudi Arabia. This code asserts that every disabled individual must receive free and appropriate medical, psychological, social, educational, and rehabilitation services, as well as employment opportunities, in the same way as other individuals in society, without any discrimination or isolation. Under this code, disabled people have the right to access the public services provided by all public agencies, and these agencies must make whatever modifications are necessary so that these services are equally as accessible for disabled people as for everyone else. In this respect, it is very similar to the Americans with Disabilities Act enacted in the United States in 1990. Furthermore, the Disability Code stipulates the inclusion of disabled students in all aspects of life; in terms of education, it requires that disabled students have easy access to all stages of education, including pre-primary, primary, intermediate, secondary, postsecondary, and vocational. Furthermore, Saudi schools are required to examine and evaluate their curricula and pedagogical approaches to teaching to ensure that they are appropriate and relevant to the needs of all students. In addition, the Disability Code established a supreme council to further address the needs of disabled people. For example, the council can collaborate with important authorities, such as the MoE, to arrange and facilitate regular training and professional development opportunities, such as workshops and conferences, for educators to exchange knowledge and experiences and ensure that everyone stays up-to-date about the latest practices in the disability sector (Disability Code, 2000). Therefore, this law maintains the rights of disabled people and guarantees them a free and appropriate life as other individuals in society. However, even though the law has been in effect in Saudi Arabia for almost a quarter century, there is a widespread lack of implementation and enforcement, so further development is required (Al-Jadid, 2013).

Overall, the Saudi Disability Code necessitates the establishment of laws to ensure that disabled people have and receive rights equal to others in society and can live their lives independently. Following the enactment of the Disability Code, which applied to all aspects of society, another fundamental legislation that supports disabled people's rights, particularly in educational settings, is the RRSEP.

2.3.2 The Rules and Regulations of Special Education Programmes (RRSEP)

The RRSEP, enacted in 2001, was the second important Saudi law for disabled students and was intended to further develop special education policy. It was established by the Directorate General of Special Education of the MoE (2001) with the help of experienced academics from the King Saud University Department of Special Education who had master's and doctorate degrees from the United States (Alquraini, 2011). Hence, the RRSEP was developed and introduced after a review of US special education policies, including the 1975 Education for All Handicapped Children Act (EHA), which was later amended to the US Individuals with Disabilities Education Act (IDEA) in 1990 (Aldakhil, 2017). The RRSEP focuses on and delineates educational placement and other educational options for disabled students more than any other Saudi law or guideline. Broadly, it emphasises the right of disabled students to have high-quality free education and social interaction opportunities within mainstream schools, designs individual education plans (IEPs), conducts assessment and evaluation procedures, provides programmes for early intervention and transition services, and ensures that schools provide these services to disabled students appropriately (Ministry of Education, 2001). Specifically, this document comprises 11 detailed articles related to important issues regarding disabilities and disabled people. A summary is included here to provide a thorough understanding of what the RRSEP does and why it is so important in the lives of disabled students.

The RRSEP starts by introducing the official definitions of terms and concepts for teachers, administrators, and other professionals to be familiar with, such as 'disability', 'disabled person', 'least restrictive environment', 'transition services', 'multidisciplinary team', 'IEP',

'rehabilitation', 'special education teachers', 'resource room special education', 'inclusive education', and more (Aldakhil, 2017). Next, the RRSEP presents the goals of special education services to provide disabled students with suitable services to meet their specific needs and disabilities and to support them in obtaining the necessary skills to live independently and successfully. The regulations identify key groups of students based on their disabilities by using various types of disability categories, such as blindness, deafness, learning disabilities, intellectual disabilities, and others; they also include a system to identify the level of a disability with stages called 'mild', 'moderate', 'severe', and 'extremely severe'. In addition, thanks to the RRSEP, a student with any kind of disability can receive special education services depending on their specific disability and needs after an accurate diagnosis, assessment, and evaluation. The RRSEP provides details on the free and appropriate special education and related services available to meet disabled students' needs and asserts that mainstream schools are the best option for disabled students so that they can learn and interact with their nondisabled peers to the greatest extent possible, even though there are separate special education classrooms and schools. In fact, the RRSEP authorises educational placement for disabled students within mainstream schools by the use of the same two models described previously: mainstream classrooms with resource room support and self-contained special education classrooms. As per the RRSEP, the 'self-contained classroom' model refers to designated special education classrooms in mainstream schools; disabled students should receive their education there for most of the school day while still taking part in extracurricular activities with their nondisabled peers in the school. This is the most commonly used of the two models in mainstream Saudi Arabian schools (Ministry of Education, 2001). However, the RRSEP emphasises that whether disabled students receive their education via the first model, in which they spend most of the school day in the mainstream classroom but also have a resource room, or via the second self-contained classroom model, they should have valuable opportunities to interact and engage with nondisabled students, such as sharing time in extracurricular activities such as meals, art classes, recess, and some kinds of sport activities (Alquraini, 2011; Aldakhil, 2017).

Furthermore, the RRSEP determined the process by which school professionals diagnose and assess individuals labelled as 'intellectually disabled', including its definition, the goals of diagnosis and measurement, the appropriate tools for each type of disability, and the makeup of an interdisciplinary team to oversee and participate in this process. In addition, IEPs are covered in detail in the RRSEP, including recognition that IEPs should be created and implemented for each disabled student individually, discussion of why special education teachers need to implement IEPs with the general education teacher, parents, and other service providers, an overview of the key elements of IEPs, such as general information about the student and their current performance, a suggestion that IEPs be developed by the multidisciplinary team and the student's family together to determine and maintain the most appropriate education and services, and guidelines for the annual evaluation of IEPs to determine if the goals have been met or not (Ministry of Education, 2001). The RRSEP encourages special education teachers to modify academic and non-academic activities, remove any barriers that could prevent accessibility to information and assessments, and prioritise the emotional well-being of all disabled students. Furthermore, the RRSEP asks school professionals and nondisabled students to use formal names when referring to or talking with disabled students, thereby ensuring that other discriminatory labels or names are prohibited (Ministry of Education, 2001). In summary, this document aims to prevent discrimination against disabled students in education and schools and encourages support and assistance for disabled students; as a result, the guidelines of RRSEP should be actively implemented and practiced to reduce and, ultimately, eliminate the various barriers that disabled students face in Saudi mainstream schools, whether academically or socially.

Overall, the RRSEP supports the right of disabled students to have free and appropriate education to the maximum extent by mandating and recommending various methods to guarantee this right, as well as by recommending other special education services designed for disabled students, such as IEPs, transition services, and assessment and evaluation procedures. However, unlike the US IDEA, the RRSEP does not include specific information

and explanations about some issues, which has led to either a lack or a low quality of disabled education. For example, the RRSEP does not monitor educational placement decisions, such as in cases where a disabled student and his or her family would like to argue against some decisions made in the assessment process. Another example is that the RRSEP does not offer specific guidelines to improve the quality of special education services, such as regarding integrating technology and devices to enhance special education services and learning and help disabled students easily access their curricula. Moreover, the RRSEP does not clarify the procedures of early intervention services and programmes that support disabled students, as the US IDEA does (Alquraini, 2013). These three examples include key issues in the implementation of the RRSEP that can easily hinder the access to education of disabled students and have negative consequences. It is clear that special education services for disabled students are still evolving and need further development and consideration. The RRSEP should be reviewed and amended to strengthen its benefits and reduce the areas of challenge.

Most importantly, taking into consideration these two pieces of legislation that the Saudi Arabian government has enacted, their lack of effective implementation has created a gap between the frameworks of these two laws and the provision of services, which has resulted in a lack of special education services for disabled students and a need for improvement.

Following this review of the key legislation that has influenced Saudi special education, the following section elucidates the current climate of special education in Saudi Arabia.

2.4 Special Education in Saudi Arabia: Recent Status and Ongoing Efforts

As discussed earlier, Saudi Arabia is one of many countries that has established and developed its own system of special education. Remarkable growth and progress have been witnessed year by year due to government support, strategic planning, and efforts of the General Administration of Special Education within the MoE (Battal, 2016). In other words, a gradual evolution in the structured educational programmes specifically designed for disabled

students has been taking place in Saudi Arabia. Starting in 1958, when special education was first described in Saudi Arabia (Aldabas, 2015), and the Kingdom of Saudi Arabia was the first Arab country to apply inclusion principles and make changes in their education system and policies to provide disabled students with the opportunity to learn and be included in mainstream schools (Almousa, 2010), the understanding of and support for the needs of disabled students has continued to grow. For example, special education services in Saudi Arabia have shifted from segregated schools and institutes to mainstream schools; accordingly, the number of mainstream special education programmes has increased to serve various categories of disabled students, as discussed in the historical development section. Furthermore, the Saudi government emphasises that disabled students eligible for special education have the right to receive free and appropriate education and services and to have a high quality of life in general (Battal, 2016).

In terms of the most recent developments in education in Saudi Arabia, Saudi Vision 2030, a broad plan to transform the country socially and economically, includes education as a key area (Saudi Vision 2030). Indeed, one of the main dimensions of Saudi Arabia's Vision 2030 program is to ensure that all Saudi citizens, including disabled people, get full access to the high-quality education they deserve and need. In particular, following the guidelines of Saudi Vision 2030, there is a growing recognition of the importance of inclusive education, and significant effort has been undertaken by Saudi Arabia to promote inclusive education and equal access for disabled students regardless of their different kinds of disabilities (Al-Zahrani and Al-Jaber, 2019; Alsolami, 2024). As reported in the latest update from the MoE in September 2023, about 10% of students with a variety of disabilities in Saudi Arabia were included in mainstream educational settings (Table 2-2) (Ministry of Education, 2023). This indicates more ongoing progress and effort than ever towards inclusive education and ensures that students with disabilities are learning alongside their peers of non-disabled students in regular and inclusive classrooms in mainstream schools. In other words, Saudi Arabia is working harder than ever to enhance inclusion and provide equal opportunities and access to

education for everyone, which aligns with the larger educational goals outlined in Saudi Vision 2030 and the MoE's current inclusion initiatives (Alsolami, 2024). In short, it can be acknowledged that impressive strides have been taken towards an inclusive education system as part of the Saudi Vision 2030 initiative. To build on this progress, further effort is needed to overcome the remaining challenges. In other words, as one central objective of Saudi Arabia's Vision 2030 is the improvement of access to educational services for disabled students, to achieve this fully and completely, ongoing effort and collaboration are essential to ensure full, equal, and high-quality education for all (Alharbi et al., 2019).

Table 2-2 Disability institutes, programs, and students in Saudi Arabia, 2019–2020*

Disability Type	Number of institutes/programmes	Number of students
Hearing impairment	586	6881
Visual impairment	363	3214
Physical and health disabilities	90	4530
Intellectual disabilities	1101	20,576
Autism	220	1464
Learning disabilities	2393	26,225
Multiple disabilities	58	490
Hyperactivity	30	81
Grand total	4796	63,461

*Adapted from Ministry of Education (2023)

2.5 Chapter Summary

This chapter discussed in detail the context of the current research in Saudi Arabia. The central themes were arranged into four sections, starting with an overview of the Saudi education system in general. This was followed by a recounting of the historical development of special education, from early initiatives to contemporary practices. This included a synopsis of the educational options available for disabled students, from a time when there was no education at all through the evolution to the current standards of educating, supporting, and including disabled individuals. In addition, the Saudi policies and regulations related to disabled individuals were reviewed, especially the Disability Code and the RRSEP, the two

main pieces of legislation that support and influence disabled individuals' rights in various aspects of life, including education. Finally, this chapter concluded with an overview of the current form of the special education programme in Saudi Arabia that is designed to support these students, with the observation that further development is required to achieve the full meaning of inclusion in the Saudi environment.

Chapter Three: Literature Review

Part One: Understanding Disability, Models, and Language Approaches

3.0 Introduction

This literature review aims to explore existing knowledge on the topic and provide an overview of the body of literature concerning a research area. For this chapter, the aim of this literature review is to explore the existing research on the attitudes, beliefs, and knowledge of female special education teachers towards the use of assistive technology (AT) in teaching disabled students in mainstream primary education in Saudi Arabia. This literature review is structured as two chapters, each with its own themes and subject matter to be explored and addressed while still relating to and supporting each other. The aim of part one is to explore topics and concepts related to the disability, the complexity of challenging traditional aspects of normalcy, and the critical examination and reconsideration of societal expectations and perceptions of capability. Furthermore, an overview of the different definitions, perspectives, and controversies will highlight the complexity of understanding and addressing disability. This overview includes an intensive examination of the 1980, 2001, and 2011 legal definitions of disability by the World Health Organization (WHO), focusing on the health condition of individuals, societal barriers, and the medical and social models of disability as key concepts in this examination. This chapter also comprehensively reviews the medical and social models of disability and their significance in shaping the understanding of disability, including a detailed comparison between the models to highlight their distinct approaches and implications. Another section of this chapter examines the significance of the language used to describe disability and refer to disabled people in particular, the person-first language versus identity-first language paradigms are reviewed. The final section delves into the debates surrounding these terminologies to provide a deeper understanding of and insight into how society conceptualises and constructs disability.

While this first chapter of the literature review focuses on the disability, the second chapter reviews and discusses topics related to assistive technology (hereby AT) in teaching, including 1) the complexities underlying the three concepts of belief, attitude, and knowledge, including an analysis of their influence on individual behaviours, decision making, and perceptions; 2) the specific ways in which the power of attitudes shapes individual perspectives by drawing upon insights from interdisciplinary fields such as education, mathematics, and psychology; 3) the significance of teachers' attitudes towards the integration of AT; 4) the history of AT policies and regulations; 5) various conceptualizations and perspectives regarding AT that give a deeper understanding of the diverse viewpoints underlying the complexities of this field; and 6) the use of videoconferencing tools and their significance for education and communication.

Of course, reviewing the approaches to and complexities of teaching students with disabilities requires a deep foundational understanding of the concepts related to disability, which makes the themes covered in this first literature review chapter essential. According to Liddiard and Goodley (2016), various meanings have been attached to disability, whether as a concept or a phenomenon, and disability is interpreted in a wide variety of ways based on context, culture, and model. Therefore, reaching an understanding on the concepts related to disability is essential for any debate on the topic across a myriad of fields, including sociology, education, healthcare, law, and disability studies (Darcy and Buhalis, 2011). Therefore, the following sections are organised as a comprehensive explanation to deeply understand the concept of disability.

3.1 Exploring Disability Concepts: Definitions, Perspectives, and Debates

In this section, the different viewpoints, perspectives, and debates held by various official organisations and agencies, disabled people, experts, advocates, and professionals are reviewed and illuminated.

Disability is a multifaceted concept that has been defined from various dimensions and perspectives, including medical, psychological, legal, policy, social, and various combinations of these viewpoints (Al-Jadid, 2013). Clearly, disability is a complex concept, and each of these fields and perspectives tends to give significance to different aspects, support strategies, and approaches (Fougeyrollas and Beauregard, 2001; Oliver, 1990). Furthermore, along with the differing perspectives across these fields of study, the concept of disability has also been variously conceptualised across time, culture, faith, and even nationality (Groce, 2006; Grönvik, 2007), all of which makes it inherently problematic to find a unified and global understanding (Goodley, 1997; Ghai, 2015). As Grönvik (2009, p. 1) stated, it is difficult to find “definitions of disability that are ‘complete’, ‘global’ or ‘stable over time’.” Parmenter (2001) concurs that the understanding of disability differs from one society and country to another. However, there have been some attempts to bring some order to this complexity. According to Grönvik (2009), there are three common perspectives used to define disability, based on administrative, functional, and subjective interpretations. Each perspective provides a distinct understanding and conceptualisation of disability that is influenced by factors such as the context, purpose, and perspectives of individuals or an organisation. Grönvik (2009) describes the administrative perspective as a pragmatic view of disability adopted by government agencies and support organisations for purposes such as providing welfare benefits or services to disabled people; implementing policies, procedures, and practices related to disability; establishing criteria for eligible services and accommodations; and categorizing individuals into different types of disability, which is often based on medical diagnoses and assessments. Grönvik’s (2009) second interpretation is the functional perspective of disability, which focuses on the limitations and difficulties of performing activities and tasks of daily living, such as mobility, communication, and social interaction, regardless of the medical condition

and diagnosis. Users of this perspective focus on assessing functional limitations to understand the practical consequences of disability and to provide appropriate support. In other words, this perspective is used to understand the impact of disability on an individual's ability to perform certain tasks and participate in various activities in society. It emphasises the importance of addressing challenges and barriers, providing support to enhance participation in society, and striving for the best quality of life for disabled people. The final interpretation posited by Grönvik (2009) is the subjective perspective of disability, which is concerned with the perceptions, feelings, and experiences of individuals who identify as disabled. A key differentiating factor for this interpretation is the value it places on the perspectives of disabled people. Therefore, according to this perspective, disability can be understood differently by different individuals based on factors such as personal experiences, cultural beliefs, and social context.

Overall, Grönvik's (2009) suggestion of these three different perspectives on the disability phenomenon suggests that there is no single universal way to define disability; instead, each perspective provides a unique lens that contributes to a more precise understanding of disability and its different aspects. In other words, these interpretations reveal that the complexity of understanding disability is influenced by personal experiences, functional limitations, and societal structures.

Following the above broad overview and the established context of the disability, it is worth narrowing the focus to specific definitions of disability. For example, according to Darcy and Buhalis (2011), a common understanding of disability that has often been cited in the academic literature is the definition introduced by the WHO and endorsed by the United Nations (UN) in 1980, called the International Classification of Impairments, Disabilities and Handicaps (ICIDH). This classification draws a distinction between impairment and disability to provide clarity regarding how disability is to be understood across various countries and contexts. Making a distinction between these definitions is also useful for describing and demonstrating the complex understanding of and relationships between health conditions and

disability support services; this allows for better design and provision of interventions and assistive devices that address both the medical aspects and social challenges of disability (Bickenbach et al., 1999).

In this context, impairment is defined as “any loss or abnormality of psychological, physiological or anatomical structure or function,” while disability is “any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being” (Darcy and Buhalis, 2011, p. 1). However, debates and critiques continually arise among researchers, disability scholars, advocates, and even support organisations regarding these definitions and their applicability and relevance in understanding the full complexity of disability. For instance, according to Oliver (1990), an advocate for disability rights and social justice, these definitions emphasise individual limitations, whether cognitive or physical, and recognise disability as a personal ‘loss’ and ‘lack of ability’. In other words, this definition is rooted in a form of medical determinism that looks at disability from a medical point of view and gives prominence to what someone cannot do rather than what they can. Oliver (1990) critiques the WHO’s approach to understanding disability in terms of individual loss and lack, while ignoring the role of society and social constructs that limit the full participation of disabled individuals. Another broader critique of the WHO’s definition aligns with the efforts of international disability rights advocate Judy Heumann, one of the best examples of an individual who directly impacted and shaped the course of the disability rights movement prior to its official conception (Lea, 2020). Based on her own lived experience of disability, Heumann exemplifies one main criticism of the WHO definition in that the understanding of disability from a medical perspective overlooks the role of social and environmental factors in shaping disability experiences. In May 1970, Heumann was refused a teaching licence by the New York City Board of Education after taking the three exams (written, oral, and medical) required for the licence. She passed the written and oral exams, but she encountered challenges during the medical examination due to her physical disability, which was a result of her childhood polio. The Board of Education cited the “paralysis of both lower limbs, sequelae of poliomyelitis” as its reason for Heumann’s refusal (Lea, 2020,

p. 5). In other words, she was refused the licence due to a perceived safety issue related to using a wheelchair in the school building rather than for any lack of ability or qualification (Malcom, 1970). Judy Heumann's experience exemplifies the systemic barriers, including easily manageable environmental ones, that disabled individuals commonly encounter in education or employment. Furthermore, the perspective of medical determinism, which focused on her wheelchair as a potential danger, determined how Heumann's physical disability was approached as a personal limitation and medical condition, while other social and environmental factors were overlooked (Lea, 2020). Heumann sued the Board of Education and won the case, becoming the first wheelchair user to teach in the New York City public schools. Reflecting back on the case, she noted that "now sometimes I say that the stars were aligned around this court case, because we had an amazing judge: the first African American female federal judge – Constance Baker Motley. And she knew discrimination when she saw it" (Heumann, 2016). Indeed, Heumann's case played a critical role in pushing the social standard to evolve in regard to attitudes, beliefs, norms, and practices, and it also inspired disability scholars and disabled people's own movements/activism to challenge the medical view of disability and press for equal opportunities and accessibility for disabled people (Lea, 2020). This aligns with the principles of the social model advocates' view, which will be discussed later in this chapter.

Despite the progress set in motion by Heumann's perseverance, it is obvious that there is still some controversial debate on the WHO definition and framework that makes a distinction between impairment and disability. In other words, some disability studies scholars argue that this understanding still relies on the medical perspective that disability is a 'problem' within the person that needs to be cured (Haegele and Hodge, 2016). Therefore, some people believe that further development is necessary to challenge this medical perspective and advocate for a comprehensive perspective that enhances the broader role of the social and environmental factors that influence disability experiences (Grenier, 2011). However, others argue that efforts have moved backwards or become worse (Disability Rights UK, 2024). For instance, "the UN Committee on the Rights of Persons with Disabilities cited changes to Housing Benefit,

eligibility criteria for Personal Independence Payment (PIP), social care, and the cessation of the Independent Living Fund as evidence of regression in the protection of disability rights" (Disability Rights UK, 2024).

Returning to the ICIDH (WHO, 1980), it is critical to clarify that the initial definition of disability established by the ICIDH has evolved over time to include a more comprehensive understanding of the interaction between health conditions and social and environmental factors. The WHO produced an updated classification in 2001 called the International Classification of Functioning, Disability and Health (ICF). The ICF (WHO, 2001) updated the ICIDH definition by incorporating a broader framework that includes the interaction of personal characteristics and social and environmental influences that affect disability experiences (Aldakhil, 2017). In particular, it states that disability is "an integration of these two opposing models [i.e., medical and social models]" (WHO, 2001, p. 20). Therefore, this updated ICF definition of disability represented the hope that this new classification system would allow for a significant shift in perspective and a unified framework and language that could be used to understand disability. Most importantly, it provides an understanding of the importance of cultural context, which has been the subject of considerable attention and ongoing debate from disability scholars and advocates in terms of understanding and putting into practice the social model approach to disability (Miles, 2000). In fact, this critical shift acknowledges the interplay and interconnection between individual characteristics and environmental factors in understanding disability. In other words, one objective behind replacing the ICIDH with the ICF was to design a standard global framework to understand both health and disability by using neutral, respectful, and inclusive language, which then helps in creating more inclusive policies and practices that can improve the quality of life for disabled individuals worldwide.

Furthermore, some disability scholars and advocates, including Morris (1991), Crow (1996), Thomas (1999), Shakespeare and Watson (2001), and Shakespeare (2006), who argued for a relational or interactional understanding of the determinants of disability, see this critical shift by the WHO (2001) as a challenge to the traditional medical view of disability and another

perspective of understanding disability. This new perspective combines the impairment/disability 'issue' and social, environmental, and personal factors into a more inclusive understanding of disability experiences that acknowledges the broader societal and structural factors influencing disabled experiences. In other words, the WHO's revised framework allows for an understanding of the importance of a holistic and inclusive perspective that highlights the complex interaction between the medical aspects of individual conditions and the societal barriers that contribute to disability, allowing it to bridge the gap between the medical and social models.

Another perspective from feminist disabled scholars, such as Morris (1991) and Crow (1996), offers a distinctive and critical understanding of impairment that extends beyond the WHO's (2001) framework. While the WHO recognises both individual and environmental factors in shaping disability, its treatment of impairment tends to focus primarily on the biological and functional aspects, rather than the complex, lived experiences of impairment that are shaped by emotion, identity, and social factors (WHO, 2001). This clinical focus on impairment as loss or abnormality of body function or structure, a perspective rooted in the 1980 definition, continues to inform the WHO's understanding, even with the evolution of the definition in 2001. In contrast, Crow (1996, p. 66) insists that "we need to focus on disability and impairment: on the external and internal constituents they bring to our experiences." This signals a more complex and situated view of impairment, not simply as a bodily deficit, but as an experience shaped by emotion, gender, and social identity. Similarly, Morris (1991) emphasises the importance of acknowledging the physical and emotional aspects of impairment, warning that to ignore these is to deny the full reality of disabled people's lives. From their perspective, impairment and societal barriers are not easily separated; rather, they overlap and intertwine in shaping lived experience. For example, Morris (1991, p. 70) critiques the disability movement's tendency to overlook "the difficult physical, emotional and intellectual experiences" of impairment, arguing that this reinforces dominant values that deny weakness, pain, and dependence. Therefore, for Feminist Disability Studies, impairment is not merely a health condition that interacts with social barriers; it is a complex, lived experience shaped by

emotional and cultural influences. The feminist approach adds important dimensions to the WHO's framework by emphasising the centrality of embodiment, identity, and emotion in understanding disability. This includes recognising the bodily experience of impairment (embodiment), how disability influences self-perception and social roles (identity), and the emotional impact of exclusion, stigma, and internalised oppression (emotion) (Morris, 1991; Crow, 1996).

In this sense, the definition of disability addresses its complexity and multifaceted nature, which is influenced by individual and societal factors. In other words, this transition view of disability as the interaction between external and internal factors or between the medical and social models captures and reflects the sense of the interactional and relational understanding model of disability (Aldakhil, 2017). In fact, this approach, instead of giving attention to each issue separately, enriches and evolves the broad perspective of disability and illustrates how individual health conditions and societal obstacles interact to create the lived experiences of disabled people.

This critical review of the initial and updated WHO definitions of disability and disability scholars' perspectives on understanding disability has made clear that the convergence of the medical and social models signifies a deeper understanding of disability and its complexity and multifaceted nature. In other words, to better understand and interpret disability, it is important to avoid creating a dichotomy between the medical and social perspectives and instead acknowledge their integration to address the complex and unique needs of disabled individuals and advocate for greater inclusivity and accessibility in their environments and societies. Furthermore, understanding disability in this way encourages a balanced view of both the medical and social models of disability.

To summarise, this section covered in detail the early ICIDH framework (WHO, 1980), some critiques of it from the perspectives of disability scholars, and the acceptance of the later ICF conceptual framework (WHO, 2001) as the main global disability guide due to its

comprehensive and holistic approach to disability as an interaction between health conditions, personal factors, and environmental (societal) influences.

In addition to earlier frameworks, such as the ICIDH (WHO, 1980) and the ICF (WHO, 2001), a brief mention of the WHO's *World Report on Disability* (2011) is essential. To illustrate, building on the 2001 ICF framework, the WHO developed *The World Report on Disability* (2011) to provide a comprehensive understanding of the global status of disability across different contexts, emphasising the significance of removing barriers to improve the lives of people with disabilities and advocating for inclusive policies and practices, such as healthcare services, education, social participation and employment in all aspects of society. This report indeed facilitates the implementation of the Convention on the Rights of Persons with Disabilities (CRPD), adopted in 2006, which aims to “promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity” (United Nation, 2006, Article 1). Accordingly, *The World Report on Disability* (2011) focuses on improving accessibility; removing barriers; promoting equality of opportunity, including promoting participation; fostering inclusive environments; and increasing respect for the rights and dignity of disabled people. This report also offers critical recommendations and practical actions to achieve an equitable, inclusive society.

To better understand the complexity of disability, the various models that have emerged in the literature to explain different perspectives on disability, specifically the medical and social models, need to be reviewed in more detail (Priestly, 2003). Therefore, the next section provides an in-depth exploration of the medical and social theoretical models to more deeply illustrate their significance in shaping our comprehensive understanding of disability. It begins with an analysis of the medical model's conventional approach and its traditional view that disability requires intervention. A contrasting analysis of the social model, which emphasises societal barriers and the role of society in creating disability, is also given. In fact, a controversial debate exists in the academic literature regarding the use of the medical model

or the social model, which informed this research. A deep understanding of both of these frameworks is crucial to properly contextualising the language of disability and how it has developed (Back et al., 2016). In other words, each disability model includes and produces its own terminology and language, and understanding these roots of the language of disability is integral for the growth of new language, frameworks, and conceptualisations of disability.

3.2 Exploring the Concept of Disability: the Medical and Social Models

Initially, it is helpful to define the term 'model' and how it can be used. According to Valentine (1982, p. 17), the term 'model' can be used in various ways, such as "(1) synonymous with 'theory'; (2) as inferior to a theory on account of reduced scope and associated confidence; (3) as a particular type of theory, which seeks to explain phenomena by reference to an abstract system or mechanism". To clarify, in some cases, the term 'model' can be used interchangeably with the term 'theory' to describe an explanation of phenomena; in other cases, a 'model' can be considered less comprehensive and having a narrower scope than full-fledged theories; and finally, a 'model' can refer to a specific framework for understanding a complex phenomenon or situation. While these illustrations help to understand how the term 'model' is used in different contexts for different purposes, it is essential to determine how this term is generally used in relation to disability studies and research. According to Llewellyn and Hogan (2000, p. 157), the use of the term 'model of disability' in the disability context refers to a model that "represents a particular type of theory, namely structural, which seeks to explain phenomena by reference to an abstract system and mechanism." Therefore, the most appropriate description of the 'model of disability' based on the categories given by Valentine (1982) is the third, which refers to a particular type of theory, because this could include a particular theoretical framework such as the medical model of disability or the social model of disability and explain the disability phenomenon by referencing abstract systems, including its nature, causes, and contributing factors.

According to Llewellyn and Hogan (2000), understanding the various models of disability and their impacts plays a vital role in creating effective laws and policies to address the essential needs and rights of disabled individuals and exploring the various aspects of disability, such as the physical challenges and social barriers that impact individuals. This can also lead to the development of better models or the enhancement of existing ones. Cline and Frederickson (2009) and Dewsbury et al. (2004) agreed that among the several models of disability that have been discussed in the academic literature, such as in educational psychology, sociology and Disability Studies, the medical and social models of disability are the two primary disability models in use. Louhiala (2009) underscores the significance of these two models in shaping and understanding discourse on disability philosophy and the rights of disabled individuals (Sharma and Dunay, 2016). However, it is critical to note that in regard to which model is the best, it is difficult to confirm that one of these models is superior to the other due to the considerable debate between these two models and the lack of universal agreement on the concept of disability; rather, it is suggested that both models are useful and can contribute to understanding the disability phenomenon (Mitra, 2006). In other words, there is no consensus on which model is dominant or which better reflects the needs of disabled individuals and describes every aspect of disability, but an overarching understanding of each model can contribute to building a broad, comprehensive, and inclusive picture of disability complexity (Smart, 2009). This recognition is also highlighted in the UN's Convention on the Rights of Persons with Disabilities: "The charity approach is the oldest of the four, followed by the medical approach. The social and human rights approaches are more recent. Yet, all continue to this day. In spite of the adoption of the Convention, the charity and medical models are still very prevalent even among the human rights community" (WHO, 2014).

In brief, the charity model perspective suggests that disabled people deserve pity and require additional support and help due to their impairments. Although the aim of this model is to promote the humane treatment of disabled people and be supportive of them, it can also lead

to negative stereotypes, perceptions, and misconceptions about disability and how society views disabled people (Retief and Letšosa, 2018).

As the medical and social models of disability have been the most notable and prominent models of recent discourse (Haegele and Hodge, 2016), examining these models in detail is advantageous to make sense of disabled individuals' needs and disability in general. This analysis can subsequently facilitate further understanding and progress in the field of education and make a positive impact on educational services for disabled students to meet their specific individual needs (Mason, 1990). Besides this benefit, analysing and describing each of these models can prompt a deeper reflection on the inherent perspectives of these models and how they significantly influence the language of disability and shape attitudes towards disabled people, whether it be promoting empowerment and inclusion or reinforcing stereotypes and discrimination. The decision to focus on these two models over other models of disability is due to their relevance to this study's research context and findings, which can be seen later in this thesis.

In addition, while discussing other models, such as the affirmational model, charity model, and social relational model, is significant, insightful, and valuable, their inclusion would extend the scope of this research and could shift the focus beyond its intended area. The affirmational model, for example, highlights pride in disability identity and cultural expression (Swain and French, 2000), which, although important, is not directly relevant to this study's focus on teachers' attitudes, beliefs, and knowledge about AT. Similarly, the charity model views disability as a personal tragedy that requires care or sympathy (Barnes and Mercer, 2010), a perspective that is now considered limited and less relevant to the purpose of understanding professional educational practices. The social relational model goes deeper into the emotional and social experiences of disabled people, especially in terms of psycho-emotional disablism and the effects of exclusion (Thomas, 1999; 2004), which, while valuable, falls outside this study's primary focus on teachers' attitudes and pedagogical approaches in mainstream educational contexts. In contrast, concentrating on the medical and social models maintains

a clear focus, remains coherent and impactful, and provides an in-depth examination of the two most widely debated models in disability literature. This allows for a thorough exploration of how disability is understood and responded to in educational settings, which aligns closely with the research aims.

3.2.1 The Medical Model

Historically, the medical model of disability, as used in developed countries, is considered a cornerstone of special education and has been predominant since the 19th century (Goodley, 2011, 2017). It is commonly used to determine the eligibility of disabled people for special education and supportive services (Stone-MacDonald and Butera, 2012). According to this model, the actions of diagnosis, treatment, labelling, categorisation and curing of illnesses are the primary tools that allow for the provision of beneficial services and support to disabled individuals (Heagele and Hodge, 2016). The academic literature shows that professionals who use the medical model, along with other medical model advocates, believe that disability is viewed as “a defect or sickness which must be cured through medical intervention” (Kaplan, 1999, p. 352), which is a main point of contrast between the medical and social models. As another example, according to the medical view, disability is defined as “an individual’s defect lodged in the person, a defect that must be cured or eliminated if the person is to achieve full capacity as a human being” (Siebers, 2008, p. 3).

In addition, the medical model focuses on the individual with a disability, mainly viewing disability as “a biological product” (Brittain, 2004, p. 430) and a problem caused by psychological and medical factors (Oliver, 1990). Hahn (1986) states that “disabilities impose a presumption of biological or physiological inferiority upon disabled persons” (p. 89). It is clear from these numerous similar perspectives of disability that the medical model frames disabilities negatively, considers disability to be an individual health problem that must be treated and cured, and maintains that disabled people can function and interact better within society if they receive suitable treatment and intervention. In brief, the medical perspective assumes that disability can be fixed and resolved through medication and treatment (Gure,

2015). A corollary is that this model typically sees individuals who choose not to follow the medical advice and solutions for their disabilities as unreceptive and resistant (Roush and Sharby, 2011). In other words, the assumption is that individuals should change to fit into society instead of restructuring or establishing the environment to fit the disabled individuals who need adjustment (Marks, 1997).

The underlying premises of the medical perspective are that (1) disability is located in the body and mind, and (2) human beings are flexible and adaptable while society is fixed and unchangeable; as a result, disabled people are expected to adapt to society's requirements (Oliver, 1990; Llewellyn and Hogan, 2000; Sharma and Dunay, 2016).

Advocates of the medical model perceive disability as a lack of ability to engage in any activity or interaction in a 'normal' way (Mantey, 2017). Therefore, another central tenet of the medical model is its focus on measuring individual physical performance and mental performance (gauged by IQ testing) to compare the disabled person's functioning against what is considered 'normal' in the community where they live (Davis, 1995). In summary, the medical model understands disability as a problem with the mind or body that needs to be medically cured and fixed (Haegele and Hodge, 2016). This indeed reflects the normative view of disability in which disabled people are considered unable to perform in a way that is commonly considered 'normal' or as a 'normal' individual would (Mitra, 2006; Roush and Sharby, 2011). It is apparent that proponents of this model focus on and measure what disabled cannot do rather than what they can, which can impact disabled people's views of themselves and their place in society (Haegele and Hodge, 2016). This is especially true in the realm of education, where students receive learning and support and build relationships with others (Slee, 2011). Palmer and Harley (2012) indicated that, in educational settings, addressing the needs of disabled students often occurs in separate and segregated special education classrooms because the focus is on 'fixing' them instead of including them and adapting the educational environment to meet their needs. Furthermore, Slee (2011) points out that the medical view leads to assigning disabled students to special schools and classrooms, even within mainstream schools. To clarify, according to the medical model perspective, disabled

individuals are diagnosed based on specific characteristics and are accordingly assigned to a specific category of disability, such as mental or intellectual disabilities, physical disabilities, and learning disabilities (Stone-MacDonald and Butera, 2012). The purported aim of this categorisation is to provide disabled people with special treatments and interventions as well as suitable educational services to a similar extent as are provided to non-disabled people (Hutchison, 1995). However, Thomas (2002) argued that the view of the medical model limits the participation and engagement of disabled people in activities and assigns them specifically to a role to receive special care and services. Hence, the medical model is viewed by many scholars of disability studies and inclusive education as a contributing factor in disability discrimination and various forms of exclusion, despite providing special services, care, and education (Barton, 1986; Slee, 2011).

Furthermore, in line with the arguments of Thomas (2002), Keleman and Vanhala (2010) posited that the medical model, by seeing disability as an individual problem, fails to promote a more inclusive environment and community, or at least to reduce the different forms of discrimination that disabled people experience in the community and in educational settings in particular. In other words, the use of the medical model to set policy can result in the segregation of disabled people into special schools or separate classrooms within mainstream schools, resulting in negative attitudes towards disabled individuals. Sharing this viewpoint, Middleton (1999, p. 139) argued that "there is no rational basis for exclusion. Disabled children share the same right to be included as a child without impairment, and any segregated treatment should be justified with their short- and long-term well-being in mind." In this sense, guaranteeing inclusion "involves a serious commitment to the task of identifying, challenging and contributing to the removal of injustices. Part of this task involves a self-critical analysis of the role schools play in the production and reproduction of injustices such as disabling barriers of various forms... It is more than mere questions of access that are at stake here. It is a quest for the removal of policies and practices of exclusion and the realization of effective participatory democracy" (Barton, 1997, p.234).

Following the above discussion, in the Saudi context, the general understanding of disability aligns with the medical model, and the segregation of disabled students into special classrooms within mainstream schools is still commonplace. In the Saudi education system, disabled students receive their education in self-contained classrooms. Policy makers, guided by the official Rules and Regulations of Special Education Policy, tend to see disability as a condition requiring classification, separation, and specialised classrooms, instead of one that could benefit from the promotion and fostering of inclusive education practices (See chapter two and six) (Ministry of Education, 2001). If enacted, such a system could include all students and support their comprehensive social and academic development in the same classrooms and environments, regardless of ability and disability (Hodge, 2017). This perspective, held by many disability researchers and advocates, has led to the emergence of the social model, which challenges and opposes the viewpoints of the medical model (Slee, 2011). The social model emerged specifically due to growing criticism directed at the limiting and negative views held by the medical model about disabled individuals in particular (Thomas, 2004).

3.2.2 The Social Model

Over the last 50 years, a shift from the medical model to the social model has taken place, reflecting how disability is understood differently now than in the past (Andrews et al., 2022). In the social model, disability academics and advocates play a critical role by contributing valuable insights and support regarding the discussion of disability, disability experiences, and disabled people's rights (Fitzgerald, 2006). The social model of disability was developed in the 1970s by British activists in the Union of the Physically Impaired Against Segregation (UPIAS), and its spread was led by scholars and workers of disability studies, particularly Mike Oliver, Vic Finkelstein, and Paul Hunt (Oliver, 2004; Thomas, 2004). Furthermore, in the 1970s and 1980s, the discipline of disability studies emerged in response to the existing dominant cultural and professional perceptions of disability (Kielhofner, 2005). To better understand the social model of disability, it is useful to recall the definition of disability studies as offered by Pfeffer (2001, p. 29); namely, it is "the field which examines the experience of being disabled and the

lives of people with disabilities”. Furthermore, the field of disability studies, asserting that disability is caused by societal barriers and how society is organised, seeks to explore the intersection of politics, economics, society, and cultural factors that shape disability experiences (Kliewer, 1998).

Inherent in the social model, and what distinguishes it from the medical model, is a great emphasis on and consideration of promoting and valuing disabled peoples’ perspectives and life experiences. In other words, disabled people are entitled to be the primary voices in disability discourse, share their own experiences of disability, address issues that might affect their lives, and advocate for societal changes (Fitzgerald, 2006). Indeed, the social model plays a crucial role in enhancing the understanding of disability and has greatly impacted the social and political movements of disabled people (Oliver, 1990; Goodley, 2011). Therefore, this model is commonly known as the ‘big idea’ in the United Kingdom (Hasler, 1993, p. 280). However, this powerful idea has not just impacted the United Kingdom; in fact, it has played a critical role in changing policy and creating positive societal change for disabled people in many countries around the world (Barnes and Mercer, 2005).

As mentioned previously, the emergence of the social model was a result of the shortcomings of the medical model of disability. In other words, disability studies academics actively sought to shift the disability phenomenon from an “individual or medical problem into a civil rights issue” (Paterson and Hughes, 2000, p. 30). This statement is clearly rooted in and emphasises the civil rights of disabled individuals and has been supported by many in the field. As another example, Smart and Smart (2006 p. 35) wrote that “a perfect world is not a world without disabilities but a world in which accommodations and services are provided to people with disabilities, and more important, disability is not viewed as inferiority”. In addition, social model supporters affirm the rights of disabled people to be included and to have full participation in society as other individuals without any discrimination. In particular, the social model focuses on disability within society instead of within individuals (Oliver, 1990; Goodley, 2011) and sees disability as an outcome of the social barriers and environmental factors that affect disabled

individuals' lives and participation in society (Thomas, 2004). As Finkelstein (2001, p. 2) expressed, "it is society that disables us and disabled people are an oppressed social group". In addition to supporting this civil rights agenda, the social model of disability incorporates a call to deconstruct and replace the medical understanding of disability with a more social point of view that would remove the negative assumptions, cultural beliefs, attitudes, biases, and practices that create disability (Scotch, 2001). One important part of this is the removal of barriers in the educational setting so that education can become more inclusive and accessible for disabled people (Kielhofner, 2005; Villa and Thousand, 2005). This means relocating the understanding of disability from the individual to the societal attitudes and actions (Charlton, 1998). To illustrate, disability scholars who support the social model argue that any social conditions that create oppression and obstacles need to be rethought and transformed. This naturally refers to changes in public policy regarding support services, information access, education systems, and physical access to public spaces and public transport (Oliver, 1990; 2004), but it also goes beyond that to include individual attitudinal issues, such as prejudice, communication, and social environment factors (Kielhofner, 2005).

Hahn (1986, p. 128) emphasised this point by stating that most barriers that disabled people encounter "[stem] from the failure of a structured social environment to adjust to the needs and aspirations of citizens with disabilities rather than from the inability of a disabled people to adapt to the demands of society." In fact, Brittain (2004) suggested that if societal attitudes improved and environmental barriers were removed, many issues and misunderstandings about disability could be eliminated.

Overall, advocates of the social model and disability studies scholars understand that disability to be a result of the environmental barriers created by society and individual attitudinal discrimination, rather than a problem of disabled people (Mantey, 2017). Hence, they focus on removing and reducing barriers within society, including in educational systems, to create an available, equal, and inclusive community for disabled citizens and students that meets each individual's specific needs (Taylor, 1999). Furthermore, the social model encourages

schools and teachers to adapt various teaching methods and strategies that can break down or work around barriers to help disabled students learn and have the same opportunities as their non-disabled peers (Ainscow, 1999). It also provides a critical understanding of why discrimination might occur in the community against disabled individuals and, above all, confirms the civil rights of disabled individuals by promoting inclusion, removal of barriers, and equal opportunity to participate fully in all aspects of life. It is clear that disability advocates and proponents of the social model demand that the social world and educational environments be changed to include all disabled individuals.

While the social model of disability has significantly shaped disability discourse, it has also faced important critiques regarding its limitations. For instance, one critique of the social model is that it distinguishes between "impairment" and "disability" (Bingham et al., 2013). Critics of the social model argue that this separation does not fully reflect the lived experiences of disabled people, as it places too much emphasis on social barriers and overlooks how impairments themselves can affect daily life (Palmer and Harley, 2012). This critique has been notably advanced by disabled feminists, who have centered the body, pain, embodiment, gender, and emotion within understandings of disability, challenging the social model's marginalization of the physical and affective realities of impairment (Crow, 1996; Thomas, 2002; Wendell, 1996). For instance, Thomas (2002) introduces the concept of "impairment effects" to highlight the direct physical consequences of impairment, such as pain and fatigue, which shape disabled people's everyday experiences and are often overlooked by models that focus solely on social oppression. Feminist and disability scholars have also emphasised how gender intersects with disability to shape embodied experiences, showing how disabled women encounter unique forms of oppression that are both gendered and ableist (Goodley, 2011; Liddiard, 2018). Moreover, these feminist perspectives draw attention to the psycho-emotional dimensions of disability, including feelings of exclusion, worthlessness, and internalized oppression, aspects that early social model frameworks tended to neglect (Thomas, 2002; Marks, 1999). Thus, disabled feminists' interventions have been pivotal in expanding disability theory beyond the social model's original parameters to embrace a more

holistic and intersectional understanding of disability as lived, felt, and deeply embodied. However, supporters of the social model acknowledge these critiques but emphasise that the primary issue lies not in the impairment itself, but in the way society treats those with impairments (Palmer and Harley, 2012). From this perspective, disability arises from social barriers and inequalities rather than from an individual's medical condition.

A second critique of the social model is that it does not fully consider the differences among individuals with disabilities. Fitzgerald (2006) argues that the model overlooks the idea of intersectionality, which refers to how people can experience more than one form of discrimination at the same time, for example, based on disability, gender, or race. This means that the social model cannot fully explain the experiences of a disabled person in that it denies and overlooks other parts of their identity.

While the social model calls for society to change in order to remove barriers for disabled people, intersectionality suggests that this alone is not enough because it overlooks how different aspects of identity, such as race, gender, and class, intersect to shape unique experiences of discrimination and oppression. For example, disabled people of colour may face compounded barriers due to both ableism and racism, making social barriers more complex and multifaceted (Erevelles and Minear, 2010; Annamma et al., 2013). Society must also address other forms of unfair treatment, such as racism. In this way, the social model has been criticised for failing to recognise how disability can be experienced differently depending on factors such as race or gender (Fitzgerald, 2006).

Another critique of the social model of disability has pointed out that it often overlooks how cultural contexts influence the way disability is experienced. While the model has been important in highlighting structural and economic barriers, it pays less attention to the impact of cultural beliefs, values, and discourses (Corker, 1999; Thomas, 1999). Feminist and postmodernist theorists argue that disability is shaped not only by material conditions but also by socially constructed norms and representations, which differ across societies (Corker,

1999). For instance, Terzi (2004) notes that Deaf individuals may face exclusion due to the lack of recognition of their language and culture, rather than purely economic barriers. These critiques show that a full understanding of disability must also include cultural and identity-based factors.

3.3 The Medical versus Social Models of Disability

Having reviewed these two most prevalent models of disability in detail, it is also helpful to compare them to understand their distinguishing characteristics more deeply. In brief, the main dissimilarity between these two models is based on how each conceptualises disability.

The medical model views a disability as a personal tragedy and medical problem that requires special care and interventions such as treatment, rehabilitation, and behaviour modification provided by medical professionals and scientists who have the ability to define and cure illnesses; thus, it focuses on healthcare policy that emphasises the need for disabled individuals to adapt to society (Brittain, 2004; Palmer and Harley, 2012). Furthermore, within this model, diagnosis and assessment are required to gain access to disability services and interventions.

On the other hand, the social model understands disability as a social issue and focuses on environmental factors and even cultural attitudes that create various societal barriers; it emphasises the need for society to be changed to accommodate disabled individuals (Forhan, 2009). Within this model, both individuals and collectives are involved in environmental and societal attitude changes. Finally, proponents of the social model defend disabled human rights and advocate for policies that enhance accessibility, inclusion, and equal rights (Darcy and Buhalis, 2011). Table 3-1 summarises the main distinctions between the two models.

Table 3-1 A summary comparison of the medical and social models of disability*

Topic	Medical model	Social model
Disability definition	An individual medical issue or defect	Social barriers, cultural attitudes, and environmental factors
Access to services	Referral based on diagnosis	Self-referral and experience
Targets of interventions	Fixing and normalizing disability and the disabled	Social and policy changes to lower barriers and increase understanding
Agent of remedy	Professionals	Advocates
Effect on non-disabled individuals	Society does not change	Society becomes more inclusive
Perception towards disabled individuals	The person is deficient	The person is unique

*from Haegele and Hodge (2016, p. 194)

Even though these two models seem to have completely oppositional views on disability and the best way to improve the lives of disabled people, it is important to recognise that no single model can provide a perfect and final solution to disability or cover every aspect of disability (Pfieffer, 2001). Instead, understanding each model in depth allows for recognising the value and usefulness that each can provide. Using these models collaboratively and bringing together different perspectives can both benefit the development of these models themselves and overcome their limitations to create an inclusive framework that reflects a better understanding of the experiences of disability and disabled individuals (Mitra, 2006; Blustein, 2012). In other words, each perspective offers valuable insights into different aspects of disability that contribute to a comprehensive understanding of disability. As asserted by Marks (1999, p. 611), both models are significant and can be considered “two sides of the same coin”.

As a final point before bringing the discussion of disability models to a close, it is helpful to reflect on what disability does not mean. According to Pfeiffer (2001, p. 44), “(1) disability is

not a tragedy; (2) disability does not mean dependency; (3) disability does not mean a loss of potential, productivity, social contribution, value, capability, ability, and the like; (4) disability is “a natural part of life, everyone’s life; and (5) there is as much variation among people with disabilities as among people in general”. In other words, challenging the stereotypes and clarifying the misconceptions of disability to build a new perspective about disability allows it to be recognised and understood as a broad experience that has both challenges and abilities. In this way, it can be possible to create and foster an inclusive, accessible approach as well as an accepting and equitable society for disabled people.

To summarise, this section presented, compared, contrasted, and critically analysed each of the two main influential models of disability: the medical model and the social model, including an examination of their contributions to conceptualising disability. This discussion reveals that different models, understandings, debates, and interpretations have been used by various organisations, professionals, and disability advocates to explain and illustrate the concept of disability from different perspectives. Furthermore, delving into the concepts behind these two models helps with understanding the different languages of disability that they use to describe and refer to individuals. This fundamentally important issue of disability language is reviewed in the next section.

3.4 Exploring the Language of Disability

Assigning names or categories to individuals based on certain characteristics, traits, or behaviours can be recognised specifically when referring to disabled people (Runswick-Cole and Hodge, 2009). Indeed, several terms have been identified and used to define and describe disabled individuals; however, there is some common global terminology to refer to this group, such as ‘handicapped people’, ‘people with disabilities’, ‘disabled people’, and ‘the physically or mentally challenged’ (Sharma and Dunay, 2016).

Understanding the medical and social disability models can help to understand the language used to refer to disabled people. In other words, the debate around the medical and social models of disability is reflected in the debate around disability language and terms. Therefore,

it is crucial to examine how the languages and terminologies related to disability reflect the different models for understanding and addressing disability. Furthermore, this research can demonstrate how teachers' use of disability languages contributes to their overall understanding of disability in general and of disabled students in particular. To illustrate, the teachers' language and the way they talked about disabilities and disabled people helped me in the analysis stage by allowing me to reflect on their understanding and perceptions of and attitudes towards disabled students, which could also influence their teaching methods and interactions with disabled students (see chapter Six).

A considerable debate has arisen among professionals, teachers, parents, and scholars surrounding the language and labels that are used to refer to and describe disabled individuals, particularly those related to person-first language compared to disability-first language, which is sometimes referred to as identity-first language (Alkahtani, 2016; Andrews et al., 2022). Many discussions and disagreements exist in the academic literature as to whether person-first language, such as 'person(s) with a disability', or alternative disability-first language, such as 'disabled person' (Gray and Hahn, 1997). This is because word selection, labelling, and the language used to refer to and describe disabled people can shape how individuals feel, think, and act towards disabled individuals and their perceptions of disability in general (Caplan, 1995). Negative or disrespectful language can create damaging impacts, attitudes, and discrimination for disabled individuals (Andrews et al., 2022). In other words, the choice of language used to refer to disabled people influences the expectations and interactions that people have with them (Barton, 2009) and reflects the user's attitudes, values, and beliefs towards disability and disabled people (Halder et al., 2017; Demetriou, 2022).

Beatrice Wright, an eminent rehabilitation psychologist, advocated for the person-first language form of 'people with disabilities' as an attempt to reduce stigma and eliminate the spread of negative perceptions that affect an individual and can lead to more and further generalised negative assessments of that person. The foremost aim of Wright's work was to

focus on the person and their humanity ahead of any disability (Wright, 1983). In other words, this approach is used to emphasise individuality and is intended to show respect by referring to the individual before their disability (Halder et al., 2017). As a result of Wright's advocacy, the term 'people with disabilities' became widely adopted (Wright, 1983), and accordingly, person-first language was seen as a positive approach, even so far as being called the 'correct' way to discuss disability and refer to disabled people (Andrews et al., 2022). Furthermore, person-first language is explicitly suggested for academic writing by numerous professional organisations in their style manuals, including the American Psychological Association (APA) (2010, P.72), and the American Medical Association (2007, p. 416). Other organisations, including the American Psychiatric Association, the American Speech-Language-Hearing Association, and the Associated Press, are slightly more flexible in that they recommend the use of person-first language but do not explicitly require it (Gernsbacher, 2017). The language preference guidelines put forward by these organizations align with the medical model of disability, as Tobbell and Lawthom (2005) argued that this language still locates the 'issue' within the individuals. In contrast, the disability community and disability studies scholars prefer and promote the use of disability-first language, emphasising that their disability is central to the identity of disabled people. The main reason behind this is that they see this term as promoting disability pride (Dunn and Andrews, 2015; Gernsbacher, 2017) and connecting individuals to the society and community that shares their same identity and similar experiences (Dunn and Andrews, 2015).

To clarify, the person-first language philosophy encourages placing the person before the domain of the disability, so it treats the person first, and it focuses mainly on what the person is, not what a person has. For instance, a student with a physical or intellectual disability is firstly a student and secondly has a disability (Halder et al., 2017). In contrast, disability-first language focuses on the disability over the person, such as in terms like 'disabled person' and 'blind person'. Thus, in this linguistic philosophy, the disability domain is the main focus. In fact, the person-first language has been used more frequently for many years and is more

prevalent in academic literature, scholarly journals, and scholarly publications than the disability-first language (Peers et al., 2014). Nevertheless, the person-first approach still suggests and reinforces that disability itself is inherently a problem within the individual (Tobbell and Lawthom, 2005).

In essence, the understanding that arises from a term like 'people with disabilities' is often associated with the medical model of disability because the emphasis is on the individuals' condition and health problem, whereas the understanding that comes from terms like 'disabled people' is more aligned with the social model of disability because the emphasis is on societal barriers and factors that need to be changed to accommodate all individuals (Erkilic, 2011).

In summary, a controversy surrounding these variations in the languages used to refer to disabled people has explained how the medical and social models of disability influence the terminologies used to refer to and describe disabled individuals (Demetriou, 2022). For example, from the medical model perspective, disability is an individual problem, and disabled individuals are referred to by their disability and classified based on the nature of their disability, such as by the term 'students with learning disabilities'. In general, advocates for the medical model encourage the use of person-first language. In contrast, the social model perspective tends to focus on and understand disability as a result of societal barriers and society's standards that must be confronted; therefore, disability activists and scholars increasingly encourage the use of and prefer terms such as 'disabled person(s)' (Back et al., 2016). In other words, in the field of disability studies, the language used to refer to disabled students can be seen as an avenue to address the experienced inequality and injustice (Back et al., 2016). However, it is worth noting that even though the social model has been popular in academia for several years, it is not yet globally accepted, and the language used in this model is still controversial (Barney, 2012). In other words, a person's choice of terminology can reflect whether their viewpoints follow the social model focusing on societal change or the medical model focusing on diagnosis and treatment of individuals.

Despite this acceptance of the social model in academics and its support by disability studies, sociology, education and cultural studies and the small changes that have happened in societies around the world, in the Saudi Arabian context, the education system is influenced by the prevalent and predominant medical model of disability (Aldakhil, 2017). Therefore, the person-first language is used more often than the disability-first language. Furthermore, in 2019, the Saudi Deputy Minister of Education for Universities, Research, and Innovation circulated High Order 1/40/3629 approving the organisation of the Authority for the Care of Persons with Disabilities to all Saudi universities. This order mandated the use of the term 'people with disabilities' in all official correspondence and media statements (Authority of People with Disability, 2019). This is also in line with the Ministry's preference for the medical model and person-first language.

Bringing the issue of disability models and their relationship with disability language to the forefront provides valuable insight into how this language shapes our perspectives on disabled people and disability in general. Even though the correct usage of disability language is still disputed in the disability community, it is important to recognise that the terminologies and languages used to define disability and refer to disabled people are a crucial aspect of the disability phenomenon and reflect people's views and understanding of each other. Without the increased understanding of disability that the different disability languages provide, disabled people would continue to suffer from negative perceptions and attitudes, which could result in a lack of access to resources, reduced feelings of well-being, and less inclusion in the community and in education in particular.

Nevertheless, because language is a phenomenon that evolves over time, changes in disability language are likely to continue, whether in spoken or written language (Darrow, 2013). Thus, it is not appropriate to create and follow specific guidelines about the usage of disability language; rather, flexibility is required in using person-first language and disability-first language (Gernsbacher, 2017). The most recent (7th) edition of the APA style manual recognises that both person-first language and disability-first language are appropriate and

respectful, which means that both can be used to refer to disabled people. This is a change, as previously person-first language was used exclusively in scholarly writing (Gernsbacher, 2017). Therefore, as it is now possible to take the disability language preferences of both the writer and the research participants into consideration (Andrews et al., 2022), it is even more important to be aware of the language that is common within societies and communities and to recognise the preferences of disabled people when referring to or working with them (Draper, 2018). Throughout this thesis, as a writer, I use alternatively both the person-first language and the disability-first language to refer to disabled people and discuss disability. Hence, using both approaches reflects and demonstrates my recognition of the diversity of terminology used in the academic literature and the flexibility of disability language used. Moreover, it presents a balanced perspective that reflects ongoing debates on disability languages in the academic literature. Additionally, I believe that the intellectual development of any phenomenon and issue in life, not merely disability issues, plays a role and could shape individual perspectives, that is, specifically how we perceive others. Thus, being flexible and realistic in evaluating phenomena and people helps us understand them and build reasonable, valuable views.

Overall, it can be seen that the language used to understand disability stems from the most influential two models, the medical and social models of disability. Consideration of these models together can help frame and understand disability in a more inclusive and respectful way to achieve full inclusion and equality. For instance, the WHO combines these disability models to understand disability, and this integrated approach helps to provide a more accurate and comprehensive reflection of the experiences and identities of disabled people (WHO, 2001). Hence, using language with consideration of preference helps disabled people in society by improving attitudes, reducing stigma, and reflecting society's role and responsibilities to treat disabled people better and fairly, which can then have a strong effect on their inclusion and interaction in the community (Clinton and Higbee, 2011).

To summarise, this section has reviewed the influence of the medical and social models of disability on the terminologies used to refer to and describe disabled people. One main takeaway is that flexibility is key to the choice of person-first language versus disability-first language, taking into consideration the preferences of disabled people regarding these approaches.

The following section reviews the categorisation and labelling of disabled individuals, one of the most controversial and complex issues in special education.

3.5 Exploring the Complexity of Labelling in Education: Challenges and Opportunities

In the academic literature, a considerable and extensive debate has arisen among researchers and educators from several academic disciplines such as, disability studies, education, psychology and sociology about whether it is necessary to categorise and label individuals based on their disability and special educational needs, especially in educational settings and environments (Halder et al., 2017). In other words, there are multiple perspectives on the issue of labelling disabled people based on their disability, the effectiveness of labelling, and whether it is necessary for the purpose of offering special support and services in an educational setting (Lalvani, 2015). In fact, the importance of discussing all aspects of labelling comes about because teachers' views towards disabled students and the language used to describe disabled students can greatly influence the way the students see and understand themselves and their ability/disability (Haegele and Hodge, 2016).

According to Demetriou (2022), the labelling of disabled people appears to be helpful and protective of their rights; thus, the use of labels should not be dismissed out of hand, as these terms have potential advantages, specifically in educational settings. Draper (2018) stated that identifying and using labels to refer to disabled people is a core element of providing support in that it imparts useful information regarding diagnosis; accordingly, disabled people would benefit from and be able to receive appropriate assistance, AT devices and services, and suitable intervention programs and resources. This viewpoint is further confirmed by

Sutcliffe and Simons (1993, p. 23) in this statement: “The acquisition of a label can open gates to resources and other forms of support that are not generally available.” Indeed, it is often argued that labelling and diagnosis can lead to easier access to treatment and resources that cannot be gained otherwise. Goldstein et al. (1975, p. 17) described a label as “a passport to special education”. In this sense, the process of labelling is common and grounded in the medical model (Haegele and Hodge, 2016).

Another potential advantage of labelling is that it can help teachers understand their students’ unique learning needs so they can adjust to use different learning strategies, interact efficiently with professionals for guidance, and organise effective lesson plans to best benefit their disabled students in the classroom (Jodrell, 2010). Vaughn and Fuchs (2003) highlighted that teachers who notice a student showing limited progress, performance and engagement, indicators of a possible learning disability, tend to refer students for special education eligibility assessments. Of course, many do this with the intention of providing the best additional support for students and see the usefulness of assessment to reach that goal (Demetriou, 2022); in other words, the referrals that teachers mean are not for the purpose of segregating or excluding students. The alternative of disregarding warning signs and keeping students in mainstream classrooms that might be challenging for them is also not beneficial (Back et al., 2016; Demetriou, 2022).

Another advantage of labelling disabled students is the reassurance it can provide the students themselves and their families; that is, some students seek a label to attach to their difficulties to feel more comfortable and known and to avoid stigma (Lauchlan and Boyle, 2007). Families also tend to feel more at ease when the student receives an official diagnosis and label, as this reduces the uncertainty of the difficulty or challenge (Gillman et al., 2000). In other words, they see the acquisition of labels as a validation and recognition of their difficulties and ‘problem’. For example, Riddick (2000) interviewed 16 adult dyslexic students to explore the benefits of labelling and found that a majority of the students preferred and found it helpful to have such a label. One student commented that the label of dyslexia helped

him finally understand his condition after many years of being treated as stupid, and other students stated, “I remember after I had seen the educational psychologist and got the results back, it was like a massive weight had lifted off my shoulder and suddenly I wasn’t stupid anymore” and “It had a name, I wasn’t stupid, the psychologist said I wasn’t stupid, and it was a lovely feeling” (Riddick, 2000, p. 659). Therefore, it seems that these students recognise the advantages of having such labels.

Likewise, as reported by Lauchlan and Boyle (2007), the use of a label also made a positive change for Victoria Biggs. Biggs was diagnosed with dyspraxia at the age of 15, and she authored the prize-winning book “Caged in Chaos” about her experience with dyspraxia in 2004. In her book, Biggs describes the moment of receiving her diagnosis as “like the sun coming out after a cold day of rain” (Biggs, 2004, p. 18); however, she also advises young people to “use the label, but don’t be defined by it” (p. 75) so that it does not become their entire identity.

Other authors have noted that the categorisation of disabled people is helpful for the legal protection and safeguarding of individual rights (Ho, 2004). Thus, disability laws in many countries, including Saudi Arabia, require the official identification of disabled people to provide them with various and best services, devices, special necessary provisions, and support (Ho, 2004; Aldakhil, 2017). Similarly, Burke and Ruedel (2008) agreed that using a categorisation system for disabled individuals facilitates the distribution of resources, opportunities, support, and any other instructional services that are helpful for them (Hayhoe, 2017). In fact, this approach of labelling and categorisation of disabled people is clearly linked to the medical model of disability (Goodley, 2014). However, even in societies where these approaches are favoured, Draper (2018) emphasised that careful consideration should be taken by educators before using labels to refer to disabled people, because each individual is unique and has specific characteristics, even if those individuals belong to and come from the same category of disability. It can be argued that to label and focus in this way suggests that disability is within and belongs to the individual (reflecting the medical model perspective) and

thus minimises consideration of the broader social, structural, and environmental factors that might contribute to an individual's difficulty (Gillman et al., 2000).

In fact, many others have argued that the effectiveness of such labels in the education environment may be limited and can create potential issues (Lewis and Norwich, 2005; Lauchlan and Boyle, 2007). Particularly in an educational environment, it has been found that labels can lead to the generalization of intervention programmes for students who fit in the same disability category or are similarly labelled, minimizing the use of specific individualized education plans based on each student's unique needs, strengths, and weaknesses (Lauchlan and Boyle, 2007). In addition, Norwich (1999) and Boyle (2014) both stated that there is no clear association between medical labels, such as Down syndrome and different categories of disability, and the requirement of educational provision. In other words, there is no clarification of the specific kinds of educational support and resources that individuals need based on medical labels because individual students differ in their specific needs, even if they are put in the same category. In support of this, Lauchlan and Boyle (2007, p. 37) argued that "if the use of the label does not lead to improved, or more appropriate and targeted educational intervention, then one may legitimately question its value." According to this statement, labels themselves cannot provide specific-enough details, so the value and practical benefits of labels as valuable tools can be questioned if the use of labels does not lead to the improvement of educational intervention or the success of disabled students. In other words, labels should be used to maximise opportunities for student success, not for stigmatisation. Hence, it is obvious that the matter is not inherently related to the use of labels, but about ensuring that individual needs are met with the appropriate intervention programmes.

Furthermore, according to Demetriou (2022), there is a potential risk of incorrect labels or misclassification. Whether by putting a student into the wrong disability category or by falsely identifying them as having special educational needs so that they are moved from the mainstream classroom to a special education programme, this usually happens based on the diagnoses and the IQ tests used to determine the specific labels for an individual; of course,

this can ultimately have a great negative impact on the individual's self-esteem, self-perception, and confidence (Hessels, 1997). Norwich (2014) clarified the potential risk of these errors in relation to being stigmatised. When a student who is experiencing some difficulties is labelled as having special educational needs and a disability, the student is at high risk of being stigmatised. A clear example of this point is the label 'intellectual disability', as the use of this label tends to lead to underestimation of students' abilities and positive characteristics and strengthening of negative societal stereotypes (Sheehan and Ali, 2016). In a similar vein, when a student who experiences difficulty in learning is not labelled as having special educational needs or a disability, the student might be at risk of not receiving appropriate additional educational support or missing critical assessment (Ho, 2004). In accordance with the previous arguments, Goodley and Runswick-Cole (2012) reported that labels are not always harmful; sometimes, their use can be beneficial thanks to the additional access and support they can provide access to; however, labels can also be damaging if applied incorrectly. They can limit the opportunities a person has and lead to reinforced stereotypes, lower expectations, or exclusion. Therefore, labelling can be either positive or negative, depending on the context of use and the nature of the label (Riddick, 2000).

Offering another perspective, Armstrong and Squires (2012) argued that labelling can help with understanding a student's main problems and difficulties if we are aware of and can use the official and formal labels, as this can lead to providing the appropriate supportive resources and intervention. As Cooper (1996, p. 147) indicated, "widely accepted categories can help teachers to interpret and develop responses to the problems they encounter". Furthermore, Hayhoe (2017) pointed out the necessity of identifying and labelling disabled people to facilitate the support they need, but with more positive labels and careful consideration. Informal or erroneous labels may result in exclusion, stigmatisation, lower expectations from others, limited confidence, and even segregation (Demetriou, 2022). In the same vein, the use of labels, such as 'dyslexia', 'dyspraxia', 'Asperger's syndrome', and 'attention deficit hyperactivity disorder', can raise awareness and improve understanding of particular

difficulties. To clarify, these terms are increasingly known and recognised, but there is still a lack of full understanding of them, particularly in educational settings; therefore, increasing awareness can lead to greater understanding and support for disabled people (Gross, 1994). A narrative story that exemplifies the usefulness of labelling and raising awareness was shared by Gus (2000) about a student named Adam with Asperger's syndrome. Before the intervention, Adam faced social challenges due to his condition, so he felt socially isolated and struggled to establish friendships with his peers in school. Adam's tutor and educational psychologist felt that his peers needed to know that he is autistic and what that means, so the psychologist decided to organise a session in which Adam's peers were asked to describe his strengths and challenges. As this discussion was led by the educational psychologist, his classmates engaged in the discussion and, in the process, gained a clearer understanding of his condition with autism. They also learned how to support him, be patient with him, and involve him more to make him feel welcome. As a result of this intervention by the psychologist, their attitudes positively changed towards Adam, and Adam's social experience in school improved. Adam's well-being increased; he felt accepted by his peers, and he no longer felt isolated. This example shows how raising awareness plays a critical role in understanding and accepting students with labels within mainstream school settings.

In contrast to this narrative, Terzi (2005) argued that identifying disabled students based on labels and categories seems less useful; rather, it is essential to focus and address specific individuals' abilities and needs. In alignment with this perspective, Thomas and Loxley (2001) stressed that even though it is crucial to individualise teaching, develop interventional approaches, choose learning approaches, and recognise individual differences and needs, this does not require labelling and categorising students; disabled students can be supported and included without relying specifically on labels. Furthermore, Norwich (2008a) suggested that instead of labelling students, teachers should be able to act as assessors to determine the appropriate support and intervention to suit each of their disabled students. Indeed, Norwich's (2008a) suggestion advocates for the use of teacher self-reflection methods to

accommodate the needs of each child, select types of support, and understand their individual differences.

It is apparent that the perspectives of Terzi (2005), Norwich (2008a), and Thomas and Loxley (2001) are likely to support the capability approach, which considers the ability of each student and individual support instead of primarily focusing on labels and classification. In fact, use of this approach results in moving from a medical perspective to a more social and inclusive perspective; this approach avoids heavy reliance on labels and is intended to enhance interaction in a more inclusive environment (Demetriou, 2022). Regarding inclusion, Connor and Valle (2015) stated that inclusion is a fundamental right of disabled students throughout their education; they should be included in the same mainstream classroom and educational environment as others without disability, regardless of their academic level, abilities, and performance. More specifically, the main aim of various legislative measures on disability is to ensure that disabled individuals have equal opportunities to access education and supportive resources in mainstream schools (Demetriou, 2022). Demetriou, (2022) further stipulated that inclusion itself is not enough; teachers also need to be professionally trained and equipped with the skills to be able to adjust their teaching methods, apply various strategies, and provide useful accommodations to help disabled students improve, succeed, and have the same opportunities for learning as others.

To extend the earlier discussions of labelling, it is also important to introduce insights from a social constructionist perspective. According to Dray (2008), disability is socially constructed through the way society creates limits and expectations. People are often labelled as “disabled” not only because of their condition, but because social barriers make it difficult for them to participate fully. In this view, it is the environment that fails to accommodate difference. The label is therefore not fixed or objective, but shaped by social rules rather than by nature. Dray (2008) also argues that public institutions play a key role in deciding who is labelled “disabled.” These institutions apply narrow standards of how individuals should work, learn, or

behave. As a result, labelling becomes not just a social act but a structural one that shapes how individuals are perceived and treated.

Building on this, Goffman (1986) shows how labels deeply affect a person's identity. From a social constructionist perspective, labels like "disabled" are not neutral or natural; they are produced through social interaction and can shape how individuals see themselves and how others treat them. Once someone is labelled, this label can become the main lens through which they are viewed, often overshadowing other aspects of their personality or abilities. Goffman refers to this as stigma, describing it as a process by which individuals are discredited and reduced to a single, negatively viewed trait that spoils their social identity (Goffman, 1986). Over time, the individual may internalise this identity, a process that disabled feminist scholars have described as psycho-emotional disablism, when societal prejudice and discrimination affect the emotional well-being and self-perception of disabled people (Thomas, 1999). Goffman also highlights the role of institutions in reinforcing labels, particularly through training and segregation. For example, he describes how a blind person may be trained only to perform simple tasks and kept separate from sighted people, which restricts personal freedom and reinforces the social meaning of the label (Goffman, 1986). Together, these ideas show how stigma is socially constructed and maintained, linking labelling theory with feminist disability perspectives.

Söder (1989) supports this interpretation by using symbolic interactionism, which explains how we understand the world through shared social meanings. He argues that disability is not simply something a person has; it is something that is socially constructed through language, beliefs, and cultural expectations. Labels influence how people view themselves and how they are treated by others. Once someone is categorised as disabled, all their characteristics may be interpreted through that label, which can "freeze" their identity (Söder, 1989). This effect becomes even stronger in institutions, where people with the same label are classified and grouped together and treated according to stereotypes. For Söder (1989), disability is not just a medical condition, it is a product of how society defines and responds to difference.

Together, these perspectives show that, from a social constructionist point of view, labelling is a powerful process that shapes how people live, relate to others, and understand themselves. It is not simply about naming a condition; it involves deep social meanings tied to identity, stigma, and institutional control.

From all the debate in the academic literature from several perspectives including education, cultural studies, psychology, and disability studies, it is clear that there can never be a clear consensus regarding categorisation and labelling of disabled students in education; there are simply too many factors to consider regarding the necessity and effectiveness of categorisation and labelling, particularly in educational settings. As a result, it is essential to acknowledge and make use of the advantages that can arise from both sides of the debate (Demetriou, 2022). In other words, there should be a balance regarding labelling and categorizing students. Specifically, negative labels must be avoided in situations where they could (1) harm a student's self-esteem and friendships or (2) lead to societal stigma and exclusion; alternatively, the use of positive and careful identification and labelling can be a part of building a positive and inclusive learning environment that values student individuality and supports the needs and the rights of disabled students in mainstream classrooms and education (Norwich, 2008b; Demetriou, 2022).

One valuable approach that can facilitate the inclusion of disabled students in mainstream classrooms is the use of assistive technology (hereby AT). According to Rahamin (2004) and Kirby (2017), AT is a beneficial tool and could be the best resource for supporting disabled students, eliminating or minimising their learning difficulties, and reducing marginalization and negative attitudes. AT also allows for differentiated teaching, frequent assessment of development, enhanced cognitive access, and facilitation of a more accessible mainstream classroom and educational environment for disabled students alongside their nondisabled peers (Alkahtani, 2013; Al-Dababneh and Al-Zboon, 2022).

It is also important to consider the use of labels when comparing the special education approach, meaning disabled students are segregated, versus the inclusive approach of teaching disabled and nondisabled students together (Demetriou, 2022). Perhaps unexpectedly, labels can be useful in inclusive education to provide valuable information for the support of students. Based on earlier collaborative work done by many professionals from a variety of disciplines (Friend, 2018), Demetriou (2022) determined that the key point is to see and understand individuals, including all their unique abilities and qualities, without relying completely on the use of labels and categories. Hence, the information gleaned from labels needs to be used thoughtfully, selectively, and for intended purposes to avoid the labels becoming a defining characteristic of the students, overused, or misused. Instead, these terms can help teachers foster support and strengthen their classroom culture, which then creates an inclusive environment that celebrates diversity and success for all students. As suggested by Hodge (2016, p. 114), "labels should be kept within locked drawers, only to be removed in necessity, with care and the certainty that this is in the best interests of the child." Most importantly, as Gillman et al. (2000, p. 407) mentioned, ideally categorisation "opens and not closes doors and creates opportunities for the person concerned." Furthermore, it is essential to replace the 'hard and strong' language and traditional categorisation of disability with a universal recognition that each student is unique and has their own characteristics, strengths, and needs. The disability language and terms should be free of norms, stereotypes, and words that could lead to stigma, low self-esteem, and exclusion (Demetriou, 2022). As part of this, Lauchlan and Boyle (2007) argued that involving disabled people and their families in the decision-making process before officially assigning a label is critical, so they have the opportunity to accept or reject a label that could have a great effect on their child's well-being.

As a final note regarding labelling and categorisation, it is worth mentioning one more perspective on how best to address the challenges of labelling. Indeed, despite not being easy to implement, it is possible to use labelling to create an interactive and inclusive learning

environment for all, including disabled students. In fact, without some changes, societal attitudes cannot evolve and the exclusion of disabled people will continue (Demetriou, 2022). Legislation and policy development related to special education and the categorisation of students can address these issues, albeit with pragmatic difficulties. According to Fiala-Butora and Stein (2016), special education laws and policies have the power to create and determine the language of disability, which can thereby influence individual awareness and societal attitudes towards disabled individuals. Therefore, it is important for lawmakers and policymakers to include disabled individuals in their work to better reflect their actual needs and interests. Without the direct involvement of the people most dramatically affected by law and policy changes, the laws and policies might continue to primarily serve administrative or economic interests and provide only minimal benefits for disabled people (Demetriou, 2022).

3.6 Chapter Summary

This chapter includes a broad review of the academic literature on disability and related themes to produce well-informed research based on the most relevant and up-to-date knowledge in these areas. Disability is a complex concept influenced and shaped by many different factors, such as social attitudes, environmental accessibility, and health conditions. Disability has also been viewed and recognised from different points of view, such as philosophy, sociology, political science, law, and special education.

In this first part of the literature review, the theme of discussion was related to the disability phenomenon and its complexity. Significant interest exists in disability research and is still growing significantly, both as a standalone area of study and across various academic disciplines (Grönvik, 2009). Indeed, this literature review required several sections to cover the major issues related to disability, and each section was supported by comprehensive discussions and examples. It started with one of the main themes related to my research focus: the conceptualisation of disability. The different understandings and definitions discussed in this chapter highlight the complexity of the concept of disability; however, the

specific focus was on the WHO's legal definition of 1980 and the revised version of 2001 as well as a brief mention of the WHO's World Report on Disability (2001), as these definitions have been globally recognised as foundations for international standards and the language of disability. To clarify, the initial WHO definition (1980) focused mainly on medical issues and understanding disability as an individual problem, whereas its evolution (WHO, 2001) reconsidered disability in the context of both medical and social models. This shift shows how the perception of disability as a personal 'problem' and health condition has changed to a broader consideration and understanding of the other societal and environmental factors that affect disabled individuals' lives and experiences, which highlights and reflects the importance of enhancing the rights, participation, empowerment, and inclusion of disabled individuals in society. An influential document and resource, The WHO Report on Disability (2011) provides a clear, extensive overview of the global state of disability to improve the lives of people with disabilities, emphasising disability rights, promoting equality, and inclusive development worldwide.

A deeper examination of the medical and social models of disabilities was undertaken to provide a comprehensive understanding of disability from different approaches, as this also helped contextualize the frameworks of disability language that are used to refer to and describe disabled individuals. The detailed examination of these models naturally led to the need to contrast them to underscore their distinct viewpoints and their unique contributions to disability language and inclusive approaches to disability. Following that, the significant controversy surrounding person-first language versus disability-first language was reviewed, including an examination of the question of whether it is necessary and helpful to use these language approaches and label disabled students based on different categories, especially in educational settings. Finally, this chapter concluded that labelling and categorising disabled students can have both positive and negative implications, as it facilitates support while also creating stigma and limiting opportunities; therefore, it is essential to use labels and categories with careful consideration and a mindful attitude to ensure fairness and acknowledge the unique needs and abilities of each student.

Chapter Four: Literature Review

Part Two: Understanding Beliefs, Attitudes, and Knowledge About Assistive Technology

4.0 Introduction

In part one of this literature review, I discussed the phenomenon and complex nature of disability, including a comprehensive discussion of multiple definitions, perspectives, and debates of disability concept. Furthermore, a comprehensive description of the medical and social models of disabilities was discussed, which followed by the discussion of medical versus social models of disability to highlight the fundamental differences and perspectives in how disability is understood. Furthermore, I covered the different terminologies and languages that are used to describe disabled students and how these have evolved over time to reflect the modern change in perspective and understanding of the concept of disability. Finally, part one included a broad review of the literature on the complexity of labelling in education, focusing on the challenges and opportunities in order to produce well-informed research based on the most relevant and up-to-date knowledge in these fields.

In this section of the literature review, different concepts, themes, definitions, controversies, and historical developments relevant to the beliefs, attitudes, and knowledge of assistive technology (AT) will be introduced and discussed comprehensively to synthesise the existing knowledge and perspectives that exist in the academic literature. Six different areas of focus have been identified, starting with a discussion of the complexities underlying three broad concepts of belief, attitude, and knowledge, including an analysis of these concepts influence on individual perceptions, decision making and behaviours more broadly, through a combination of education, experience, cognitive processes, and personal values. Then, the focus turns to examining the specific ways in which the power of attitudes shapes individual perspectives, focusing particularly on teachers by drawing upon insights from interdisciplinary fields such as education, psychology and mathematics.

The second section/part of this chapter then moves to explore the more specific significance of teachers' attitudes towards the integration of AT education. Factors impacting on teachers' attitudes can include the teachers' attitudes towards technology and the teachers' knowledge and abilities regarding the use of technology. Ultimately, the literature reveals that teachers' attitudes, abilities, and beliefs impact their use of AT in their classrooms and teaching practices. Following that, various conceptualizations and perspectives regarding AT will be introduced, with the aim of reaching a deeper understanding of the diverse viewpoints underlying the complexities of this field. Then, this chapter includes an overview of the history of AT policies and regulations. This aspect is crucial to review in order to bring to light the important contributions and significance of legislative frameworks in the promotion of accessibility and the concept of inclusive education for disabled students. The literature review concludes with a review of videoconferencing tools and their significant role in education and communication. These tools offer flexibility and promote accessibility, equal opportunity, and inclusivity for disabled students, which was especially consequential during the COVID-19 pandemic and its ensuing requirement for online education.

4.1 The Complex Concepts of Belief, Attitude, and Knowledge

This section will explore how belief, attitude, and knowledge interact, shaping our perceptions and guiding our actions and responses. The terms "belief," "attitude," and "knowledge" are equally significant terms in social science that need to be individually defined, explained, and understood. According to Aminrad (2013), social science researchers believe that knowledge and attitude are linked to each other, whereas attitude is more closely connected to behaviour. Despite the similarities and overlap among the definitions and usages of these terms, especially in common parlance, it is important to make distinctions among them to clarify and more deeply understand their complexity and interaction.

In the academic literature, various perspectives and understandings of the concepts of belief, attitude and knowledge exist. In fact, the terms “attitudes” and “beliefs” and the concepts of “belief” and “knowledge” are sometimes used synonymously and interchangeably, even though this is incorrect (Oskamp and Schultz, 2005; Southerland et al., 2001). Indeed, the relationship among these three concepts is complicated and, in the field of social science, is considered a complex network of interaction. In other words, these concepts, while distinct, are interconnected and can influence and shape an individual's understanding of and responses to situations and objects (Furinghetti and Pehkonen, 2002). Therefore, the concepts of belief, attitude, and knowledge are prominent in the academic literature.

Early in the research into these concepts, Rosenberg and Hovland (1960) described beliefs as the collection of a person's ideas and thoughts. According to Abelson (1979), a notable interest in understanding beliefs emerged in the 1970s, driven by interdisciplinary scholars in various fields, including psychology, and neuroscience. According to Rokeach (1968), the concept of belief cannot be directly observed but is generally perceived as representing an individual's mindset; therefore, a person's beliefs shape their attitudes or orientations towards specific ideas or thoughts. Later, Fishbein and Azjen (1997, p. 131) defined belief as “the subjective probability of a relation between the object of the belief and some other value, concept or attribute”. Fishbein and Azjen (1997, p. 135) further indicate that “a person's beliefs represent the information he has about himself and his social and physical environment”. Therefore, according to these definitions, the concept of beliefs can be seen as ideas that individuals create about an object or situation that can be either true or false. To articulate, beliefs in this context reflect the cognitive aspect that shapes individual thoughts, ideas, and knowledge towards objects and situations. Hence, the crux is that beliefs are ideas held by individuals that are shaped and influenced by individual experiences and surroundings. Furthermore, according to this perspective, a close connection can be seen between beliefs and attitudes. Indeed, even though it has been established that beliefs cannot be directly

observed, they undoubtedly contribute to the formation of attitudes and impact the individual behaviours, actions, expressions, and choices that play a role in shaping our attitudes.

A different perspective on understanding beliefs, according to Underhill (1988), beliefs are a type of attitude. In an article in the field of mathematics education, Laster et al. (1989, p. 77) expanded on that by explaining that “beliefs constitute the individual’s subjective knowledge about self, mathematics, problem solving, and the topics dealt with in problem statements”. From this perspective, beliefs are seen as an integral part of individual knowledge and attitudes. In other words, beliefs are not just fact-based knowledge, but rather are seen as subjective perspectives and attitudes that influence individuals to engage and react in specific situations. Therefore, this reflects and suggests that beliefs are also linked to the affective or emotional aspects of individuals and our attitudinal responses. In other words, the interconnection between the cognitive and affective dimensions of individuality highlights the association between cognitive representations and involuntary physical responses, reflecting how we think, feel, and interact in different situations and influencing our overall attitudes and responses.

In accordance with the above, according to Furinghetti and Pehkonen (2002), beliefs can be viewed and understood in different aspects, such as cognitive (knowledge) or affective (emotional and attitudinal) dimensions. They suggested that beliefs should be considered as part of how an individual can organise and process information. In other words, if a connection is made between beliefs and knowledge, the term “beliefs” is meant to indicate the cognitive structure and component of individuals; however, if the term “beliefs” is treated as reactions towards specific objects and situations, the beliefs are more aligned with the affective and emotional aspects of the individual. In line with Furinghetti and Pehkonen (2002), Zimbardo and Leippe (1991) also emphasised these two aspects of belief. They stated that the cognitive aspect encompasses beliefs and knowledge about an object or situation, while the affective

aspect includes the feelings and emotions that reflect individuals' attitudes through observable physiological reactions or responses.

Adding to these ideas, other researchers view beliefs and attitudes as two contrasting aspects. For instance, in the field of mathematics education, Bassarear (1989) held a view of beliefs that focuses on individual thoughts, understanding, and perceptions of the nature of problem solving and the learning process of mathematics; in contrast, he stated that attitudes are more concerned with an individual's predisposition and behaviour to respond in a specific way.

Returning to the concept of knowledge as it relates to beliefs, the literature shows a close connection (Furinghetti and Pehkonen, 2002). As mentioned earlier, beliefs are part of an individual's subjective knowledge that includes a set of ideas and information that they hold based on their personal experiences and understanding. Building on this, Furinghetti and Pehkonen (2002) described two types of knowledge: objective (official) knowledge and subjective (personal) knowledge. The term "objective knowledge" refers to knowledge that is acknowledged and accepted by the society or community, whereas the term "subjective knowledge" describes the knowledge that is constructed by and belongs to an individual. Therefore, the beliefs that belong to an individual's subjective knowledge might be true or false. Accordingly, beliefs, being cognitive reflections, encapsulate the set of ideas that individuals hold to be true or false, thereby highlighting the complicated interplay between knowledge and beliefs. Indeed, any distinctions made between knowledge and belief are inherently complex and difficult to distinguish. To demonstrate, the philosophical perspective famously articulated by Plato posits that "knowledge is justified true belief" (McDowell, 1987, p. 94). Indeed, this statement provides a framework for understanding knowledge, as it emphasises that knowledge is simply beliefs that meet the specific three criteria of being true, justified, and believed by the individual. To clarify, it identifies beliefs as the core of knowledge and posits that in order to form true knowledge, a belief must be true, the belief must be

justified by evidence or reasons, and the individual must believe it to be true. This philosophical perspective is pivotal in the field of epistemology because it helps distinguish between what is considered belief (or opinion) and what can be considered knowledge based on specific criteria and standards.

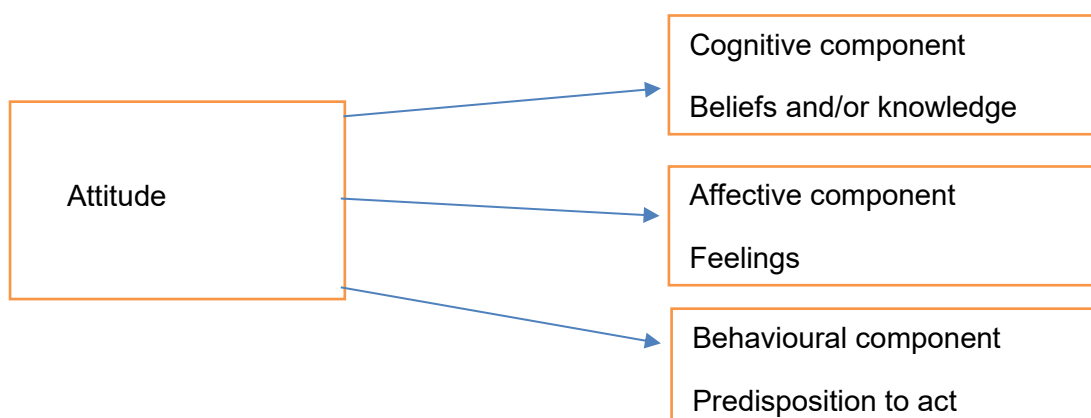
In contrast to Plato's philosophical perspective and the definition of knowledge as justified true beliefs, educational psychology offers another perspective. In this field, researchers work to construct explicit definitions of knowledge and beliefs despite the inherent overlap of these two terms. For instance, Alexander et al. (1991, p. 317) defined knowledge as "an individual's personal stock of information, skills, experiences, beliefs and memories". They further indicated that "knowledge encompasses all that a person knows or believes to be true, whether or not it is verified as true in some sort of objective or external way" (p. 317). Therefore, according to this definition, knowledge is more than just a collection of justified true beliefs; rather, knowledge in this context is a broad concept and category that includes various aspects such as skills, memories, information, experiences, and beliefs that are viewed as a component of the individual's overall knowledge base, regardless of whether they have been objectively verified or not. This definition seems to diminish the distinctions made earlier between knowledge and beliefs; nevertheless, some educational psychologists have viewed knowledge and beliefs as having overlapping dimensions (Alexander and Dochy, 1995). This means that knowledge can be described as needing justification and emanating from factual information that is formed as a result of the learning process of individuals and their formal experiences, whereas beliefs can be understood as subjective, including personal feelings as well as everyday experiences (Alexander and Dochy, 1995).

It is essential to recognise the complex nature of beliefs and their involvement in both the cognitive and affective dimensions of individuality. When conducting research that relates to understanding beliefs, it is important to recognise that beliefs can include both a cognitive factor that involves accepting or rejecting propositions and an affective factor that shapes the

acceptance or rejection of certain beliefs. In addition, when dealing with beliefs in terms of their overlap with knowledge, it is essential to keep in mind both objective and subjective types of knowledge and to recognise that beliefs belong to an individual's subjective knowledge.

As mentioned earlier, even though beliefs, attitudes, and knowledge are separate concepts, they are undoubtedly interconnected and influence each other (Rokeach, 1968). To elucidate, according to Matteson et al. (2016), each belief that exists within an attitude is composed and influenced by three main components: cognitive, affective, and behavioural. These three components are explained by the attitude model put forth in the social psychology research of Eagly and Chaiken (1993) (Figure 4-1). In brief, the cognitive component refers to the knowledge and beliefs that an individual holds towards the attitude's object or situation, the affective component refers to the individual's feelings and emotions, and the behavioural component refers to the individual's actions towards the attitude's object. The key concept to extract from the research of Eagly and Chaiken (1993) is that recognizing the interplay of these three components is essential to gain a complete understanding of an individual's comprehensive experience, as well as to create a more extensive perspective that combines rational, emotional, and active factors, responses, and experiences. However, individuals' attitudes can be shaped based on one or two components, and they might have beliefs about certain objects but might not reveal observable reactions (Eagly and Chaiken, 1993). In this study, the attitude object is the conceptualisation of and work with disabled students.

Figure 4-1 The concept of attitude and its three components



Information adapted from Boer et al. (2011)

To give an overview based on the complex and various but linked perspectives presented above regarding beliefs, attitudes, and knowledge, it is clear that some researchers consider beliefs to be part of cognitive processing and knowledge, while other researchers acknowledge that beliefs represent some affective component of attitude (McLeod, 1989; 1992). This comprehensive analysis of these three concepts reveals that beliefs are a way of understanding how things work based on the information that individuals have, and it is clear that beliefs, attitudes, and knowledge as complex concepts underscore the depth and richness of human experience and thought. Furthermore, the concepts of beliefs and knowledge, which have been subject to critical attention in psychology research, are two essential aspects that are inherently difficult to clearly define, and their relationship is recognised as complex and intertwined. Therefore, being aware of their complexities and overlapping natures is critical for navigating complex social interactions, building relationships, and fostering critical thinking. While this section has focused primarily on beliefs and knowledge, an in-depth analysis of the attitude component is provided below.

4.2 The Power of Attitudes in Shaping Perspectives

For a complete analysis of the three overlapping concepts of belief, attitude, and knowledge, a deeper look into the concept of attitude is necessary. The concept of attitude is considered a core concept of social psychology and one of the most active areas of research in the field (Bohner and Dickel, 2011). Early scholars, such as Thomas and Znaniecki (1918), defined and recognised social psychology as the main scientific study of attitudes (Schwarz and Bohner, 2001). Jung (1923) defined the term “attitude” in his writings about psychological types as a readiness to respond. Jung’s definition was later integrated into the work of Gordon Allport (Albarracin and Shavitt, 2018). In 1954, Allport, a pioneering psychologist in the study of attitudes, noted that “this concept is probably the most distinctive and indispensable concept in contemporary American social psychology” (Allport, 1954, p. 43). Attitudes are thought to

be formed by a variety of factors, including education, experience, culture, and traditions (Alhudaithi, 2015).

However, social psychologists are not the only scientists who study attitudes; rather, attitude is an interdisciplinary concept studied by sociologists, political scientists, communication researchers, and psychologists, among others (Oskamp and Schultz, 2005). For example, among several terms associated with the concepts of beliefs, attitudes, and knowledge, the term “attitude” is commonly found in the psychological research literature. There are two main types of attitudes that are discussed: explicit attitudes and implicit attitudes. An explicit attitude refers to one that individuals are aware of, can easily articulate, and can self-report. An example of an explicit attitude is one that can be ascertained via a market research survey. This type of survey may ask people to try two products to gather information based on the feedback they provide on which they like better and the reasons behind their choice. In this example, the individuals are aware of making a choice and can explain their decision. In contrast, an implicit attitude is one that individuals may either not be aware of or may have difficulty articulating. For instance, in a situation where an individual is asked to make a quick response to a question, their response will indicate their positive or negative attitude towards the issue (Thompson, 2021).

While psychological definitions of beliefs, knowledge, and attitudes provide a useful foundation, they often focus mainly on internal processes within individuals. However, such definitions may not fully capture how these concepts are influenced by the broader social and cultural environment in which people live, which can limit our understanding because beliefs and attitudes are not fixed mental states; rather, they can change depending on cultural meanings and social expectations attached to different situations. Therefore, Matsumoto (2007) shows the importance of considering the role of context, such as culture, ideology, and social roles, in shaping cognitive (thinking), affective (feeling), and behavioural (acting) aspects of these constructs. He argues that human behaviour results from the interaction of three main sources: basic human nature shared by all people, culture through socially defined

roles, and personality through individual identities. Crucially, he explains that situational context determines how much each source influences behaviour at any given time. For example, how a person thinks, feels, or acts can differ depending on cultural expectations in a specific situation. Matsumoto (2007, p. 1286) states, “individual behaviour is the product of the interaction between culturally dependent social roles and individually different role identities.” This shows that beliefs, knowledge, and attitudes are shaped not only by psychological factors but also by cultural and social contexts. Such a perspective helps address contradictions found in cross-cultural studies and highlights the limitations of psychological definitions that ignore the role of culture and context.

Building on this, Markus and Kitayama (1991) further illustrate how cultural context shapes the way people understand themselves and interact with others. They describe two main cultural patterns of self: the independent self, common in individualistic cultures, and the interdependent self, often found in collectivist cultures. In individualistic contexts, people are more likely to see themselves as separate from others, which shapes their beliefs and attitudes to focus on personal goals, internal thoughts, and self-expression. In contrast, in collectivist cultures, people tend to see themselves as connected with others, leading them to form attitudes and behaviours based on social harmony and group expectations. These cultural differences influence how emotions are felt and expressed, how people think about knowledge, and how they behave in different situations. This shows that the affective, cognitive, and behavioural aspects of beliefs and attitudes are deeply shaped by cultural values, and again highlights the limitations of definitions that ignore the role of social context.

Additionally, due to its complexity, the concept of attitude has been defined in various ways and from different points of view in the academic literature (Njiku et al., 2019), and no universal definition can be agreed upon. For instance, according to Rajecki (1982), attitude includes desires, feelings, views, opinions, beliefs, hopes, judgments, and sentiments. Furthermore, Bohner and Dickel (2011) described attitude as “an evaluation of an object of thoughts,” in which “attitude objects comprise of anything a person may hold in mind, ranging from

mundane to abstract, including things, people, groups, and ideas” (p. 392). In simpler terms, attitudes have been described as “likes and dislikes” of objects (Bem, 1970, p. 14). Similarly, Maio and Olson (2003, p. 299) defined attitudes as “tendencies to evaluate objects favourably or unfavourably”. However, the most inclusive and comprehensive definition that seeks to demonstrate individuals’ feelings and thoughts towards a wide range of aspects of the social world, including objects, ideas, people and issues, is the definition of attitude put forth by Baron and Byrne (2000). They conceptualized attitude as “our evaluations of virtually any aspect of the social world, the extent to which we have favourable or unfavourable reactions to issues, ideas, persons, social groups, objects, any and every element of the social world” (p. 118).

This sweeping variety in how attitude is defined highlights and acknowledges the complexity of the concept based on the diverse factors that can influence attitudes and their diverse natures. However, the most common understanding that can be extracted from all of these definitions is that attitudes are a mental set that involves a cognitive process in assessing and forming responses and opinions about individuals, objects and situations.

Summarising the above considerations, a broad and comprehensive definition of attitude has been chosen for the purpose of this study, namely that of Gall et al. (1996, p. 273), which states that “an attitude is an individual’s viewpoint or disposition towards a particular ‘object’ (a person, a thing, an idea, etc.)”. Indeed, this definition captures and emphasises the essential aspects of attitudes that include the personal opinions, general inclinations and tendencies, and thoughts of individuals. In other words, it inherently includes the cognitive, affective, and behavioural components of attitudes.

According to Rokeach (1968), teachers’ beliefs and attitudes are typically inferred from their words, actions, and intentions; therefore, it is essential to examine all three aspects to gain an accurate and clear representation of their beliefs. Furthermore, for the context of this study in particular, the teachers’ beliefs, attitudes, and knowledge towards the use of AT in teaching

disabled students are examined and analysed based on the full complement of cognitive, affective, and behavioural components. Even though direct observation of the teachers in their classrooms was not possible due to the COVID-19 pandemic, it was still possible to examine and analyse the behavioural component of the teachers' beliefs, attitudes, and knowledge towards the use of AT in their teaching. In this research, the teachers' feelings, descriptions, examples, and discussions based on common behaviours towards the use and integration of AT, especially during and after the COVID-19 pandemic, still provided valuable insights into the teachers' positive attitudes towards the use of AT in teaching.

As a final point in this section, despite the diverse points of view on attitudes that exist, it is obvious that there is an overarching consensus regarding the connection between attitudes and beliefs. It is understood that beliefs and attitudes are related and interconnected, but they are not synonymous. Thus, while attitude is represented as broad feelings or preferences towards an object or situation, a belief is narrower in scope and includes more detailed thoughts about a particular aspect (Oskamp and Schultz, 2005). Overall, taking everything into consideration, attitudes, beliefs, and knowledge are all three essential concepts that play a critical role in shaping an individual's understanding, interpretation, and interaction with an object, situation, or the world around them. Having a clear vision of the different perspectives and the interplay between the notions of belief, attitude, and knowledge, the next essential step in this literature review is to seek further understanding of teachers' attitudes towards the integration of AT into their teaching.

4.3 Teachers' Attitudes on the Use of AT

Broad research and considerable attention and interest were given to the question of attitudes in teaching practice between the 1950s and the 1970s (Richardson, 1996). In the educational sector, teachers' positive attitudes are essential for effective and successful teaching practices (Stronge, 2002). In other words, attitudes and beliefs are important elements that can influence and guide teachers' actions and behaviours in their classroom teaching methods. According

to Al-Husain (2010), attitude is an important part of a teacher's personality; as it is strengthened by emotion and influenced by the cultural and social environment in which teachers live and work, and these factors differ for each individual, it is normal that attitude also varies from teacher to teacher. This definition underscores the critical role of teachers' attitudes and acknowledges their influence via a combination of internal elements, such as individual personality characteristics, and external elements that represent environmental and cultural influences.

The successful use of technology in the teaching process and classroom instruction depends heavily on teachers' attitudes (Chiu and Churchill, 2015). Hence, teachers' attitudes towards technology are clearly a critical factor that impacts their use of technology. In fact, according to Kumar (2008) and Afshari et al. (2013), the successful integration of technology into education and a curriculum depends on three main factors that are all related to the teacher, namely their knowledge, skills, and attitude towards technology. In the context of this research, the phrase "technology integration" refers to the use of various types of technology, such as computers, data projectors, videoconferencing software, the internet, learning management systems, presentation software, and social media, for both instructional activities and course management (Motshegwe and Batane, 2015).

Michaels and McDermott (2003, p. 29) pointed out that researchers are "almost universally in agreement that the success of students with disabilities with AT is related directly to the AT knowledge, skills, and dispositions of special education teachers". Therefore, exploring teachers' perspectives can lead to enhanced teaching practices and improved learning experiences for students. It can also help teachers to overcome difficulties, acquire and develop new skills, and build experiences (Tony, 2019). Teachers clearly have a fundamental role in integrating AT into their teaching practice. According to Singh and Chan (2014), the integration of technology into education has brought about considerable attention and changes in the educational process and in the learning experiences of disabled students, helping them to develop academic and independent learning skills.

As it is clear that the success of applying AT in the teaching process for disabled students depends on a combination of teachers' attitudes, knowledge, and skills, it is vital to further elucidate the details of these factors. The following sections provide a comprehensive exploration of teachers' opinions about the integration of AT in their classrooms.

4.3.1 The Influence of Attitude on AT Integration in the Classroom

In education, a positive attitude towards teaching is seen as a critical component for effective teaching and positive classroom management (Stronge, 2002), which is confirmed by the growing body of literature exploring teachers' attitudes towards technology integration. As examples, Khlaif (2018) describes a clear and meaningful connection between teachers' attitudes and technology integration. Albirini (2006) claims that teachers holding a prior positive attitude is a key factor with regards to technology use, and Kessler (2007) determined that the independent use of technology depends primarily on teachers' attitudes towards technology. Furthermore, Blackwell et al. (2014) conducted a survey of over 1200 early childhood teachers to explore their attitudes towards the value of technology in supporting students' learning, and the results showed that teachers' positive attitudes, influenced by their personal beliefs, had a strong impact on their use of technology in the classroom. Regarding specific devices, Cumming et al. (2014) found that teachers have a generally positive attitude towards the use of iPads because they could see that the devices positively affected students' attention and learning achievement. Similarly, Al-Zaidiyeen et al. (2010) determined that teachers' attitudes towards information and communication technologies had a direct influence on their use of these technologies for educational goals. Likewise, Akbaba (2013) examined the attitudes of history teachers towards using technology as part of their teaching materials and found a positive correlation between teachers' attitudes and technology integration.

However, not all researchers have come to the same conclusions. The research by Gray et al. (2010) found that despite increased access to computers and other digital technology, the actual use of technology by teachers in the classroom remained infrequent and limited. Ertmer et al. (1999), Parette et al. (2010), and Wachira and Keengwe (2010), showing similar results, explained the possible reasons for this infrequent use of technology as a lack of professional development, such as training and support, lack of access to technology, limited time to learn the use of technology, and, most significantly, teachers' negative beliefs and attitudes towards technology integration. Some researchers have posited that, despite access to technology and the increase in the availability of professional development in this area, teachers still fail to effectively integrate and use technology in their teaching environment (Ertmer et al., 1999; Zhao et al., 2002; Ertmer et al., 2012).

Based on the breadth of the research, it is clear that teachers' attitudes and perspectives are among the most successful predictors of technology integration. Thus, building positive attitudes leads to the success of technology integration, which in turn helps to create a supportive and encouraging educational environment to enhance disabled students' growth and learning experiences and to impact their overall education.

4.3.2 The Influence of Knowledge and Skills on AT Integration in the Classroom

In addition to the influence of a teacher's attitude on technology integration, a teacher's knowledge and skills are equally important factors in the successful adoption of technology into education and a curriculum. In other words, a teacher's knowledge of what, how, and why technology is used contributes to the success of integrating technology into their teaching practice (Spiteri and Chang Rundgren, 2020). To clarify, the meaning of knowledge and skills in this context refers particularly to technological knowledge and abilities. According to Aesaert et al. (2013), academic research distinguishes between traditional curricular knowledge and

technological curricular knowledge, with the understanding that technological curricular knowledge is more complicated and varied and requires teachers to be creative and innovative to use technology in their subject area. To clarify, in the modern era of education, traditional curricular knowledge by itself is not enough; instead, teachers also need to be highly skilled and expand their knowledge to effectively integrate technology into the different teaching methods and subject areas of the classroom (Spiteri and Chang Rundgren, 2020). Further research findings have shown that teachers are required to acquire technological knowledge and skills to successfully integrate AT into their teaching environment, with the goal of making appropriate improvements in students' learning and outcomes (Hutchison et al., 2012; Edyburn, 2013). Furthermore, according to Cennamo et al. (2013), teachers need to have knowledge that enables them to initially identify the specific technologies and tools that support their curricular goals, be aware of how these tools can be used to meet the student's specific needs and support students in their own use of learning technologies, and select the most appropriate technologies for their professional practice and growth. As asserted by Lawless and Pellegrino (2007), "technological literacy has fast become one of the basic skills of teaching" (p. 580). Teachers need to know how to use technology to plan lessons and facilitate the learning of their disabled students, and they also need to be able to assess the impact of technology on their students' learning. Likewise, teachers' knowledge of technology helps them create and develop lesson plans with different resources and strategies to support, inspire, and improve students' learning (Wake and Whittingham, 2013).

Teachers can gain this technological knowledge through various resources and training programs, such as workshops, courses, online communities, self-learning, professional development programs, and institutional support (Ertmer et al., 2010). This training is essential, as a lack of these technological skills can influence teachers' confidence levels and prevent the integration of technology, which then negatively impacts their disabled students' learning (Hew and Brush, 2007). Similarly, teachers' technological skills need to be supported within their school system through an administrative emphasis on the importance of

educational technology integration, as well as through formal and informal teacher collaboration and communication (Petko et al., 2018). Borko and Putnam (1995) reached the same conclusion; recognizing that teacher knowledge has a significant effect on attitudes towards technology integration, they stated, “to help teachers change their practice, we must help them to expand and elaborate their knowledge systems” (p. 37).

Looking at the influencing factor of teacher knowledge from a different angle, teachers’ knowledge can be conceptualized according to Shulman’s (1986) technological, pedagogical, and content knowledge (TPACK) framework, which describes different types of teacher knowledge and the use of technology for teaching purposes. In brief, this framework helps teachers integrate technology effectively into their teaching practice by taking into consideration the interactions among these three types of knowledge (Santos and Castro, 2021). The TPACK framework is explained and described in detail in Chapter Seven of this thesis.

Continuing on the same theme, Petko et al. (2018) also reported that teachers’ integration of technology into their teaching practice depends on having sufficient knowledge and skills. Having sufficient technological skills ensures their ability to identify the right tools to be used for disabled students, act as innovators, successfully create new approaches, and contribute to positive changes in the teaching and learning process. However, several researchers have pointed out that many special education teachers still do not have enough familiarity and training in AT in order to adopt it effectively in their classroom and teaching environment, which can negatively impact their students’ academic achievement (Ault et al., 2013; Flanagan et al., 2013; Abed, 2018). Abed (2018) interviewed 20 teachers to investigate their use of AT computer systems with students with learning disabilities; the findings showed that teachers were able to use the computers, but they needed more training in AT to integrate multiple AT approaches and meet each individual student’s needs. Similarly, a study conducted by Flanagan et al. (2013) used a quantitative method to examine middle school special education

teachers' perceptions, effectiveness, and use of AT for literacy instruction with disabled students. The study determined that teachers recognised AT as an effective tool for literacy, but they used it minimally due to insufficient knowledge and lack of training or experience. Another factor revealed by Ertmer et al. (2012) is that there is a strong connection between the duration of a teacher's experience and their use of AT, meaning that the longer teachers have been teaching, the less likely they are to be comfortable with newer technologies and adapting their time-tested lesson approaches to new tools.

On the positive side, a considerable amount of existing literature has focused on teachers' knowledge as an important influencing factor that positively impacts their successful use of AT in teaching. For example, according to Giek (2021), teacher knowledge is an essential element that enables and encourages teachers to be competent in using AT. Furthermore, there is a clear and meaningful correlation between teacher knowledge and technology integration. For instance, Atangan et al. (2019) argued that the more knowledge of technology teachers have, the more confident they are with using AT in their teaching. Supporting this, Fernández-Batanero and Lopez (2019) found that younger teachers with less teaching experience tended to be more highly skilled in technological knowledge due to the professional training and broad knowledge of AT they obtained during their pre-service educational programmes. In this regard, Alnahdi (2014) confirmed the significance of preparing and equipping teachers with the training, knowledge, skills, and competencies needed to effectively integrate AT into their teaching and support the diverse learning needs of their disabled students, with the ultimate outcome of teachers gaining broad knowledge and experience using technology for their teaching.

To summarise, these factors of attitude, knowledge, and skills are considered personal factors related to the individual teachers that influence how they approach and actively engage with the use of technology in their teaching. It is apparent that teachers' perspectives towards the use of AT are influenced by variables such as their beliefs, level of training, and familiarity with

AT. Despite some challenging situations, there are no insurmountable obstacles. In fact, the research indicates continued improved use of AT in the future for the benefit of all students. In terms of the needs of disabled students, special education teachers bear the greatest responsibility for organising and adopting AT in their classrooms according to their students' needs and regardless of their disabilities. Since the success of AT in the classroom depends on teachers' perspectives, they need to be highly skilled in this area and be aware of the significance of AT in the teaching process. These critical domains influence not just teachers' use of AT but also the learning and teaching experiences as a whole. Therefore, understanding these factors is crucial, as they shape all aspects of classroom education, including teachers' instructional methods and materials, use of technology, teaching approaches, learning environment, and communication between teachers and students.

In addition to knowledge and skills, some studies have also considered how gender may influence teachers' attitudes toward educational technology.

In addition to the influence of knowledge and skills on AT integration, some studies have also considered how gender may influence teachers' attitudes toward educational technology. Research has shown that male and female teachers may approach technology integration differently. For example, Yuen and Ma (2002) conducted a quantitative study with secondary school teachers in Hong Kong to explore gender differences in teacher computer acceptance. They found that male teachers had more positive attitudes and greater confidence in using computers than female teachers. The study suggested that this may be linked to differences in perceived usefulness and ease of use, which are key factors influencing technology acceptance. It also noted that teacher training in Hong Kong at the time was often brief and did not address the specific needs of different groups. As a result, male teachers may have benefited more if they already had informal or personal experience with computers outside of training. This could help explain why male teachers felt more confident in using technology during that period. In contrast, Almekhlafi et al. (2017) conducted a mixed-methods study with

male and female teachers in elementary schools in the United Arab Emirates to explore gender differences in technology integration among elementary school teachers. They found that female teachers used educational technology more frequently than male teachers. One reason for this was that female teachers regularly used technology in their daily teaching, which helped them build confidence and motivated them to take part in further training. This suggests that differences in technology use may be influenced more by teachers' familiarity with technological tools and their motivation, rather than by gender alone.

Similarly, Islahi and Nasrin (2019) conducted a quantitative study in Indian secondary schools to examine the attitude of teachers towards the use of technology in teaching from a gender perspective. The study found no significant gender-based differences in attitudes toward educational technology. They suggested that the rapid development and widespread use of technology in education may be reducing gender differences in attitudes.

Although these studies have explored how gender differences may influence teachers' attitudes toward and use of educational technology, they highlight that factors such as training, experience, motivation, and support are key influences on technology use. Since all participants in the current study were female, it is likely that their confidence and positive attitudes toward AT were shaped more by these social and environmental factors than by gender alone.

4.4 Assistive Technology Conceptualization and Classification

Assistive technology, known familiarly as AT in the context of the educational support of disabled students (Akpan and Beard, 2013), is a broad concept that includes a wide range of services and devices and can have different meanings depending on the context and its functional process (Maor et al., 2011; Nsofor and Bello, 2015; Smith et al., 2018). According to Cook and Polgar (2014, p. 2), the World Health Organization (WHO) defines AT as "any product, instrument, equipment, or technology adapted or specially designed for improving the functioning of a disabled person". According to Ahmad (2015, p. 64), AT is "a generic term

that includes assistive, adaptive, and rehabilitative devices for individuals with disabilities and includes ‘virtually anything that might be used to compensate for lack of certain abilities’, ranging from low devices like a pen to high and complex technology devices such as computers with specialized software”. AT, also known as “technical aids” or “assistive equipment,” includes information and communication technologies, universally designed technologies, educational technologies, emerging and innovative technologies, and accessible technologies (Goddard, 2004). AT can consist of tools, software programs, mobile applications, devices, and modified equipment, all of which can help improve the 21st-century skills of disabled students and, in particular, their social, learning and communication skills (Assistive Technology Industry Association, 2019).

While multiple definitions and understandings of AT have been suggested in the field of education, this research will use the definition of AT identified by Individuals with Disabilities Education Improvement Act (IDEIA) (2004), as that definition of AT includes both services and devices, is highly relevant to the focus of the research, and is the clearest and most inclusive definition. According to IDEIA (2004), AT can be one of two different types: either AT devices or AT services. These generally go hand-in-hand, so an AT device is defined as “any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability” (Cook and Polgar, 2013, p. 2). In its breadth, this definition strongly supports and encourages the use of a wide range of AT to directly assist disabled students to better function in their daily life routines, education, and development of academic skills and independent learning. Indeed, AT is increasingly seen as a productivity tool that can assist disabled students in different aspects of life, regardless of their difficulties and needs (Alpert and Goggin, 2017). In particular, the IDEIA (2004) definition is an inclusive one within the broader category of AT that allows for the categorisation of AT as low, mid, or high AT and includes various types of digital technologies, such as computers, tablets, projectors, software applications, and other electronic devices that are used to support disabled individuals in

different domains and change disabled students' educational and learning processes. From this same perspective, Fernández-Batanero et al. (2022) described digital technologies as essential tools that are commonly used in the classroom setting to support disabled students' learning and provide them with the same access to curricula as non-disabled students. In this regard, digital technology, as a subset of AT, has been confirmed to be a beneficial support and educational resource that provides access to information, communication tools, and other forms of assistance in schools. Based on these definitions, this research is concerned primarily with examining the use of high AT tools and services to seek a further understanding of how they can be used in supporting disabled students.

In contrast to an AT device, IDEIA, 2004, Assistive Technology Service 300-6, defines an AT service as “any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device”. Indeed, providing AT devices alone is not enough, as disabled students need support and services to use them effectively. According to this definition, AT services include the following:

- (a) the evaluation of the needs of a child with a disability, including a functional evaluation of the child in the child's customary environment;
- (b) purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices by children with disabilities;
- (c) selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing assistive technology devices;
- (d) coordinating and using other therapies, interventions, or services with assistive technology devices, such as those associated with existing education and rehabilitation plans and programs;
- (e) training or technical assistance for a child with a disability or, if appropriate, that child's family; and
- (f) training or technical assistance for professionals (including individuals providing education or rehabilitation services), employers, or other individuals who provide services to, employ, or are otherwise substantially involved in the major life functions of that child (IDEIA, 2004, Assistive Technology Service 300-6).

Therefore, an accurate assessment of the student, the right choice of device to align with the student's needs, the use of the device, and whether it can be used only in school or at home as well, all reflect critical key principles regarding the provision of AT to disabled students. In

other words, these principles provide a framework for creating an accessible and effective AT device and service set that enhances disabled individuals' independence, inclusion, and participation in society.

The IDEIA (2004) definitions are written to emphasise comprehensive support for disabled students to have equal access to devices, tools, training, support systems, and services, because disabled students need all of these as inclusive support to utilise them effectively. For example, the United States law mentions that "each public agency must ensure that assistive technology devices or assistive technology services, or both, as those terms are defined in 300.5 and 300.6, are made available to a child with a disability if required as a part of the child's (a) special education under 300.17; (b) related services under 300.16; or (c) supplementary aids and services under 300.550(b)" (Marino et al., 2006).

Emiliani et al. (2011) described AT as providing an alternative approach to communication and interaction between disabled individuals and digital devices. To clarify, from their perspective, AT refers to the following:

The technologies (devices or services) used to compensate for functional limitations, to facilitate independent living, to enable older people and people with activity limitations to realize their full potential. Some technologies, even if not purposely designed for people with activity limitations, can be configured in such a way as to provide assistance or assistive functions when needed. The term AT covers any kind of equipment or service capable of meeting this definition. Examples include wheelchairs, prostheses, communicators, and telecommunication services. AT includes, for example, equipment and services for access to information (e.g., for seeing, hearing, reading, writing), interpersonal communication and control of the environment (Emiliani et al., 2001, p. 102).

Indeed, this definition captures the essential role of AT in that it shows the full transformative potential and support of AT for disabled individuals in various domains of life. It promotes access and inclusion, empowers disabled individuals to fully engage and participate in different social activities in communities, and facilitates independent living. Similarly, Lewis (1993) proposed the following framework for AT as having two main objectives, the first being

for AT to increase disabled individuals' existing abilities and skills and enable them to overcome their limits, and the second objective being to find and provide new methods for disabled individuals to accomplish tasks and activities that might be challenging or unmanageable due to their disability.

There is another perspective that can be used to categorise AT. According to Cook and Polgar (2014), AT is often classified based on two main sources of procurement: mainstream and specialised sources. To clarify, mainstream or off-the-shelf products include the generally accessible technology that is designed and developed for general purposes and populations but can be used by disabled individuals as well. In particular, this refers to more advanced and complex technologies, including mobile phones, computers, tablet devices, digital tools, and software applications. As disabled individuals have the right to equal access to AT as non-disabled individuals, mainstream off-the-shelf technology can be designed to support the principles of universal design in technology. In this context, the term "universal" means "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation" (Sanford, 2012, p. 66). Therefore, the classification of mainstream technology in this way promotes both inclusivity and equality and demonstrates the accessibility and usability of AT for disabled students. From this perspective of categorisation, the second type is specialised products, which refers to the technology that is specifically designed and developed to address and meet the specific needs and requirements of disabled individuals, whether physically or digitally, such as wheelchairs, screen readers, and alternative communication devices. This classification can be further broken down according to the specific type of disability (e.g. visual, hearing, learning). The classification of AT in this way reveals the significance of specialised technology that can be used according to the specific needs of individuals. Specialised technology also offers versatility, inclusivity, and effectiveness when it is adapted to meet the diverse needs of disabled individuals.

In brief, these various classifications provide a comprehensive framework for understanding the diverse landscape of AT and its possible solutions. Furthermore, drawing from the various conceptualisations and definitions available helps the researcher to gain a comprehensive understanding of AT as a tool to enhance accessibility, interaction, and learning for disabled students. However, with regard to the classification aspect of AT, it is essential to recognise that it is difficult to limit oneself to a single AT framework due to its array of purposes and functions (Manoj Kumar et al., 2023). In other words, it is acceptable that AT falls into more than one category, as it depends on each individual's specific needs.

With all of this in mind, it is useful to select one device, the iPad tablet, to examine deeply as an example of the adaptability of AT in meeting the diverse needs of disabled students. The iPad is a high AT learning tool, and it has been chosen as the exemplar, rather than any other tablet device, because the iPad is by far the most popular and available device used in schools around the world (Karsenti and Fievez, 2013). Apple, the producer of the iPad, controls over 75% of the education market, which explains the popularity of the iPad in educational settings (Khaddage, 2013). Furthermore, iPads are popular because they are portable, encourage creativity, help with organisation and planning, and have a wide variety of applications for taking photos, playing games, and listening to music (Cumming et al., 2014). In addition, it has dramatically changed the approach towards learning, working, and interaction for all students including disabled students (Melhuish and Falloon, 2010). According to Powell (2014), many schools choose the iPad in particular due to its desirable features and functions, such as size, weight, various ways to present images, access to textbooks and resources, and the fact that the content of each iPad can be modified to meet an individual's needs. The iPad, as both an AT and an educational tool, has a wide variety of applications that can support a wide range of disabled students in their learning and communication skills (Cumming and Draper Rodriguez, 2013). Melhuish and Falloon (2010) and Cumming et al. (2014) both mention that using a reading application on an iPad can help students with learning disabilities to engage with the text in different ways, such as listening to the text while reading, developing

reading fluency, and using a dictionary to find the meaning of unfamiliar words, all of which can improve both literacy and listening skills. Furthermore, one small study in California (Cumming and Draper Rodriguez, 2013) investigated the impact of the integration of iPads into language arts lessons for four elementary school-level disabled students. The iPads used for the study were on loan from Apple for a six-week period, and each student was given one device to use during their language arts lessons. The iPads had only one application available: Language Builder. This application was designed to support language development and improve students' expressive and receptive language skills. The researchers found that using the iPad increased the students' academic engagement, which was measured by keeping track of how many prompts were needed to keep the pupils on task. However, the study's small sample size, limited application selection and utilization, use of Language Builder, and short duration limited any generalisations that might be made from it or any contributions based on the overall validity and reliability of the study's findings.

Similarly, according to Ok (2018), the built-in accessibility features, such as Siri, that are available on tablet devices such as iPads, help visually disabled students access and perform various tasks using voice commands. This means that they are able to speak to send messages or e-mails, which greatly facilitates their ability and freedom to communicate independently. This feature also helps them access information on websites quickly; by asking Siri to search the web and read out search results, they can gather information and learn independently. Likewise, dictation is another built-in accessibility feature of the iPad that recognises speech. Its function enables users to click a microphone button to capture their voices, and it then converts their spoken language into written text. As a result, this feature can support students who find writing skills difficult, such as those with a learning disability, but these speech-to-text features are beneficial for students with various kinds of learning and visual disabilities. Similar to the built-in dictation function, there is a free and simple application called Dragon Dictation that can be utilised as AT with students. Its function is similar to dictation, as it just requires the user to tap a record button and speak, and it then converts the

speech into written text. While both Dragon Dictation and the built-in dictation function offer speech-to-text capabilities, it has been observed that Dragon Dictation has some issues related to accuracy, but it stands out for its advanced of seamless integration with other educational tools or software that makes it easier to use. Therefore, the choice between them depends on the user's preference (Ok, 2018).

iPads are also equipped with built-in accessibility features, such as FaceTime, that serve multiple functions for enhancing communication and accessibility for students who are deaf or hard of hearing. According to Caughey et al. (2023, p. 295), FaceTime is a "video-communication tool enabling real-time social interaction between separately located users". Furthermore, using the Facetime tool enables students who are deaf or hard of hearing to use sign language for communication, which otherwise would often involve accessing interpretation services. Being able to use FaceTime instead increases their opportunities to fully participate in different social activities (Ok, 2018).

AT is also useful for students with autism disorders. Ganz et al. (2013) noted that autistic students tend to prefer communication applications over traditional approaches to interacting with other people, whether by using text, symbols, or pre-recorded messages. In fact, the group of applications designed for augmentative and alternative communication (AAC) is one type of AT that is recommended to reinforce communicative skills. In other words, the numerous AAC applications that are available on iPads can essentially turn these tablets into useful AAC devices to support autistic students. According to Xin and Leonard (2015, p. 4154), AAC applications offer a range of features, such as "symbols, pictures, photos, and written words to communicate thoughts and ideas in visual presentations that are inanimate, predictable, and more static than speech". Therefore, in addition to being communication applications that are used to enhance autistic students' social and communication skills for fuller participation in social interactions and academic activities, these applications also offer additional reinforcement and opportunities to improve other aspects of learning, such as

language and literacy development, cognitive abilities, and independent living skills (Ok, 2018). Hence, it is likely that autistic students could have a positive learning and communication experience by using the iPad to its fullest extent as a versatile tool.

In summary, a tablet can be used as a multifunctional tool when combined with various AT applications. In particular, iPads, with their wide range of built-in accessibility features and the extensive set of third-party applications designed for them, are considered valuable tools and inclusive resources that can enhance the learning and social interaction needs of a diverse group of disabled students. Furthermore, it is clear that iPads can support disabled students in building various skills, including communication, learning, reading, writing, engagement, and independence. It can even be said that, with its variety of features and downloadable applications, the iPad can be fully personalised to support a disabled student's individual learning and communication needs.

Another newly developed effective AT tool that can be used in many ways to support disabled students in their learning and communication skills is Google Read and Write, both found as part of Google Drive. This tool enables both students and teachers to create, share, and collaborate inside and outside the classrooms (Gatchalian, 2019). Indeed, this tool offers a range of features, such as dictionary tools, text-to-speech, highlighting tools, word prediction, annotation, and navigational tools that can easily be integrated into classroom lessons to allow students to read, write, and express themselves confidently in a more engaging and collaborative environment (Miller, 2013; Gatchalian, 2019). In addition, thanks to its wide-ranging functionality, using the Google Read and Write tool can boost the productivity of disabled students who struggle with reading, writing, speaking, or even students who have dyslexia. Also, besides its usefulness in helping disabled students complete tasks and assignments independently, it can also be used by teachers to organise lesson plans with different activities specifically intended to facilitate the participation and collaboration of disabled students in their classrooms. Overall, Google Read and Write, with its

multifunctionality and adaptability to meet diverse needs, is considered a valuable and inclusive resource for teachers seeking to support the 21st-century learning and communication needs of their disabled students.

Taking everything into consideration, AT devices and services alike have been shown to be powerful and beneficial tools that can be used to support both special education teachers and disabled students in their education, learning, participation, and social interaction. Expanding on the iPad and Google Read and Write, a comprehensive overview of other applications for AT in education, including a greater variety of types of AT devices, their specific applications, and their potential benefits for disabled students with diverse needs, is given in Table 4-1. We are fortunate that in this modern era, there are many examples of AT devices, software programs, and tools that serve and address the different purposes and diverse needs of disabled students based on their functionalities. Table 4-1 highlights the various types of devices that can be used to lessen the challenges and support the educational needs of students with a wide variety of disabilities. This exemplifies how AT is adaptable and capable of addressing the full range of challenges faced by disabled students. However, as discussed earlier in this section, careful consideration and mindfulness of the main principles are required for evaluating the suitability and successful usability of AT. The chosen AT should be helpful and need-based, affordable, accessible to the individual, easy to use in the individual's daily life, and at a level of comfort and satisfaction for the individual. Assessment and monitoring of each individual student's ability to use AT is critical to achieving effective outcomes and providing great benefits to disabled individuals.

Table 4-1 Summary of the use of AT in education*

Function	Relevant AT applications	Relevance for classroom learning
Reading	Electronic books, books adapted for page turning, single-word scanners, predictable texts, tabs, talking devices or software, speech software	For students having difficulty reading and understanding written text, or those with focus issues
Writing	Pencil grips, templates, word processors, word card/book/wall,	For students having difficulty with writing or composition

	software, spelling/grammar checkers, adapted papers	
Math	Calculators, talking clocks, enlarged worksheets, voice output measuring devices, scientific calculators	For students having computational problems or confusion, or those finding it difficult to perform well in maths lessons
Vision	Eyeglasses, magnifiers, screen magnification, screen readers, Braille or large-print books, audio lesson tapes	For students who have difficulty seeing or lack complete vision
Hearing	Hearing aids, pen and paper, signalling devices	For students who have difficulty hearing or are fully hearing impaired
Computer access	Word prediction, alternative keyboards, pointing options, switches, voice recognition software	For students who find it difficult to access the computer in its standard form or have difficulty performing academic tasks
Augmentative or alternative communication	Communication board, device with speech synthesis for typing, eye gaze board/frame, voice output device	For students who have language comprehension problems, lack the ability to express themselves, demonstrate delayed expressive language, or are unclear in their speech
Learning disability and attention deficit hyperactivity disorder (ADHD)	The choice of application/device depends on the type and degree of disability, but includes talking electronic devices, calculators, electric organizers, highlighters, pencil grips, post-its, computers, spelling/grammar checkers, electronic organizers, recorded materials, hand-held scanners, print or picture schedule, electronic diaries, etc.	For students with difficulty in language development, reading, or writing (dyslexia), hand-eye coordination, written expression, or composition (dysgraphia), fine motor skills or coordination (dyspraxia), math skills (dyscalculia), and attention (ADHD)

*from Ahmad (2015, p. 66)

4.5 A Historical Overview of AT Policies and Regulations for Disabled Students

This section provides a brief overview of the main AT legislative acts in the United States that have significantly impacted AT considerations for disabled people. Understanding AT legislation is crucial, as it affects accessibility, inclusion, and rights protections for disabled people, as well as contributing to a more equitable and inclusive society for all (Marino et al., 2006). Furthermore, it is significant to note that the reason for focusing on United States legal precedents is that the policies surrounding special education in my research area of Saudi Arabia, specifically the Rules and Regulations of Special Education Programs (RRSEP), were

developed based on the United States laws regarding the use of AT and societal equality for disabled people. (As discussed in Chapter Two)

In the United States, prior to the Education for All Handicapped Children Act (EHA) (Public Law 94-142), the availability and usability of AT was not addressed by government law or policy. The EHA, enacted in 1975, was the first legislation in the United States to require a high standard of special education and other related services for disabled people. In other words, before the EHA, disabled students generally did not receive the educational support they needed; instead, they were largely ignored while being educated in schools and with curricula for non-disabled students (Katsiyannis et al., 2001). As time passed and the issue of properly educating disabled people gained importance, the EHA was renamed the Individuals with Disabilities Education Act (IDEA) in 1990 and then the Individuals with Disabilities Education Improvement Act (IDEIA) in 2004 (Alquraini, 2013).

Another significant and valuable law related to AT that was enacted in the United States is the Technology Related Assistance for Individuals with Disabilities Act of 1988 (Public Law 100-407), referred to as the “Tech Act” and described as “the first substantive federal legislation dedicated solely to AT” (Marino et al., 2006, p. 19). The Rehabilitation Research and Design and Disability Center (2004) also described it as the first legislation specifically related to AT. Thanks to the Tech Act, AT services and devices were formally and officially defined for the first time (Jacobsen, 2012), and the law provided financial support for the use of AT in schools (Dyal et al., 2009).

Another law, the 1990a Americans with Disabilities Act (Public Law 101-336), specifically via titles II and IV, further improves opportunities for disabled people and specifically addresses the accessibility and usability of transportation and telecommunication services, ensuring equal access to these services and technologies.

The next piece of legislation in the United States that has significantly impacted AT usage is the Assistive Technology Act of 1998 (Public Law 105-394). This legislation provides further support and development of AT use to improve the quality of life of disabled people in the United States; the implementation provides funds to the states to establish AT programs and services that support and assist disabled students. Additionally, this legislation recognises and acknowledges the benefits of AT; therefore, it encourages businesses to take accessibility features into consideration when designing new products, with the aim of further reducing barriers and encouraging participation for disabled people in various aspects of life (Marino et al., 2006).

In 1998, Section 508 of the 1973 Rehabilitation Act (Public Law 93-112) was amended to require the United States government to provide disabled people with equal access to federal digital information sources as non-disabled individuals. As one example, it requires that federal electronic information be as accessible and usable by blind people as it is for non-disabled people. This amendment also provides legal protection for disabled people from discrimination based on physical, mental, learning, or any other type of disability in the education sectors of schools, colleges, and universities.

Taking everything into consideration, the 2004 IDEIA is considered one of the most important pieces of legislation that has led to improvements in accessibility and decision making for disabled students regarding AT, building on IDEA in 1990b and expanding on the premise of the Tech Act. To illustrate, the main focus of this Act is to confirm the rights of disabled students to be educated in a suitable manner alongside non-disabled students to the greatest extent possible and to receive a free and appropriate public education to prepare them for their future lives. Furthermore, this legislation was designed to enhance access to the general education curriculum and increase the responsibility of teachers to make appropriate decisions regarding the use of AT to facilitate learning and participation for disabled students.

It states, in part, that “each public agency must ensure that assistive technology devices or assistive technology services, or both ... are made available to a child with a disability if required as part of the child’s special education ... related services ... or supplementary aids and services.” (Public Law 101-476, 300.105a). Crucially, this legislation emphasises the importance of providing comprehensive AT support to disabled people to help them overcome barriers to access, use, and benefit from AT devices and services to ultimately be able to actively participate in their educational environment. Furthermore, based on the above discussion on AT legislation and regulation, making appropriate and effective decisions regarding the need and use of AT for disabled students in schools and, specifically, in the individualized education plans (IEP) of disabled students requires teachers to understand AT resources and legislative initiatives to provide beneficial assistance. As Marino et al. (2006, p. 19) highlighted, “successful AT programs utilize preassessment, collaborative problem solving, effective implementation, and systemic evaluation”.

Overall, these regulations have marked a significant shift in how AT is viewed in the United States. Furthermore, these regulations have significantly impacted AT consideration for disabled students, improved their access to information, and opened the door for disabled students to have equal rights and receive services and devices. These AT regulations also address broader issues related to disability education, rights, and digital and information technology. By enacting these regulations, disabled students in the United States have been protected, supported, and provided with necessary and suitable AT devices and services, thanks to all of these different legislative actions.

In this section, an in-depth review of the legislation and policies related to AT that have been enacted in the United States was reviewed. Despite the advancements in AT legislation and its impact on accessibility in the education sphere, according to Kouba and Newberry (2010), there are still challenges that schools encounter when trying to ensure equitable access for all, such as funding constraints and lack of sufficient resources.

4.6 A review of Videoconferencing Tools

The purpose of this section is to discuss the concept and use of videoconferencing tools, including some examples to emphasise the significance of these tools in improving accessibility, supporting participation, and facilitating learning for all students, including disabled students. In fact, videoconferencing, after becoming a primary educational resource since the first lockdowns in 2020, is now recognised for its usefulness for many different aspects of work and daily life, such as meetings, education, social interaction and communication, healthcare, public services, and company business (Leporini et al., 2021). Of course, most videoconferencing tools are not specifically designed as AT for disabled students, but their features and functionalities could make them inclusive and valuable tools for supporting disabled students' diverse learning and communication needs, especially as these tools were used in response to the COVID-19 pandemic in 2020 and the urgent call for school closings. Doush et al. (2023, p. 1353) explained the benefits of videoconferencing by stating that "video conferencing systems have made remote communication much more accessible for a vast number of users by allowing them to communicate at the same time, effectively, through seeing and hearing one another while being in different physical locations". Indeed, this description highlights the key feature of videoconferencing applications for facilitating communication in different geographic spaces so that individuals can interact with each other simultaneously through both audio and visual channels as if they were meeting in the same room. Doush et al. (2023) also mentioned other benefits and features of videoconferencing applications, include boosting collaboration, improving productivity, sharing materials and documents easily, recording attendance, providing immediate feedback, and saving time and cost by reducing the need for movement and travel (Hampel, 2006). The fact that videoconferencing applications allow for real-time collaboration greatly facilitates the learning process for both teachers and students, including disabled students. One of the additional valuable benefits of using videoconferencing tools for teaching and learning is that they enable teachers to share a wide variety of resources with their students, such as text documents, audio files, video clips, slide presentations, and, of course, their own screens on

which they can write or draw (Hung, 2016; Butler et al., 2021). Furthermore, the benefits of videoconferencing applications extend to the student side as well; they can access virtual classrooms from different locations and devices, and they can bring up questions to discuss with their teachers, either privately or in group discussions (Doush et al., 2023).

It is worth noting that, according to Suduc and Bizoi (2022), the terms “video conferencing” and “web conferencing” have been used in the academic literature to refer to two different categories of online communication systems. In the literature, videoconferencing systems were mainly considered to offer basic audio and visual communication, while web conferencing was described as offering other support functionalities, such as screen sharing and chat. However, these differences in terminology become less important over time, ultimately becoming synonymous and used interchangeably in the literature to refer to the same functionalities.

Furthermore, numerous videoconferencing tools have been developed, and many of them are known to meet the distinctive and various needs of teachers and students. These include Google Meet, Zoom, Microsoft Teams, Skype, EduMeet, and GoToMeetings (Anderson, 2021). The focus of this discussion is primarily on the Zoom videoconferencing platform, as it is the common videoconferencing commonly used in education to support the learning and communication processes for all, including disabled students, and its ability to handle large numbers of participants without significant performance issues (Singh and Awasthi, 2020; Suduc et al., 2023).

However, it is important to mention that other videoconferencing platforms, such as Microsoft Teams and Google Meet, also offer effective and valuable functionalities and features that support learning and communication experiences; therefore, the choice of a particular videoconferencing tool to use depends on the needs of the users, the purpose of the meetings, and most significantly, the policy of the educational institution (Suduc et al., 2023). Also, Zoom

is the one most academic research has been done on. In fact, although Zoom is used as the example here, the Microsoft Teams videoconferencing platform, the platform that teachers used for their online teaching during the COVID-19 lockdowns, is discussed in the results chapter of this thesis (chapter seven).

According to the academic literature, the Zoom videoconferencing platform, being reliable for large video calls, is the best and most popular tool for education as well as the best choice for webinars, large groups, and conferences. Additional key features and benefits of Zoom, according to Suduc et al. (2023, p. 290), are as follows:

- up to 1000 interactive participants via the Zoom large meetings add-on
- integration with learning management systems
- dozens of other integrations and add-ons
- screen sharing (multiple options)
- breakout rooms
- participant reporting feature
- education-focused features
- suitable for users who need only videoconferencing
- two-factor authentication
- end-to-end encryption
- waiting room feature

Before proceeding further, it is worth noting that Zoom videoconferencing has undoubtedly made meetings more accessible and meets the needs of disabled students in several ways (Anderson, 2021). To clarify, videoconferencing tools may offer varying degrees of inclusive accessibility for disabled students; in some instances, these tools are accessible and considered a great opportunity, such as for students who experience mobility disabilities and students on the autism spectrum (Ferri et al., 2020). However, for others, they may be less inclusive and accessible. In other words, some disabled students experience different barriers and accessibility challenges when using videoconferencing applications due to their special access needs (Hersh et al., 2020). To illustrate, videoconferencing applications should be designed to afford the greatest possible flexibility so that they can be used in whatever way individual disabled students can use and navigate it easily and independently. For example,

videoconferencing applications should have functions such as text transcription, whether in the form of closed captions or subtitles, sign language capability to translate the speech into sign language for deaf or hard-of-hearing students, and alternative text to provide context for images for students who cannot see them (Doush et al., 2023). Another concern is that tools such as Zoom are sometimes inaccessible to disabled students in terms of the accessibility of their interface. For instance, deaf disabled students find it challenging to view the visual element introduced by the speaker simultaneously with the sign language interpreter. This occurs most commonly when the main focus is on the speaker, so that the sign language interpreter can either hardly be seen or is not sufficiently featured to be easily viewed (Doush et al., 2023). Similarly, another example of Zoom inaccessibility was reported for students who have visual disabilities. Anderson (2021, p. 188) reported that “Zoom ensures that its products are operable and perceivable for users with visual impairments,” and identified features and options to effectively use this tool with visually impaired students. Anderson (2021) stated that even though essential supplemental tools including screen reads, which allow for texts to be read aloud, are available, one accessibility challenge for visually impaired is related to the interface and nature of online class communication. Students during an online class commonly speak at once and talk over each other using the chat functions, which makes the interface frustrating for students who experience visual disability. They have difficulty following the conversation and understanding the content being discussed or feeling hesitant to participate. Furthermore, content shared via slide presentations can be difficult for students with vision disabilities, especially when the screen read function is not able to accurately recognise and interpret complex visual content (Anderson, 2021). Nevertheless, some of these issues could be mitigated if the teacher learns how to make slide presentations in such a way that the screen read function can understand them, but this takes a high level of skill and experience. In addition, a study was conducted by Leporini et al. (2021) to explore the accessibility and usability of the top three video conferencing tools, Zoom, Microsoft Teams, and Google Meet, for disabled students who have visual disabilities and use the screen reading software and keyboards. To examine that, they assigned tasks to 29 students to complete with each

videoconferencing tool and then asked them about their experiences to ascertain if they had faced any difficulties. The findings showed that Zoom was more accessible overall than Microsoft Teams and Google Meet, but none of these tools was fully accessible with screen readers and keyboards. The students also reported a number of difficulties that they had encountered related to the interface, including problems related to turning the microphone and video camera on/off, keyboard shortcut function issues, and navigating the chat feature with a screen reader.

Consistent with the findings of Leporini et al., Hersh et al. (2020) claimed that it is difficult to find a comprehensive and fully accessible videoconferencing application, particularly for students who experience visual disability. Specifically, they raised the issue of how to present shared content in a way that is more accessible for this group. Likewise, Anderson (2021) reported that students who have physical disabilities can also encounter difficulty with Zoom videoconferencing. Challenges with typing in chat boxes or participating on a whiteboard feature limited their ability to interact and contribute in online sessions and lessons. Taking this all into consideration, it is obvious that there are still ongoing challenges that need to be addressed to improve the accessibility and usability of videoconferencing tools for disabled students.

Despite these challenges of the existing inclusivity and accessibility limitations of videoconferencing applications, they can certainly be improved to enable disabled students to have equal access opportunities to online learning education regardless of their type of disability. In other words, awareness of these challenges helps to provide clear guidelines for the ongoing design of accessible online learning and communication environments for all; addressing these issues to provide accessible learning environments for all learners is a key step toward educational success for all (Betts et al., 2013). For instance, Doush et al. (2023) recommended “utilizing gesture recognition technology to generate real-time interpretations and to focus on the deaf contributing to the meeting at the moment” (p. 1357). This would

allow for the immediate interpretation of sign language gestures made by deaf or hard-of-hearing students into spoken language for other participants to understand. Additionally, functions to describe images and other visual content that is displayed in the videoconferencing application can be beneficial and effective for students who experience visual disabilities (Anderson, 2021).

It is important to note that most of these challenges were observed during the increased use of videoconferencing technology during the COVID-19 pandemic, but that experience has led to videoconferencing being more ubiquitous in education even after the pandemic ended (Anderson, 2021). Therefore, it is possible that some of these challenges have been controlled and managed and the near future will bring more improvements in best practices and the development of new technologies to address the goal of technological accessibility for all.

4.7 Chapter Summary

This second part of the literature review was intended to cover different contexts related to my research topic, including beliefs, attitudes, and knowledge, as well as AT in the context of special education. Several concepts, definitions, and points of view were discussed and synthesised to gain deeper insights and foster a comprehensive understanding of the complexities. It can be summarised that the relationship among beliefs, attitudes, and knowledge is a complicated interplay; as a result, different interpretations and understandings have emerged in the literature. Furthermore, beliefs, attitudes, and knowledge are all considered important factors and play important roles in shaping individual behaviours, decision-making processes, and social interactions. In brief, beliefs reflect what individuals perceive or hold to be true; attitudes represent individuals' feelings towards objects or situations influencing their reactions and interactions; and knowledge encompasses the information and understanding that individuals possess. A deeper examination of the concept of attitude was undertaken with a review of different definitions of the concept of attitude. Multiple definitions were identified, all of which carried the idea of its power to shape individual

perspectives, feelings, and opinions so that these affect what individuals do and decide. This discussion of the power of attitudes led to an exploration in the following section of teachers' attitudes towards AT integration in the teaching and learning process, as their attitudes are considered to be a key indicator to evaluate their success in teaching. Hence, two main factors that influence teachers' attitudes towards the use of AT were the main focus, and both are considered personal factors: the teacher's attitudes and the teacher's level of knowledge. Furthermore, it was beneficial to find and learn from previous research studies covering this topic in different contexts to further understand the impact of these factors. Further conceptualizations and classifications of the concept of AT were addressed and explained, encompassing a wide range of devices, tools, and strategies designed to support disabled students in different aspects of their lives, including education. Also, the difficulty of identifying a unified classification of AT was mentioned; this situation comes about due to various factors, including individuals' specific needs, the nature of their disabilities, and the goals they aim to achieve. Nevertheless, based on this review, it seems useful to consider that AT can be categorised based on the type of disability, the function or purpose of the AT, and its level of sophistication, supported by different examples of AT tools and devices that support disabled students in their learning and communication. In addition, the historical development of AT was reviewed and linked to disabled students' rights to equal opportunities and accessibility to various AT. Specifically, it was important to understand how these laws were organised to provide equal access and an inclusive environment for all students, including disabled students, to be able to learn, participate, and interact in an inclusive environment. The final section of this chapter covered the benefits of videoconferencing technology as a valuable tool and its role in supporting disabled students. Its use can empower them to actively engage and participate in their education, which was especially apparent during the COVID-19 pandemic, by facilitating remote communication, collaboration, and learning opportunities. These tools can indeed facilitate access to multiple educational resources, remote learning environments, and virtual classrooms, regardless of the physical location and distance of students. However, different challenges that exist have been addressed; these have the

possibility of limiting the equal access of disabled students to these tools and their full range of functionality.

Chapter Five: Methodology and Methods

5.0 Introduction

Following the literature review, this chapter presents the research methodology and the methods used for collecting and analysing data and presenting the research results. According to McGregor and Murnane (2010), methodology and methods are actually two different terms, even though they are sometimes used interchangeably or as synonyms, especially in a research context. To clarify, methodology refers to the underlying framework that guides how research is conducted, such as a qualitative or quantitative framework. The methods, on the other hand, are the practical tools, techniques, and procedures applied to conduct the research within that framework (McGregor and Murnane, 2010). Simply put, methodology is the overarching approach, whereas methods are the specific techniques and procedures, such as interviews, observations, focus groups, and surveys, that are chosen to ensure that the research is conducted in a way that is consistent with the underlying framework (Hammond and Wellington, 2012).

This chapter addresses multiple topics related to both methodology and methods. It starts with an explanation of the researcher's positionality and the reasons for choosing this research area. After that, essential information about the methodology is covered, including a) the choice of and rationale behind using a qualitative approach; b) the benefits and challenges of a qualitative approach; and c) adapting the qualitative methodology for the COVID-19 era. This also includes an explanation of my choice to use the workshop method for this research. The next topic covered is the research process, such as the pre-recruitment procedures, participant selection, and the pilot workshop, followed by a description of the online workshop method, and a discussion of the benefits and challenges of online workshops. This chapter also discusses the workshops in detail, including the workshop design and procedure, the use of the Google Meet platform as a tool, themes, and a brief reflection on all three workshops. Next, the data handling methods are explained, including data organisation, transcription and

translation, the data analysis methods, and the six steps that were followed to determine the final themes, which will be reviewed in the results and discussion chapters. This methodology and methods chapter also centralises discussions of research validity and reliability and ethical considerations.

5.1 Researcher Positionality and Experience

As suggested by Wellington et al. (2005), the researcher should state his/her position early in the thesis, as it helps provide a foundation for understanding the choices the researcher makes. It also allows the researcher to acknowledge how their background may influence any stage of the research process and clarifies their subsequent discussion and analytical choices.

“The biography of researchers, how and where they are socially positioned, the consequent perspectives they hold and the assumptions which inform the sense they make of the world, have implications for their research interests, how they frame research questions, the paradigms, methodologies and methods they prefer, and the styles that they adopt when writing up their research”. Wellington et al. (2005, p. 21)

In line with this, I aim to justify my choices the methodology by considering how my identity as a female researcher within the Saudi cultural context guided and influenced various aspects of my research. ‘Positionality’ in qualitative research refers to a researcher’s recognition of how their identity, values, and personal background can impact various aspects of the research process and approach (Sikes, 2004). Wellington et al. (2005, p. 99) mentioned that “the methodology and methods selected will be influenced by a variety of factors, including the personal predilections, interests and disciplinary background of the researcher”.

In addition to providing a personal background and experience that was explained in Chapter One, positionality also means understanding and considering how my stance might shape the research in multiple ways. For instance, a researcher’s perspectives can influence the development of research questions, the methods used for data collection, and the interpretation of results (Stewart-Withers et al., 2014). With this in mind, I recognise that my identity and cultural context could influence various aspects of this research. To illustrate, in

line with Saudi social and cultural norms, this research and workshops were conducted with female teachers only because it would have been challenging for me to communicate with male teachers who are not related to me. Hence, my gender as a female researcher guided my decision to work with female special education teachers. This also means that I have easier access to female teachers, could ensure their comfort, connect more easily with them, and foster open discussions in the workshops, with the hope that their insights would lead to improvements in teaching and support for disabled students. Also, conducting the workshops online further contributed to participant comfort, as they felt more at ease sharing their experiences in a virtual setting. I also explained that their information would remain confidential, and they signed consent forms, which further supported their willingness to participate.

Furthermore, as a researcher familiar with Saudi culture and the field of special education, I interpreted participants' responses and identified emerging themes with a deeper contextual understanding. My familiarity with Saudi perspectives on special education enabled me to recognize implicit viewpoints that might not be as evident to someone from a different background. At the same time, I actively reflected on my role and how my positionality shaped the way I interpreted the data.

It can be said that this choice reflects an awareness of how cultural context can affect the research. In particular, it demonstrates an awareness of how my positionality shapes the research process, including participant selection and access, data collection, the nature of my interactions with participants in the workshops, and the interpretation of findings.

While I have already acknowledged the influence of my positionality on recruitment, interaction, and analysis, it is also important to recognise that my perspective is shaped by my background as a non-disabled educator. Both the Saudi and UK contexts offer valuable perspectives on disability and inclusion. However, conducting my PhD in the UK allowed me

to engage with a broader range of global ideas and discussions of disability, adding new layers to my understanding that complemented what I already knew from the Saudi context.

I recognise that my background as a non-disabled educator shapes how I interpret and theorise the views shared by participants. While this provides a valuable lens that deepens my understanding of the topic, I also acknowledge that my positionality may introduce certain limitations in fully capturing the lived experiences of disabled individuals.

5.2 Research Approach

According to Abutabenjeh and Jaradat (2018), the research process across most disciplines consists of three stages: creating questions to guide examination, collecting data to answer the questions, and explaining the results. Moreover, Ary et al. (2018) states that the various research approaches such as quantitative, qualitative and mixed-methods approaches used in educational enquiry can enhance and complement each other. Accordingly, the research approaches commonly used in educational research include experimental/naturalistic, qualitative/quantitative, and case study/survey (Wellington, 2015). For this research, it has been determined that the most suitable approach is a qualitative one based on a series of three online workshops related to the use of AT with disabled students before, during, and after the COVID-19 pandemic using an online platform such as Google Meet. The first benefit of this approach is to reach a deeper understanding of special education teachers' attitudes, beliefs, and knowledge about the use of AT with disabled students in the Saudi Arabian context, and the second is to use their perspectives and opinions to make recommendations for programs and courses of action regarding the use of AT in teaching disabled students.

5.2.1 The Choice of a qualitative Methodology

Understanding the various approaches to research design is a critical element of the research process, as using an appropriate research design is needed to successfully conduct valid research (Abutabenjeh and Jaradat, 2018). The selection of a suitable approach is the most

important decision a researcher can make to set the subsequent research stages in place. The choice of research approach depends on many factors, such as the purpose of the research, the researcher's personal experiences, the objectives of the research questions, and the nature of the research topic (Wellington et al., 2005). Taking these factors into consideration, there are a few reasons why a qualitative approach was deemed best for this project. First, a qualitative approach is helpful to obtain an in-depth understanding of specific situations, meanings, attitudes, and actions; a qualitative approach attempts to explain a phenomenon or relationship (Cohen et al., 2018). Furthermore, various methods can be used in qualitative research, such as observations, interviews, focus groups, and case studies (Nielsen, 2011). Finally, qualitative research is the most common approach used in the field of social sciences (Merriam, 2009).

According to Creswell and Creswell (2017), qualitative research is used to explore and understand the meanings and interpretations that individuals or groups ascribe to a social or human issue. In other words, a qualitative approach focuses on how and why something works or happens to build understanding or generate theory (Sullivan and Sargeant, 2011). In addition, qualitative methods are effective for researching cultural and social phenomena (Creswell and Creswell, 2017). Yilmaz (2013, p. 312) defines qualitative research as an "emergent, inductive and naturalistic approach to the study of people, cases, phenomena, social situations and processes in their natural settings in order to reveal in descriptive terms the meanings that people attach to their experiences of the world". Additionally, qualitative research can be seen as a multidimensional method that focuses on personal experiences, beliefs, life stories, and the meanings of individuals' lives to obtain deeper clarity regarding the situations or phenomena being studied and to make sense of the world; it is obvious that qualitative research emphasises the social and human aspects of research (Denzin et al., 2005). Accordingly, these multiple functions of qualitative research were the basis for the decision to use this approach over other possible approaches. In particular, the selection of this approach helps gain an insightful understanding and collect the various perspectives and

experiences from special education teachers about their utilization of AT in the primary teaching environment of disabled students.

To further support this choice, it is important to consider the basic beliefs that guide research, namely ontology and epistemology. These refer to how the researcher views reality and knowledge, which influence the entire research design. Ontology refers to the nature of reality, whether it exists independently of human perception or is shaped through people's experiences and social interactions. For instance, Snape and Spencer (2003), note that researchers may ask whether truth is universal or depends on individual experiences.

Epistemology, on the other hand, concerns how we come to know what we know. It distinguishes knowledge from beliefs or opinions and asks how valid understanding is formed (Scott and Usher, 2011). These philosophical questions are essential in social research, as they guide how knowledge is collected and interpreted. Researchers' views about reality (ontology) and how knowledge is created (epistemology) influence their entire research approach from the methods they choose to how they analyse findings (Creswell, 2007; Sikes, 2004). As Cohen et al. (2007) point out, the social world is human-centred and requires approaches that capture personal stories and lived experiences.

This understanding informed my decision to use qualitative methods, such as workshops, which are particularly suited for exploring participants' perspectives.

In qualitative research, these beliefs often align with the interpretive approach, which holds that knowledge is shaped by individuals' unique experiences and the social contexts in which they live (Denscombe, 2007; Merriam, 2009). This view assumes that reality is not fixed, but constructed through people's interaction and the meanings they assign to their experiences. In other words, multiple interpretations of the same issue can be valid (Gall et al., 2010; Wellington, 2015).

Interpretivist researchers recognise that their interactions with participants enrich the research process by helping uncover deeper meanings (Bryman, 2012; Denscombe, 2014). This

approach is particularly suitable for my research, which explores the attitudes, beliefs, and knowledge of Saudi female special education teachers regarding the use of AT in mainstream primary schools in Saudi Arabia.

Interpretivism focuses on understanding how people make sense of their experiences and how meaning is created within social settings (Bryman, 2012). It assumes that reality is shaped by people's perspectives rather than existing as a fixed truth (Panhwar et al., 2017). In this view, knowledge is not objectively discovered like a scientific fact, but is socially constructed through language, culture, and shared meaning. As Sikes (2004, p. 20) explains, knowledge is "socially constructed, subjectively experienced and the result of human thought as expressed through language."

Interpretivism is closely linked with constructivism and naturalism, which also stress understanding the world through the lived experiences of individuals (Elshafie, 2013). Although the terms 'constructivism' and 'interpretivism' are sometimes used differently, many scholars agree that both emphasise how people create meaning through their experiences (Schwandt, 1998; Hammond and Wellington, 2013).

Given these assumptions, the interpretive approach is a strong fit for my study, which investigates how Saudi female teachers in special education perceive and use AT in their classrooms.

In contrast, positivism sees knowledge as objective and measurable, focusing on observable facts and generalisable outcomes (Wellington, 2015; Bryman, 2012). Positivist researchers test hypotheses and seek cause-and-effect relationships, as in the natural sciences (Fox, 2008). Ontologically, positivism holds that reality is fixed and exists independently of the observer (Scotland, 2012; Alharahsheh and Pius, 2020).

However, positivism may not be well-suited for studying human experience, which has led many researchers to adopt interpretivism instead. This paradigm recognises that reality is constructed and that knowledge emerges from social context and interaction (Denscombe,

2007; Merriam, 2009). It values subjectivity and personal meaning, and accepts multiple valid interpretations of the same phenomenon (Gall et al., 2010; Wellington, 2015). Researchers also acknowledge that their engagement with participants adds depth to the research process (Bryman, 2012; Denscombe, 2014).

The following section addresses some of the benefits and challenges of a qualitative approach.

5.2.2 Benefits and Challenges of a qualitative Approach

Qualitative research refers to a type of social research that relies on textual data, rather than numerical data, to understand the meanings behind human actions and behaviours (Carter and Little, 2007). According to Cohen et al. (2018), qualitative research has several benefits, as well as some challenges. In terms of the benefits, the greatest is that qualitative research gives the participants a voice and the opportunity to explain their opinions and experiences via data collection methods, such as interviews, documents, focus groups, and observations. It also enables the researcher to collect rich details about the topic in question because it includes thorough descriptions of words, pictures, and themes. Furthermore, this approach can directly address the research questions with detailed insights. The qualitative approach is also known as the descriptive approach because the data analysis uses a descriptive style (Merriam, 2009; Sullivan and Sargeant, 2011). Based on these advantages, this research study had to use a qualitative approach to gain insights, understanding, and interpretation. Specifically, in line with these qualitative benefits, this research was conducted through three 2-hour online workshops with special education teachers who teach disabled students. These workshops allowed them to explore their beliefs, attitudes, and knowledge about using AT in their classrooms and gave them an opportunity to share their experiences, perspectives, and feelings regarding AT utilization in the learning and teaching environment. Further discussion about these workshops will be found later in this chapter.

Of course, there are inevitably potential issues and limitations with the qualitative approach. For example, qualitative research cannot be a completely objective process, as the researcher's interpretations and explanations can unintentionally bring subjectivity or bias to the study (Robson, 2011; Bryman, 2012). In addition, analysing the data gathered via a qualitative approach can be time consuming due to the types of data collected (Robson, 2011; Bryman, 2012). In other words, the analysis process requires much more effort and time on the part of the researcher (Bryman, 2012). Nevertheless, it is possible to manage and overcome these challenges in order to use qualitative research in its best ways, which are deeply exploring, reporting, explaining, and creating key concepts, opinions, and experiences that enable researchers to understand social phenomena (Cohen et al., 2018). The next section will discuss the adaption of the qualitative research methodology during the period of COVID-19.

5.2.3 Adapting the Qualitative Methodology for COVID-19

The COVID-19 pandemic had a huge impact worldwide and brought many difficulties to our lives and educational systems (Wajdi et al., 2020), including restrictions on gatherings, the need for physical distancing, prohibitions on travel, and, of course, the closures of schools, colleges, and universities that resulted in switching to online teaching and learning systems (Rashid and Yadva, 2020). During this period, many qualitative researchers, including me, had to adapt their research to use online approaches and various technological tools (Shamsuddin et al., 2021). Doing qualitative research online, whether it be through interviews, focus groups, or workshops, means relinquishing the aspect of face-to-face interaction (Chen and Hinton, 1999).

The social distancing, home schooling, and remote working of the COVID-19 era were challenging and restrictive for social scientists, who usually observe human interaction and reaction situations to gain deep and rich insight (Tobin et al., 2020). For this research, due to the restrictions of COVID-19 and the difficulties of conducting online class observations with

special education teachers, I had to adjust my research methods, planned for 2021, from in-person interviews and classroom observations to three online workshops.

Despite the obvious drawbacks, this situation also offers new opportunities and alternatives for researchers to strengthen their online research and presents new pathways to future technology use (Lupton, 2020; Tobin et al., 2020). Thus, I was able to combine using qualitative research workshops with a method for doing educational research online via web conferencing using the Google Meet platform. The next section will discuss the preliminary research procedures.

5.3 Research Design and Procedures

5.3.1 Pre-Recruitment and Participant Selection

Conducting any research requires selecting an appropriate sampling method. It could be a probability sample, also known as a random sample, or a nonprobability sample (Cohen et al., 2018). Because the main aim of this qualitative research is to obtain a deep and rich understanding rather than generalizing findings, the non-probability sample type was chosen, as it can be used to delineate a particular group of individuals within a wider population, such as a group of teachers or students (Merriam, 2009). According to Cohen et al. (2018, p. 218), there are multiple types of non-probability sampling, such as “convenience, quota, dimensional, purposive, and snowball”. This research used the purposeful sampling type, also called ‘judgment sampling’, because this technique involves selecting participants based on the researcher’s judgment. In other words, researchers use their expertise to identify and select participants who are likeliest to provide valuable, rich, relevant, and insightful data for the research (Cohen et al., 2018). This method allows the researcher to access participants’ in-depth knowledge, identify and select rich information and experiences related to the phenomenon of interest, and focus on specific or unique issues and cases (Oppong, 2013; Palinkas et al., 2015). Therefore, the research sample for this research consists of female

special education teachers in primary education programs in Saudi Arabia who have a bachelor's degree in special education and teach disabled students.

Following the selection of an appropriate sampling method, it is crucial to use justifiable pre-recruitment procedures. Hence, after obtaining ethical approval for this research from the School of Education Ethics Committee at the University of Sheffield on 06/04/2022 (Appendix 1 approval letter), the first step towards creating the sample was to contact the Saudi Ministry of Education (MOE). I sent a request to the MoE in Saudi Arabia requesting another approval letter to conduct my research and gain access to the target schools and teachers in Saudi primary schools. As Hennink et al. (2011, p. 66) put it, "seeking permission is an essential part of any research project". Hence, in order to receive approval from the Saudi MoE, I emailed them multiple documents, including a copy of my ethical approval from the University of Sheffield, a brief summary of my research context in both Arabic and English, and a letter to explain my interest in conducting this research in Saudi Arabia, with a brief description of my research topic, the level of the study, the methods to be used, and a list of some mainstream schools. This list included schools that implement the model of special education that this research aims to explore and that have special education teachers; not all mainstream primary schools have special education programmes and special education teachers. In other words, the choice of representative schools depended on their implementation of special education programmes and the special education teachers in each school.

After receiving the Saudi MoE approval letter (Appendix 2 in Arabic), I contacted the head teacher of each mainstream school with whom I had received permission from the Saudi MoE to conduct my research. I introduced myself, informed them about my research, and supplied an information sheet to ensure full understanding. The first communication was via WhatsApp on July 30, 2022. As Novick (2008, p. 7) pointed out, "the use of technology is actually well-accepted in qualitative research". This approach meant that the special education teachers were first informed about the research by the head teachers of their schools and were informed

about the purpose and process of the research via the detailed information sheet that they were able to keep (Appendices 3 and 4, Arabic and English versions).

5.3.2 Participant Selection and Sample Size Determination

From the primary schools that were approved by the Saudi MoE, six volunteers from four different schools initially reached out to me and expressed interest in participating. I answered their questions and explained any points that were unclear. For example, some participants asked if the three workshops would be conducted on specific dates or if there would be flexibility in arranging days and times. One participant asked if it was necessary to have a Gmail account to join the workshops on the Google Meet platform. In the end, all concerns were met satisfactorily, and these first six participants were recruited for this research. All six participants are female special education teachers with a bachelor's degree in special education and lengthy experience teaching disabled students (Table 5-1).

Table 5-1 Summary of research participants

Pseudonym	Gender	Teaching specialty	Educational qualification	Years teaching
Afnan	Female	Special education	Bachelor's in special education	9
Maha	Female	Special education	Bachelor's in special education	9
Amal	Female	Special education	Bachelor's in special education	9
Sarah	Female	Special education	Bachelor's in special education	9
Majd	Female	Special education	Bachelor's in special education	13
Wejdan	Female	Special education	Bachelor's in special education	9

Consent forms, distributed prior to conducting the workshops, had to be signed and returned by email to indicate each participant's full understanding of the research and agreement to participate (Appendices 5 and 6, Arabic and English versions). Two copies of each consent form were created: one for the participant and the other for the research data file. As clarified in the consent form, the participants were informed that participation was voluntary and that they could withdraw at any time with no repercussions.

After the participants signed and returned their consent forms, we coordinated to arrange suitable dates and times to conduct the three online workshops online through Google Meet.

We created a group on WhatsApp limited to me and the participants to facilitate communication and ensure that the arrangements were suitable for all. Table 5- 2 summarises the workshop details.

Table 5-2 Workshop details

Method	Interface	Date	Time (duration in hours)	Participant count
Pilot	Online via Google Meet	07-09-2022	7:30–8:30 pm (1)	3
Workshop 1 (interrupted)	Online via Google Meet	10-09-2022	Could not be completed due to Internet connection and audio recording issues	6
Workshop 1 (completed)	Online via Google Meet	19-09-2022	8:30–10:30 pm (2)	6
Workshop 2	Online via Google Meet	26-09-2022	8:30–10:30 pm (2)	6
Workshop 3	Online via Google Meet	27-09-2022	8:30–10:30 pm (2)	6

Having a sufficient sample size is important in qualitative research to gather enough data for rich descriptions and results validity (Oppong, 2013). According to Boddy (2016), it can be difficult to determine what sample size is needed for qualitative research because it depends on the research purposes, questions, and design. However, Merriam (2009) suggests that an adequate number of participants should be determined by its ability to answer the research questions and meet the study's goal. Hence, the aim of this research was to identify a sample size suitable for the qualitative description. Therefore, it was determined that this research should have at least six volunteer participants from four different primary schools in Saudi Arabia to make a sufficient sample size. This number of participants is also useful because the researcher can collect a wide range of information from people of different backgrounds, which is also significant in conducting qualitative research. In other words, focusing on a small sample allows for more in-depth data collection, leading to richer insights. Another consideration is having a sample size that allows the researcher to spend a reasonable amount of time engaging with each participant deeply and critically. As highlighted by Bryman (2012), practical factors, including time and access to participants, can affect sample size decisions.

In general, making appropriate decisions about sample size is a significant and difficult step in planning a study, so it is important to build in flexibility and consider the issues related to sample size in the early stages of the research process.

5.3.3 The Pilot Workshop

Before actual data collection begins, a pilot test of the planned workshop is crucial. Therefore, before any workshops were conducted with the participant teachers, an online pilot workshop was arranged with three other special education teachers who have similar interests to those taking part in the main research (Turner, 2010). As Hennink et al. (2011, p. 149) illustrated, the test “involves asking the discussion questions to a group of people with similar characteristics to the study population (if possible)”. The purpose of this pilot workshop was to assess the clarity and effectiveness of the workshop questions, structure, and activities and to assess the functionality and the recording system of the Google Meet platform. This allows for the early identification of any problems, issues, or areas of improvement that might arise and affect the actual workshops later (Van Teijlingen and Hundley, 2002; Hennink et al., 2011). As Hennink et al. (2011) stated, the main issues that need attention and assessment during the pilot test are: 1) is there a clear understanding of the questions, concepts, and vocabulary related to the research focus; 2) is there a logical and sequential order of questions; 3) if there is a need to rephrase or revise the research questions for the participants, can they provide clear and comprehensive answers. While the guide presented by Hennink et al. (2011) was intended to be used for face-to-face interviews, a similar approach was applied to the online workshops for this research. Overall, in addition to building confidence and trying out the workshop content, the pilot workshop was useful for testing and becoming familiar with the platform (Google Meet) and its features, functionality, and recording quality before conducting the full-scale research.

5.4 Data Collection Method

5.4.1 Online Workshops Qualitative Research Method

This research used the workshop as a qualitative research method to explore the attitudes, beliefs, and knowledge of female special education teachers regarding the use of AT in teaching disabled students in mainstream primary schools in Saudi Arabia.

Workshops can mean different things in different contexts; for instance, according to Ørngreen and Levinsen (2017, p. 71), a workshop is “an arrangement whereby a group of people learn, acquire new knowledge, perform creative problem-solving, or innovate in relation to a domain-specific issue.” For this research, a workshop is considered an arrangement of online meetings with a group of special education teachers that includes a range of questions and activities designed to seek opinions, extract knowledge, discuss ideas, and solve problems in a collaborative and productive environment to gain a deep understanding and generate written output related to the use of AT with disabled students. Thus far, there has been little research investigating the use of workshops as a qualitative research method, especially when conducted online (Ørngreen and Levinsen, 2017; Ahmed and Asraf, 2018; Shamsuddin et al., 2021), even though online workshops are often used for professional development programs in the education field. Nevertheless, according to Ahmed and Asraf (2018), there are many reasons to consider workshops a viable qualitative research method for educational research. First, workshops allow the researcher to choose participants through purposive sampling to gain rich and meaningful information (Creswell and Poth, 2018). Another reason that workshops can be considered for qualitative research is that they can be used as a methodological tool and collaborative space to produce valid data about the domain to be explored (Ørngreen and Levinsen, 2017). With the goal of creating a collaborative environment, each workshop should begin with a warmup and ice-breaker to encourage participation and reduce anxiety (Bennett, 2007). Workshops, especially workshops in a series, allow the researcher to use a variety of data collection methods, such as question prompts, note taking, text chat, verbal communication, and written post-workshop feedback,

followed by extensive and detailed written descriptions of the workshop procedures (Ahmed and Asraf 2018). Thanks to these valuable features and advantages of workshops, this research could be done using online workshops as a qualitative research method.

Three online workshops were undertaken with special education teachers via the Google Meet platform to deeply explore their knowledge, gather their experiences, and learn about their diverse backgrounds and perspectives on AT. The collaborative nature of workshops offers a further advantage in that bringing together people from different backgrounds is beneficial for a deep understanding and the development of strong recommendations or approaches to research (Banks et al., 2019). Accordingly, the cohesive process of involving special education teachers in the workshops and collecting different perspectives can, when taken together, improve the quality of teaching and learning for disabled students by identifying effective teaching strategies, addressing challenges, and developing recommendations and guidelines for programs and courses regarding the use of AT for teaching disabled students.

Conducting successful workshops requires the facilitator to design activities that are relevant to the research scope and objectives and to create a comfortable and productive environment so that the participants feel that their voices and opinions are valued. The researcher should consider ethical issues, such as giving participants complete information about the research, getting prior consent, and gathering written feedback after a workshop session to improve subsequent sessions. The next section discusses in greater detail the benefits and drawbacks of online workshops.

5.4.2 Benefits and Challenges of Online Workshops

Conducting interactive group discussions, such as workshops, on virtual platforms presents new opportunities for future approaches to qualitative research that make use of technology (Ahmed and Asraf 2018). However, as mentioned previously, conducting research via virtual

workshops is still in its early stages, and not much can be found in the literature (Shamsuddin et al., 2021).

Indeed, conducting workshops via web conferencing systems and virtual environments has advantages as a research methodology by minimising both time and costs for individuals (Woodyatt et al., 2016). As participants do not have to travel to participate, the opportunity for individuals from disparate geographical locations to contribute increases. Furthermore, according to Shamsuddin et al. (2021), participants can feel more comfortable, safe, and relaxed when discussing and negotiating concepts online. It has been shown that joining online workshops helps participants acquire and develop multiple skills, such as collaboration techniques and verbal communication skills (Öberg and Hernwall, 2016). In addition, people who have serious health conditions or disabilities, or those with family commitments, are able to contribute and engage in online workshops more easily (Woodyatt et al., 2016). Finally, the use of online workshops can benefit not only the participants but also the researchers through the chat box and recording features; these are useful for easily saving data for later analysis (Shamsuddin et al., 2021).

On the other hand, there are some barriers and obstacles that can be associated with online workshops for both participants and researchers. For instance, some participants may face technical problems or low-speed internet connections that can cause disruptions (Shamsuddin et al., 2021). According to Hacker et al. (2020), the facilitator might find it difficult to keep participants motivated and engaged throughout the course of an online workshop. Of course, the main challenge faced by a researcher when conducting online workshops is the limitation of effective communication; it can be difficult to read the body language and facial expressions of the participants, especially if they sit away from their device or turn the camera off (Dodds and Hess, 2020). Nevertheless, it is possible to manage and overcome these challenges by focusing on the goals of the workshops, using the available technological tools, and being prepared before conducting any workshops. In addition, it is possible that interactive group

data gathered online, such as via workshops, can present new developments and pathways to the future use of technology.

According to the above discussion about benefits and challenges, it is helpful to reflect on these aspects within the context of this research. Thus, during the data collection for this research, I encountered a challenge with my participants in the first workshop related to the issue of internet connections and audio recordings. Some participants experienced connectivity issues, some could not hear to participate properly, and the recording button did not work properly which caused disruptions. As a result, the first workshop needed to be rescheduled to another date, at which time the problems had been resolved and it completed successfully.

5.4.3 Workshop Method Design and Procedure

This section explains the design and process of the three online workshops for this research in detail. The data collection was conducted through three online workshops, all with the same six special education teacher participants, held using the Google Meet virtual discussion platform.

This series of three themed online workshops with the special education teachers explored their experiences and viewpoints regarding the use of AT with disabled students in a primary education setting in Saudi Arabia. The goal was to gather participants' attitudes, beliefs, and knowledge towards the use of AT with these students and in this setting. The workshops were specifically designed to fulfil the research purpose and to produce rich and valid data about special education teachers and their experiences of the use of AT with disabled students in classrooms. All the workshop questions and activities were first prepared in English and then translated into Arabic for use with the participants. As this research needed to be written in English, it was better to use this approach to ensure that the research questions were clear and accurate. In addition, this approach simplified all supervisory reviews and ensured that the research questions and any relevant activities could be scrutinised and validated before

undergoing the data collection. After that, the workshop materials were translated into Arabic so that the participants could understand them, engage, and fully participate in the workshop discussions. All of the participants speak Arabic as their native language, and not all of them can speak English. Therefore, this approach helped to maintain academic quality and rigour and ensure that the participants were comfortable.

5.4.4 Using Google Meet Platform

The monumental switch to online platforms during the COVID-19 crisis required qualitative research to be done on web conferencing systems and digital platforms, such as Google Meet, Microsoft Teams, and Zoom (Raider-Roth et al., 2021). Most web conferencing systems, including Google Meet, facilitate free access to virtual meetings and webinars, support audio/video calls and recordings, facilitate distance learning, offer public and private text chat tools, and allow for screen and content sharing (Doush et al., 2023). Google Meet, formerly known as Google Hangouts, is a video communication service that includes a text chat function and allows for meetings of up to eight hours with more than 500 individuals (Meliana et al., 2021). Hence, this platform was used for this research due to its efficiency, flexibility, and ease of use for both the researcher and the participants. Google Meet allows for the sharing of screens, documents, and various learning media such as PowerPoint and YouTube (Riyanti, 2021).

To clarify, I chose to use the Google Meet platform to conduct these three online workshops with a group of special education teachers. This tool was chosen over the other available virtual platforms due to it having been validated by the University of Sheffield, its usefulness for meetings, and its accessibility both from within and outside the university. Most importantly, Google Meet allows for holding meetings with participants even if they do not have a Google account. Furthermore, the whiteboard tool in Google Meet is effective for ice-breakers, warmups, activities, and discussions, in that it can be used to give instructions and clarify the process of the activities (Ahmed and Asraf 2018). Many individuals became familiar with multiple digital platforms during the COVID-19 global pandemic. Accordingly, one might

assume that a large part of the population has increased their digital skills and familiarity with these platforms, consequently making participation in online research easier (Lobe et al., 2020). Thus, it can be seen that research via web conferencing systems is another resource and venue for researchers who may need to transfer their projects from face-to-face qualitative data collection to online methods. It is worth noting that, in addition to using Google Meet's recording functionality, I used my iPhone's voice memos recording tool as an additional tool to capture the session data, in case of any technical issues with the Google Meet recordings. Hence, using both recording systems, I created a reliable backup for preserving the recorded sessions. Also, because the Google Meet recording does not work in the breakout rooms, I used phone recording when I visited these rooms to capture participants' discussions. I wasn't able to record breakout room discussions when I wasn't there, but the six-participant group discussions afterward were thorough and covered all the details discussed previously.

All three workshops were held in Arabic and audio-recorded using the recording function in Google Meet. The participant consent form included a section for the participants to agree to the audio recording. After the workshops were completed, the recordings were listened to and transcribed in Arabic language manually because Google Meet's built-in transcription feature is available in certain languages and does not support Arabic transcription functionality at that time, and then translated into English.

Even though the Google Meet platform includes video recording functionality, the workshops were only audio recorded to align with the teachers' preferences and comfort levels. As the research goal is to focus on capturing the key discussions and insights on the research topic, I fully respect and appreciate their decisions in this matter and wanted to ensure their comfort in participating in the discussion.

5.5 Overall Workshops Themes

The three thematically linked workshops were designed around open-ended and flexible questions and activities intended to elicit the teachers' experiences and attitudes towards the

use of AT in teaching and learning environments. Each individual workshop lasted around two hours, including time for breaks. The workshop activities were all consistent with the following three main themes: 1) the teachers' understanding of disabled students and their experiences of using AT before, during, and after the COVID-19 pandemic; 2) the teachers' opinions and perspectives on the challenges and benefits that arose from the use of online AT during the COVID-19 pandemic; 3) the teachers' thoughts on how to best support students with disabilities moving forward. Overall, all three workshops were designed to fit within a scheduled timeframe. Specifically, each session was organised with a specific schedule to ensure that time was used effectively and to help the participants remain engaged and involved (Appendix 7). The following sections provide further explanations and details for each workshop and the activities designed for them.

5.5.1 Workshop One

Theme A: Teachers' Understanding of Disabled Students and Experiences of Assistive Technology Use Prior-During and After COVID-19

This workshop aims to explore teachers' understanding of disabled students and their experiences of using AT with students both before, during, and after the educational changes brought about by the COVID-19 pandemic. First, I introduced myself and the research purpose and thanked the teachers for their participation and time. The workshop started with an icebreaker activity called 'ten common things', in which the participants were divided into two smaller groups and asked to come up with things they had in common using a shared jamboard link. This broke down barriers and revealed shared interests and experiences so that the participants could know each other better and have more open conversations and stronger connections. This was followed by a character profile activity using images (Appendix 8) completed by each teacher individually using a jamboard link. This activity encouraged self-reflection, allowing the participants to reflect on their own personalities and encouraging deeper self-awareness. The session continued with a conversation based on general and flexible questions about their definitions of disabled students and who they are, as well as their

beliefs and attitudes towards teaching and working with disabled students. After this discussion, there was a ten-minute break. In the second part of this workshop, the discussion shifted to the teachers' experiences of using AT in teaching disabled students before, during, and after the COVID-19 pandemic; the teachers were asked to talk about their experiences and share their knowledge, such as how they incorporated AT into their lessons before COVID-19, what types of AT they prefer or have access to, and how they make use of the AT that is available to them. In addition, the teachers were asked to discuss their experiences moving to an online use of AT with students with disabilities and their experiences after the pandemic. The workshop concluded with a thank-you to everyone.

5.5.2 Workshop Two

Theme B: Teachers' Perspectives of Benefits and Challenges of Assistive Technology in Teaching

This workshop focuses on the challenges and benefits that special education teachers experience using online AT for teaching disabled students. The same participants from the first workshop continued in the second, and the workshop duration was about the same. The second workshop started with an icebreaker called 'the emotions wheel', which is a tool to help individuals identify, understand, and express their feelings and the reasons behind them. Each participant had a jamboard link to use for the icebreaker. Then, the session shifted to small group discussions on the second theme. The participants were divided into two breakout groups of three; each group first discussed the challenges of online AT and next the benefits of online AT. Each group was given a total of 30 minutes and a worksheet to help guide their discussion (Appendices 9 and 10 workshop guides in Arabic and English). I alternately observed both groups during their discussions. Then, the two groups came back together to discuss and compare their ideas and notes as six. When that task completed, there was a ten-minute break. The final activity of the workshop asked teachers to use sticky notes on the Google Meet whiteboard to describe their personal day-in-a-life story. This is to understand the teachers' typical day with details of their daily experiences, routines, challenges, and

activities. The goal of this activity is to extract further details to add to the comprehensive understanding of the participants' daily experiences in school and to contribute richer and more insightful thoughts to this research (Appendix 11). Finally, the session concluded with expressions of gratitude to everyone.

5.5.3 Workshop Three

Theme C: Teachers' Perspectives on Factors that Facilitate the Use of Assistive Technology

In the third workshop, the teachers were already comfortable and familiar with each other from the previous workshops, so there was no need for a third icebreaker activity. The theme of this last workshop was to design and develop improved support for teachers and disabled students in the use of AT. In this session, the participants were asked to share their thoughts and opinions on the best ways to support disabled students and their teaching processes in the future. They were asked to work individually for 30 minutes to write a vignette by completing individually a missing sentence activity using the Google Meet whiteboard (Appendix 12). To follow up, the participants shared and commented on each other's ideas and continued the topic through discussion. The workshop ended with a thank-you to everyone.

5.6 Workshop Reflections

This section is dedicated to a brief overall reflection on the three online workshops. Conducting online research for the first time was challenging for both me and my participants, especially during the COVID-19 period, but it was also rewarding. To illustrate, one significant benefit was the flexibility and accessibility it offered so that participants were able to join from various locations and distances. Also, it was useful to record and review the sessions digitally, as these three workshops had rich and detailed information, the basis for the data analysis, that needed to be carefully stored to ensure that no valuable information was lost. However, technical issues occasionally disrupted the flow of discussion and the smoothness of the workshops. In addition, the lack of face-to-face interaction sometimes made it harder to read

and understand participants' emotions and underlying thoughts. Despite these challenges, the overall experience was positive, and the data collected was valuable, rich, and suitable for this research.

5.7 Data Organisation, Transcription, and Translation

5.7.1 Data Organisation

In qualitative research, creating and using a data management system and software tools for data analysis are essential for organising data files and ideas. Thus, to ensure data security and privacy, I used the University of Sheffield's secure Google Drive system for the storage of all research data, including the workshop audio recordings.

5.7.2 Data Transcription

After each workshop, I transcribed the workshop's data, which included the text chats, the recorded audio, images, and the written materials. Transcription is an essential step in collecting all the information, as it ensures the accuracy of the qualitative data and prevents the data from being lost or destroyed. Moreover, transcription simplifies the data analysis and is a critical part of the analysis stage, as it allows the researcher to fully engage with all the collected data in the early and initial stage of data analysis. In particular, Bird (2005, p. 227) argued that transcription should be seen as "a key phase of data analysis within interpretative qualitative methodology". The process of transcription helped identify initial coding and key themes early in the data generation process prior to translation. Furthermore, transcription gives a confirmation of data accuracy and validity, provides the researcher with great detail that might otherwise be missed during the workshop process, and enables the researcher to exclude nonverbal aspects of the workshops if desired (Angrosino, 2005). Hence, being well prepared to do adequate transcription and note taking from the workshops was crucial, as this enabled me to access and work with the data easily during the analysis.

5.7.3 Data Translation

After transcription, the transcript notes, figures, images, texts, and any other essential data that I gained need to be translated from Arabic into English. This vital step needs to be an explicit and transparent part of this process to maintain data integrity. Translation can be a big challenge for researchers who conduct their research in a language that is different from the language of the produced research (Nurjannah et al., 2014), which, in this case, requires translating from Arabic, which was used for the workshops, to English. According to Crystal (1991, p. 346), translation is a process whereby “the meaning and expression in one language (source) is tuned with the meaning of another (target) whether the medium is spoken, written or signed”. Some might say that this work can be outsourced to a qualified translator; however, assigning a translator is not recommended in qualitative research because it might involve other translator interpretations and understandings. This can change the original meaning of the data and texts and make the translation less neutral and inappropriate, as suggested by Nuriannah et al. (2014, p. 4) who said, “a professional translator may be considered inappropriate because translation is not considered to be a neutral technique to change words from one language into another”. As this research required translation of the data from Arabic to English, I decided to personally undertake the translation process to eliminate the possibility of translation error.

In fact, neither transcribing nor translating the data was an easy process or quickly done. Even though they were challenging and quite time-consuming, I observed several benefits from undertaking these steps on my own. For instance, I was able to immerse myself in the data more deeply to get a rich and valuable context and understanding, which was also valuable and essential during the analysis stages. In terms of data integrity, doing the translation myself helped to maintain both the anonymity and confidentiality of the data and avoided the risk of the data being altered by another translator. Also, the transcription contains academic terminology and concepts that relate to the research field, such as the terms ‘disability’, ‘AT’, and ‘inclusion’, which need full understanding and accurate translation to be correctly

produced in English according to the research context. Overall, assigning an outside translator might have resulted in different interpretations or understandings (Smith et al., 2008). Finally, the translation strategy helped to capture the individual context, mood, and feelings of the participants in each workshop, which was crucial for grasping a deeper understanding of different interpretations and meanings. The data transcription and translation processes were helpful in the early stages of the data analysis, which is explained in the following section.

5.8 Data Analysis: Thematic Analysis Method

Organising and categorising data into key concepts or themes and identifying links and relationships between data points are parts of data analysis that guide the researcher to make sense of and give meaning to the collected data (Chenail, 2012). In fact, in the research process, the data collection and data analysis stages should be done alongside one another, as these processes can support each other (Merriam, 2009; Ngulube, 2015). Data analysis is the process of extracting meaning from data and is often done as an ongoing process during the research. Wellington (2015, p. 263) suggests that qualitative data analysis includes: “(a) dividing the data into units of meaning; (b) classifying and grouping the units of meaning; (c) including new units of data into these groupings/categories; (d) searching for categories that are similar and/or which can be merged into a single category; (e) reviewing categories that contain large amounts of data to see if they can be split into smaller categories; (f) checking that the categories include all the data and are mutually exclusive; and (g) looking for linkages, contrasts and comparisons between the categories”. In addition, choosing the appropriate approach for qualitative analysis in research is significant because there are many different methods that could be used, such as discourse analysis, narrative analysis, thematic analysis, and grounded theory (Braun and Clarke, 2006). To clarify, choosing the appropriate approach for analysis depends on many factors, such as the purpose of the research, the researcher’s knowledge and experience, and the research methodology (Braun and Clarke, 2006). Taking all of this into consideration, it has been determined that the thematic analysis approach is the best method to analyse the qualitative data in this research, as it includes various types of

data, such as texts, pictures, and audio, to be organised by category, code, queries, and reports for efficient analysis (Bazeley and Jackson, 2013). To be useful, data need to be easily organised, managed, and processed, making the thematic analysis method a suitable tool for this research. Furthermore, the thematic analysis approach is commonly used in qualitative research due to its simplicity and flexibility in extracting meanings and ideas “without threatening depth of analysis” (Javadi and Zarea, 2016, p. 39). In addition, further advantages of thematic analysis, as outlined by Braun and Clarke (2006), are as follows: 1) it is a valuable method for working and conducting research with participants acting as collaborators (in this case, working collaboratively with the teachers in the workshops); 2) it is a beneficial strategy for summarising features and key aspects of a large amount of data and offering an in-depth, ‘thick description’ of the data; 3) it can be used to effectively highlight both the similarities and differences across the data; and 4) it provides a framework for creating qualitative insights that are valuable for informing and shaping policy decisions.

The remainder of this section describes the steps used throughout the data analysis journey to implement the thematic analysis approach as presented by Braun and Clarke (2006) (Table 5-3). Following these guidelines, the qualitative data collected in this research was classified and analysed based on themes and categories to glean clear concepts and meanings.

Table 5-3 The six stages of thematic analysis*

Stage	Description of the process
1)Familiarizing yourself with your data	Transcribing data, reading and re-reading the data, noting down initial ideas.
2)Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3)Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
4)Reviewing themes	Checking if the themes work in relation to the coded extracts and the entire data set, generating a thematic ‘map’ of the analysis.

5)Defining and naming themes	On-going analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6)Producing the report	Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature.

*From Braun and Clarke, 2006, p. 87.

5.8.1 Familiarisation with the Data

Familiarisation refers to the process by which the researcher becomes fully acquainted with the data (Mason, 2002; Ritchie and Spencer, 2002; Wellington, 2015). According to Wellington (2015), the researcher needs to become immersed in the data by reading and re-reading, gaining understanding, exploring, devising explanations and interpretations of the data, and reflecting on its meaning. As a researcher, I started to familiarise myself with the data through active interaction and engagement in the workshops with my participants. I continued my familiarisation with the data by listening to the audio recorded workshops, writing transcripts, translating, reading, and re-reading both the Arabic and English versions of the transcripts after each workshop. The eventual goal is to make connections among the presented content by searching for meanings and patterns, recognizing and noting initial codes and ideas, and reviewing the notes and transcripts. Indeed, the process of familiarisation is not isolated and does not stop at any specific stage, but it continues throughout the entire process of data analysis.

5.8.2 Generating Initial Codes

According to Hammond and Wellington (2012, p. 22), “coding is the process of applying tags, names, or labels to items of data”. The process of coding is a necessary part of the analysis intended to organise data into meaningful groups (Miles and Huberman, 1994; Tuckett, 2005). However, codes and themes may be seen as similar concepts by some researchers, while others see codes as bricks to build a theme (Bryman, 2012). This research was done using

the second approach, which sees codes as bricks to build a theme. Even though applying coding to a large amount of data can be challenging, it is essential for organising the data in a useful way. Most qualitative research projects require clear coding and justifiable procedures to show how the coding process was developed (Hammond and Wellington, 2012). Therefore, after familiarising myself with the data and recognising the interesting ideas contained within it, I started to produce initial codes from the data. I started by coding the data manually and used some strategies to help with the coding process. For instance, I created tables to organise texts, wrote notes in the texts, highlighted important parts of texts, and assigned descriptive labels (Appendix 13, coding example). This was useful because it helped to recognise and understand the prevalence of certain concepts, words and short phrases, revealed the frequency of use of some phrases, and showed the number of participant responses throughout the data. This process of data coding was done for all three workshops by creating tables in Microsoft Word. This stage was helpful because it enabled me, as a researcher, to highlight patterns and make relevant connections within and across the data (Hammond and Wellington, 2012), which is also beneficial for the following stage of looking for and identifying broader themes. In other words, coding helps identify which themes are the most prominent.

5.8.3 Identifying Themes

In this stage, the focus shifted from generating initial codes to identifying and developing potential broader themes and patterns within the data. In fact, using the tables created in the previous stage as visual representations was helpful for sorting the different codes into themes.

I grouped related codes that addressed similar concepts into broader themes and combined codes and ideas that had both explicit and implicit connections to produce overarching themes and subthemes. As Ritchie and Spencer (2002, p. 314) wrote, designing a thematic framework “involves making judgments about meaning, about the relevance and importance of issues, and about implicit connections between ideas”. These resulting themes represent significant

concepts that are relevant to the research questions and focus. For example, codes related to “save time and effort,” “information delivered easily and quickly,” and “new approach to learning and assessment” were combined under the theme of “benefits and advantages of technology”

I ended up producing several major themes with relevant subtheme(s) under each. These coherent themes accurately reflect the data’s underlying meanings and patterns and provide a comprehensive view of the key patterns and concepts within the data, guiding the final analysis and interpretation.

5.8.4 Reviewing Themes

Following the identification of themes, it is crucial to review the themes and subthemes while re-reading all the data transcripts in depth. The main purposes of reviewing these themes are to ensure their relation and validity to the data and to check and code any important data that might have been missed in the early coding stage (Braun and Clarke, 2006). In short, this stage helped me review my data theming more deeply so as to include everything that could be themed and to modify or discard themes that turned out to be inaccurate. For instance, I realised that I could combine two separate themes related to one theme, such as with the themes of ‘teacher confidence and competence’ and ‘teacher knowledge of AT’, which emerged into the broader theme of ‘teacher experiences of AT’.

5.8.5 Defining and Naming Themes

This stage is about focusing and naming themes to use in the final analysis. Indeed, providing clear theme names and working titles can give an immediate impression of what the research is about and how these themes fit into the broader overall story (Braun and Clarke, 2006; Nowell et al., 2017). Therefore, for this research, the choice of name for each theme and related subthemes had the purpose of determining what aspect of the research each theme covered so as to present a comprehensive and coherent story for the data as a whole. In the process of the data analysis, I changed the names of the themes and subthemes many times

to generate clear and evident ones that presented and described the scope and content of each theme clearly and efficiently.

5.8.6 Producing the Report

The final stage of the thematic analysis approach presented by Braun and Clarke (2006) and applied in my thematic analysis process was producing the report. In other words, this stage involves the final analysis, interpretation, and write-up of the research data. In particular, this stage aims to tell the reader about the complicated story of the research in a logical, concise, coherent, and interesting way, including enough evidence for the themes through supporting examples or short descriptions from the data. Therefore, my analysis and interpretation of the findings of this research describe how this stage was conducted with supporting evidence, examples from the literature, participants' statements and responses, and how these overall answer the research questions. As will be apparent in the later findings chapters, the effort that I made in this stage was intensive because it required defining concepts, finding associations, and providing explanations in a comprehensive way.

In addition to the above stages used for the thematic analysis method, I integrated the aforementioned IPA method to gain deeper insights into certain key themes. This helped me explore and understand the different factors influencing the participants' experiences. In other words, combining the thematic analysis with IPA helped achieve a comprehensive understanding of teachers' beliefs, attitudes, insights, and experiences as a whole regarding AT and disabled students.

5.9 Trustworthiness in Qualitative Research

According to Cohen et al (2018), trustworthiness is a critical component of qualitative research because it encompasses key factors that ensure the integrity and credibility of the research. These include credibility, transferability, dependability, and confirmability, which are used to evaluate the quality of the research (Hayashi Jr et al., 2019).

Hayashi Jr et al. (2019) explained that due to the variety of methods used for qualitative research, there are no widely agreed upon criteria to assess trustworthiness in qualitative studies. However, Lincoln and Guba (1985) proposed the following four main criteria for ensuring trustworthiness in qualitative research: (a) credibility, which refers to the truth value and means that the researcher compared their findings with the existing literature and followed the recommended good practices; (b) transferability, which means the results of a research can be transferable to other contexts or settings; (c) dependability, which focuses on the consistency of measurements taken during the research and the detailed documentation of steps and decisions so as to be able to report them clearly; and (d) confirmability, which means reflecting on what has been done by others as evidence and writing about the value of the research. Furthermore, the trustworthiness of the research depends on other factors that the researcher needs to ensure, such as designing effective research questions and selecting suitable methods and samples (Rezapour Nasrabad, 2018).

As discussed earlier in this chapter, thematic analysis was used in this study to analyse the data, and the stages of this analysis were aligned with the criteria of trustworthiness, namely credibility, transferability, dependability, and confirmability. Hence, each stage of the thematic analysis process contributed to establishing the trustworthiness criteria. For instance, the detailed process of reviewing transcripts, coding, identifying themes, and refining those themes supported the credibility of the findings by ensuring that they accurately reflected the participants' perspectives. The process of regularly revisiting themes throughout the analysis stages to maintain consistency contributed to dependability, while rich and detailed descriptions of the research context and participant characteristics enhanced transferability. Additionally, maintaining an audit trail and grounding all themes in the data through the use of participant quotes supported confirmability, ensuring that the findings remained objective.

Furthermore, several strategies and techniques have been used to ensure that the research is trustworthy and that the findings and interpretations are credible. For example, I first ensured that the research questions comprehensively covered the research topic by consulting with

my supervisors. Second, the pilot workshop was conducted to confirm the usefulness of the method, and all participants were provided with the same instructions and materials. Third, clear steps and procedures were followed during the data collection stage to ensure consistency in the data collection process. Finally, the steps taken in the data analysis were done following a clear and defined procedure.

5.10 Ethical Considerations

It is important for researchers to conduct their research with careful consideration of ethical guidelines. As Wellington et al. (2005, p. 104) said, “Nowadays researchers are often required to have their research proposals approved by ethics committees before they can proceed or are, at least, exhorted to ensure that they adhere to ethical guidelines or codes of practice devised by professional or discipline-based organisations”. Furthermore, according to Creswell (2003, p. 23), a researcher should consider that he or she “has an obligation to respect the rights, needs, values, and desires of the informants”. Ethical considerations are integral to any research and relate to the right and proper justification of a researcher’s choices and actions and how those impact the study participants, their families, the researcher, and the research community (Israel and Hay, 2006). Thus, the researcher must be aware and proactive in protecting research participants from harm and any possible ethical issues that could arise during the study (Robson, 2011).

When research entails working with people, several principles and steps must be followed to conform to professional ethics and confirm that no participant is harmed or affected. As a researcher, I also follow these principles and make them clear to my participants. This adherence includes providing participants with an information sheet with all necessary information related to the study, such as the purpose of the study, the confidentiality rules, their rights regarding anonymity and withdrawal from the study, and assurance of the avoidance of sensitive topics (British Educational Research Association, 2018). The British Educational Research Association (2018, p. 5) stresses that all research participants “should be treated fairly, sensitively, with dignity, and within an ethic of respect and freedom from

prejudice regardless of age, gender, sexuality, race, ethnicity, class, nationality, cultural identity, partnership status, faith, disability, political belief or any other significant difference.”

It is my duty as the researcher to carefully explain these guidelines to the participants and check if they have any questions. Therefore, for further confirmation, all the written information was reiterated orally before arranging the workshops. After understanding these points and reading the information sheet, the participants were asked to sign a consent form giving their confirmation to participate and be recorded so that the workshop sessions could be conducted.

In addition, the participants were assured that any data collected from the workshops, including all participants’ personal information, schools’ names, and any other information that might identify the participants and their identities, would be kept confidential and not disclosed to anyone. Mcauley (2003, p. 4) significantly highlights this by saying that “one of the most important aspects of social research is the protection of the participants’ identity.” Thus, anonymous names were used to ensure complete confidentiality and anonymity for the participants. All of this information is included in the information sheet and consent form to ensure privacy and security.

Another significant aspect of ethical considerations in research is keeping the participants’ data private and confidential (Mei and Brown, 2011). Therefore, the data management plan must include data storage with security measures. The participants were assured that all data and recordings would be kept private and stored safely on the secure University of Sheffield Google Drive management system and destroyed when no longer needed. As a researcher, I committed to minimising possible risk to both participants and myself, ensuring the safety and well-being of the participants.

All ethical considerations were taken into account during the course of this research. To increase my knowledge and abilities in this area, I have taken multiple online courses related to information security training during my PhD journey, including courses on cyber safety, protecting personal data, and protecting information and others.

For this research, special consideration had to be given to the ethical issues that arose from switching the research to an online platform. Collecting online data requires the researcher to be mindful of additional ethical issues and implications, such as the capture of text and emoticons from text chat tools and the recording of whiteboard content, along with the audio recordings of the workshops. Participants must be informed that their data will be stored safely and kept confidential.

5.11 Chapter Summary

This chapter presented in detail the methodology and methods of this research. It started with a positionality statement and a critical discussion of the research methodology and justifications for choosing the qualitative research approach and the workshop method. The benefits and challenges of both the qualitative approach and the workshops were also discussed. The processes and procedures for recruiting participants and conducting the data collection via workshops were described in detail. In addition, this chapter includes an in-depth explanation of how the data was organised, analysed, and interpreted and highlights what challenges were involved in the process, including the challenges in transcription, translation, and theme definition. These challenges arose specifically due to the linguistic differences between the data collected and the English context in which the research is to be presented. This chapter concluded with a detailed discussion of the research validity, reliability, and ethical issues.

Chapter Six: Data Analysis and Findings: Teachers' Understandings and Experiences of Disabled Students

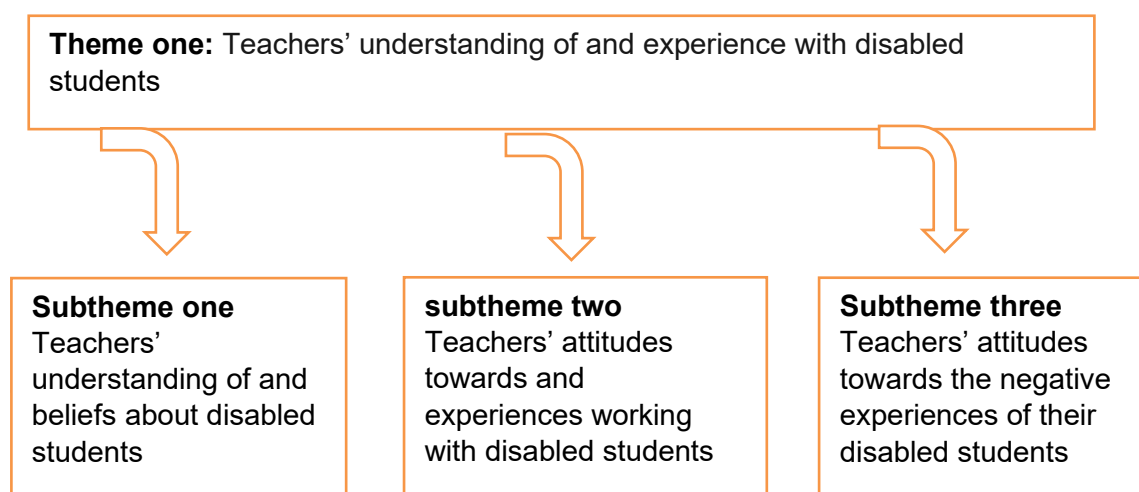
6.0 Introduction

In the previous chapter, the discussion focused on the methodology and methods employed in this research. It examined in detail the qualitative approach and technique and outlined the research process. The thematic analysis method, and its six steps that were followed also explained. This chapter and the following two will focus on and present an analysis of the findings of this research. To clarify, this research's findings are presented in three main chapters, each with its main themes and relevant sub-themes, which will be discussed later in separate chapters.

This chapter is the first to present, analyse and discuss the findings relevant to this research's aims, objectives and questions. A clear theme that emerged from data analysis relates to how special education teachers understand disabled students and their experiences working with and supporting disabled students in schools. Three sub-themes were developed as follows:

- 1) Teachers' understanding of and beliefs about disabled students that aim to define disabled students and teachers' beliefs about disabled students;
- 2) Teachers' attitudes towards and experiences with working with disabled students that focus on teachers' attitudes towards working and supporting disabled students; and
- 3) Teachers' attitudes towards disabled students' negative experiences, which target the perspectives of non-disabled students in schools and other individuals in society. (See Figure 6-1).

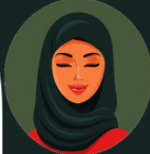
Figure 6-1 The First Main Theme and the Related Subthemes



As mentioned in the previous methodology chapter, the data are from three online workshops that lasted two hours each and the subsequent thematic analysis, which used qualitative research methods. The participants included six female special education teachers of disabled students from four mainstream schools in Saudi Arabia. The purposive sample included only special education teachers who earned a bachelor's degree in Special Education after completing four years of study in Saudi Arabia. Accordingly, these teachers were only allowed to teach disabled students in special classes in mainstream schools. All participants had many years of experience teaching disabled students: Five teachers had nine years of experience teaching disabled students, and the sixth teacher had 13 years of experience. They had various numbers of disabled students in their classes; however, the most frequent range was five to seven students per class. Their students had various disabilities, although teachers mostly mentioned students with learning disabilities and mild to moderate intellectual disabilities. All this information is mentioned in the persona worksheets that were designed for the workshop purpose and posted below. (See Figure 6-2).

Figure 6-2 Character profile worksheet

Hobbies/interests الهوايات/الاهتمامات	Things related to teaching أشياء تتعلق بالتدريس	
Handicrafts Crochet Computer	Art, Math, Computer English, Social Studies, Life Skills, Science, Islamic Studies.	Name/Age الاسم /العمر
Years of teaching experience عدد سنوات الخبرة 9 Years	Number of students: 7 students with moderate intellectual disabilities 5 students with hearing disabilities	
Character traits السمات الشخصية Cooperative Precise Active	Number of students in my classroom: One student only Type of students' disability Intellectual disability	

Hobbies/interests الهوايات/الاهتمامات	Things related to teaching أشياء تتعلق بالتدريس	
Travel Organizing and arranging Watching historical movies Reading poetry	Art, Math, Computer English, Social Studies, Life Skills, Science, Islamic Studies.	Name/Age الاسم /العمر
Years of teaching experience عدد سنوات الخبرة 9 Years	Number of students in my classroom: 5 students	
Character traits السمات الشخصية Organized Precise Achiever Leader Quick-witted	Type of students' disability: students with both intellectual disability and Learning disability	

The following sections describe, analyse and interpret the theme and subthemes that developed from the data analysis.

6.1 Theme One: Teachers' Understanding of and Experience with disabled students

The focus of this theme is on how special education teachers understand and view disabled students. It explores who the students are and how they learn. It also highlights teachers'

experiences working with disabled students in Saudi Arabia. Three related subthemes arose from the data analysis.

6.6.1 Subtheme One: Teachers' Understanding of and Beliefs About Disabled Students

The aim of this subtheme was to develop an understanding of how special education teachers understand disabled students and their beliefs about them. Consequently, the data showed that teachers have two perspectives and beliefs regarding understanding disabled students and their beliefs about them. More specifically, the first perspective that most teachers mentioned in their persona worksheets that were posted earlier was that they understood their students as having different kinds and levels of disabilities in the separate special classrooms in mainstream schools and that their students were mostly diagnosed with mild to moderate intellectual and learning disabilities. More clearly, the special education teachers in this study recognised and classified their students according to different kinds of disability and severity.

Before proceeding, it is worth noting that, according to Foreman and Arthur-Kelly (2017), considerable debate has happened for many years in the academic literature about the classification and terminology used to describe and understand disabled students; therefore, careful attention is necessary when referring to and defining these groups. Hence, different languages and terminologies with varying meanings have been used in the academic literature to describe and define disabled students, even in Saudi Arabia, such as 'exceptional children', 'handicapped children', 'children with disabilities', 'children with special education needs' and 'children with special needs' (Wilson, 2002; Alkahtani, 2016).

Despite a variety of terminologies and concepts used in the literature to define and understand disabled students, countries and school districts tend to distinguish and define this group of students based on the natures of their disabilities and the categories of disabilities that describe students, such as blindness, deafness, deaf or hard of hearing, students with learning

disabilities, students with intellectual disabilities, physical disabilities, gifted and talented, and autism (Hallahan and Kaufman, 2008, Villanueva et al., 2012).

Similarly, in Saudi Arabia, the Legislation of Disability was the first nationwide legislation for people with disabilities; the Disability Code (2000, p. 20), as further explained and discussed in the research context chapter of this thesis, defined 'disability' as follows:

"Affected by one or more of the following disabilities: visual disability, hearing disability, mental disability, physical and mobility disability, learning difficulties, speech and language disorders, behavioural disorders, autism, double and multiple disabilities as well as other disabilities that require special care". Aldakhil (2017)

In addition, in the legislation of disability in Saudi Arabia, the disability of individuals must be approved by an official medical organisation, such as a medical/health institution, through a diagnosis and assessment process to protect and enhance individuals' rights and enable them to receive the appropriate free services and interventions (Al-Mousa, 2010). The following statement from the King Salman Centre for Disability Research web page (2018, p. 8) confirmed, "The State shall guarantee the right of the disabled to services of prevention, care and rehabilitation. It shall encourage institutions and individuals to contribute to charitable work in the field of disability". Hence, the main purpose of this statement is to provide access to any services that disabled students need, such as health and rehabilitation services (Alquraini, 2010). In addition, the Disability Code identifies different aspects and services available to disabled students, such as education, social domains, culture and sport, media and complementary services. For example, under the educational section, the system:

"Includes the provision of educational and educational services at all levels (pre-school, public education, technical education and higher education) to suit the abilities and needs of persons with disabilities and to facilitate their enrolment, while continuously evaluating the curricula and services provided in this field". (King Salman Centre for Disability Research, 2018, p. 2)

In the same vein, the Saudi Arabia Rules and Regulations of Special Education Programs (RRSEP), represented by the Ministry of Education's Directorate General of Special Education (2001), describes a 'disabled learner' as 'anyone with a total or partial permanent defect in

his/her physical, mental, communication, academic or psychological abilities to the extent that it requires the provision of special education services' (Ministry of Education, 2001, p. 8). Furthermore, as discussed in chapter two, the RRSEP defines the key groups of various kinds of disabilities as statutory categories in Saudi Arabia, such as blindness disabilities, intellectual disabilities, learning disabilities, hearing disabilities, multiple disabilities and all kinds of disabilities, as well as the level of disabilities, that is mild, moderate, severe and extremely severe. The RRSEP also specifies the role of professionals and members who work with disabled people and the placement available to each category of disability in selected public mainstream schools (Al-Mousa, 2010). (Further explanation mentioned in chapter two)

However, as stated earlier, the purpose of this classification in Saudi Arabia is to understand all individual's specific needs and provide them with necessary and appropriate services and interventions that meet and support these needs, such as medical and educational, habilitation and rehabilitation and employment services (Al-Mousa, 2010; Alquraini, 2010).

In this regard, according to Saltes (2013), the understanding and classification of individuals based on their disabilities is often influenced by the medical 'deficit' model of disability and the disability more widely, which relies on understanding the characteristics of individuals to determine and provide appropriate educational and medical services (MacKay, 2002). This is also linked to Marks's (1997, p. 86) assertion that "policy makers tend to rely on medical definitions of disability to assess the prevalence of disability and provide treatments, services and benefits" (p. 86). In fact, the medical view maintains that disability is an individual problem, so the focus is on the disability, not the person's needs (Bunbury, 2019). In addition, from the perspective of the medical model, individuals must change to fit and benefit effectively from the general education system and be included in society (Lynas, 2013).

Obviously, Saudi Arabia's legislation and education system, including higher education, is medicalised and individualises disabled students. The medical model is rooted and predominant in the Saudi Arabian context, which many activists and advocates for disabled

students in the UK criticise, even though they were supporters of the medical model in 1970 (Norwich, 2001; Runswick-Cole and Hodge, 2009). In other words, the British Disability Rights Movements have challenged the medical model that focuses on individual deficits; instead, they advocate for a social model that supports disability rights, empowerment, and the removal of barriers to positively impact disabled people and allow them to be included in society (Thomas, 2004).

Therefore, this study illustrates that special education teachers' beliefs and responses to the definition of disabled students were based on different categories of disability and understanding disability as an individual problem according to their first perspective, as mentioned in the persona worksheet. For example, teachers wrote that they had students with intellectual disabilities and learning disabilities in their schools. In fact, it was clear that teachers were influenced directly by the Saudi legislation and education system, which is based on the nature and severity of an individual's disability. This was also influenced by the medical 'deficit' model of disability.

Besides the persona worksheet completed for the online workshop, the teachers were asked to discuss their understanding of and beliefs about disabled students. Hence, this conversation was guided by open-ended questions regarding teachers' understanding of disabled students and how they describe them as well as teachers' beliefs and attitudes towards supporting and working with disabled students to make the discussion clear, informative, engaged and interactive. Thus, the following voices were revealed. For example, one teacher named Afnan said the following:

"SEND students who have special needs and, accordingly, need special individual plans, support and programmes or even different tools and techniques that suit their mental abilities to help them achieve the best performance and succeed as their normal peers do in a supportive and encouraging school environment".

Wejdan revealed a similar outlook by saying this:

“I can say that SEND students are the ones who need programmes, plans and strategies planned specifically for them and for their learning abilities, whether these include the teaching methods, an individualised educational plan or different tools and techniques to help them achieve a high level of learning comparable to their normal peer students”.

Similarly, another comment by Amal maintained the following:

“Students with SEND can be recognised as students who need different support in their learning environment by using multiple strategies and tools to help them reach as high a level as their normal peers”.

These comments, alongside the previously discussed classification of disabled students, exemplify that few teachers seem to understand disabled students from the perspective of normality, which is also supported by the medical perspective. In fact, the words ‘normality’ and ‘normalcy’ have been in use since the 1850s (Davis, 1995). Furthermore, the teachers’ responses indicate that their understanding of disabled students includes them having mental or intellectual ‘problems’ that prevent them from learning and functioning as their ‘normal’ peers of the same age do, for instance, (*‘[...] suit their mental abilities to help them achieve the best performance and succeed as their normal peers do’; ‘[...] to help them achieve a high level of learning comparable to their normal peer students’; and ‘[...] to help them reach as high a level as their normal peers’*). Indeed, this view of ‘normalcy’ is supported by proponents of the medical model, who believe that individuals must be changed and cured to overcome their disabilities and be accepted as ‘normal’. They postulate that normalisation or curing interventions are the only way that can support disabled people and help them function ‘normally’ and participate in society’s activities (Goodley, 2011, 2017; Grue, 2015). Furthermore, the medical model measures individual intelligence, performance, and body appearance against what is considered ‘normal’ in society (Davis, 1995). In other words, the medical model explains disability as pathological, meaning the disability is seen as a lack or limitation within the individual’s mind and body and inherent to the person (Imrie, 2004).

However, this understanding of medical intervention as the only appropriate way for disability to be cured and disabled people to be normalised has been criticised by Grue (2015) and other scholars of disability studies. To clarify, society uses the common perception of normality to understand and describe disabled people (Davis, 1995; Grue, 2015). Davis argues that disability is not an individual problem but is a social and cultural issue created by the concept of the norm. He argues that normalcy is a societal concept that is applied to particular groups, including disabled people, in order to preserve power and control. In other words, the problem is not the disabled people but rather the way that normalcy is constructed.

Debates about the concept of disability continue; as it is a complex concept and phenomenon, there is no universal agreement or specific way to understand it (Goodley, 1997). Gronvik (2007, p. 751) points out that the term 'disability' includes the idea of "distinct meanings across decades, cultures and ideologies'.

In sum, a few of the teachers' responses seem to be influenced by the medical view of disability that focuses on individuals being changed and cured to overcome their disabilities to be accepted as 'normal' individuals.

As mentioned, the terminologies and language used to describe and define disabled people are controversial. Hence, there is no common, agreed and specific definition and understanding; instead, such definitions and understandings are relative to each country's policies and society. In fact, many countries, both developed and developing, have created their own systems and policies for special education, including Saudi Arabia, to understand disabled people and provide fundamental services and support (Al-Mousa, 2010). For example, teachers in Saudi Arabia are often exposed to the full idea of labelling and classification to understand disabled students. In other words, the medical model of disability predominates in Saudi Arabia and is followed by the education system and the community.

Teachers' Language of Disability

It is vital to note that before going further, even though the participants in this research sometimes did not express their definition of disabled students or display their beliefs clearly and explicitly, the vocabularies, phrases and languages that they used in their responses, whether verbally or written, signalled to me as a researcher to capture and analyse the meaning of these responses and the teachers' understanding of the medical view of disability. Although this process was not clear to me at the beginning of the analytical stage, it became apparent to me eventually after reading and re-reading the transcripts and analysing the teachers' every single word to understand their responses and perspectives clearly. To clarify, referring to the languages that teachers use to refer to disabled students in this study, another vital point and aspect that must be clarified and addressed by the data analysis is to demonstrate the insightful meaning of this research. Hence, the teachers in this research in Saudi Arabia tend to understand their students based on the nature of their disabilities and the official clinical diagnosis of their impairments at the beginning, such as the use of the term 'students with SEND', SEND students and the word 'normal' to compare disabled students to non-disabled students. Such language seems to have little value and significance for teachers and is not inherently objective. Instead, teachers focus on understanding students' educational support needs more effectively than their disabilities or 'deficient' (Pameijer, 2006). The following points will discuss this idea clearly and in more detail.

There is another contrasting perspective and belief that appeared from the teachers' perspectives about disabled students. However, this also relates to the languages and understanding of disabled students during the group discussions about understanding disabled students in different ways. Accordingly, in the previous teachers' quotes, the teachers illustrated various ideas for describing disabled students. Consequently, these ideas also revealed another interpretation and analysis of the data. For example, most teachers expressed a similar understanding of their views of disabled students in the discussion room. During the online workshops, the teachers defined these students as having special needs

and needing additional support accordingly. For example, a teacher, Majd, reported the following:

“SEND students could be understood as having special needs and needing additional support specifically in their academic learning; they also need to justify and simplify tasks for them to help them achieve the best performance and success”.

This and previous examples illustrate that teachers mostly agree to use the same term consistently ‘special needs’ and need additional assistance when they speak to refer to disabled students. This differs from their previous explanation when writing their responses defining students according to specific kinds of disability, for example, an intellectual disability and learning disability. It is clear that the term ‘special needs’ needs to be clarified. Indeed, considerable debate exists about the definition of ‘special education’, and different terminologies have emerged to describe disabled people who need additional support and services. For instance, the term ‘special educational needs’ (SEN), which was proposed in the Warnock Report to increase the acceptance of disabled individuals, has led to a great deal of discussion in the academic literature (Warnock, 1978). For instance, Gross (2002) regarded that term as inappropriate and others asserted that it could encourage discrimination (Solity, 1991). In fact, the term ‘SEN’ became popular and accepted in the 1970s and remains in use for classification and addressing the educational needs of disabled students in educational settings (Runswick-Cole and Hodge, 2009). However, Tomlinson, (1985) argues that this term has become controversial because it can lead to a negative impact on disabled students’ educational experiences and outcomes. For example, according to Rorty (1989) and Runswick-Cole and Hodge (2009), using the term ‘SEN’ can lead to the exclusion of disabled students from mainstream educational and social activities, as they might be seen by professionals or other students as different and deficient.

In addition to the ‘SEN’ term, Marshall (2008) proposed that the use of other terms such as, ‘children with additional needs’ could be more appropriate than the term ‘SEN’ while Alkahtani

(2016) argued that the term 'special needs' to describe disabled individuals could reduce their stigma and marginalization. According to Wilson (2002), there had been no clear definition of the term 'special needs' until the late 20th century. Therefore, the word 'special' is still ambiguous and could have different meanings, such as (a) 'peculiar', 'specific' and 'not general' as well as (b) 'of special importance' (p. 62). Others suggest that 'special' connotes powerlessness (Corbett, 1996). However, the special education teachers in this research are more likely to understand the word 'special' in their context as somewhere between the meaning of 'specific' and 'of special importance' to encourage and support disabled students. Furthermore, according to Villanueva et al. (2012), the terms 'special needs' and 'special education needs' are used broadly and interchangeably in the academic literature to refer to students who need additional support for their academic learning. Thus, the meaning in this context relates to what students require in their learning to achieve their best performance. This understanding correlates with those of this research's special education teachers, as clarified by their shared perspectives. For instance, a teacher named Maha stated:

"From my perspective, SEND students have special needs and need special programmes and support. Therefore, they need specific educational programmes, strategies and technological tools to help them learn better and improve. These could include an individualised educational plan that uses technology and different teaching tools and methods to support each student's specific needs and learning outcomes".

Amal emphasised the following:

"The special needs students need additional support, especially in their academic learning, so I think including an individualised educational plan is the most important approach, as this helps to identify the specific skills for the students to be developed and enhanced".

In other words, the teachers' quotes and examples revealed that they possessed general beliefs and understandings of disabled students in terms of their need for specific additional support to assist them with learning and improving their academic skills, as their 'normal' peers

do. Hence, they depicted that students need various teaching methods, strategies, technologies and educational programmes to accomplish this.

In addition, the teachers shifted their perspectives from individual and medical views that conceptualise students based on their disabilities towards views that include different approaches for teaching and supporting disabled students in their learning environment. More specifically, this view could correlate with the view of the social model of disability. Indeed, the social model maintains that society and the way it is organised cause disability, so it suggests that the removal of socio-educational barriers that restrict life for disabled people can help them be independent and equal in society (Bunbury, 2019). This model is supported by disabled individuals and scholars of disability studies who criticise the medical model and advocate for the social model (Shakespeare, 2006; Grue, 2015).

According to the argument above, teachers' views defining and understanding disabled students are supported by Bruggink et al. (2013), who noted that, nowadays, disabled students tend to be defined in terms of their need for additional assistance and support in the classroom to develop and improve their learning, in contrast to the older view of them as 'deficient' students. Similarly, Hassanein (2015) asserts his disfavour of the term 'deficits', as it could limit individuals and describe them negatively and he confirms the focus should be working with disabled students according to their individual learning needs. Moreover, Darrow (2013), for example, emphasised that the terminologies used to define disabled students have evolved over time and continue to evolve, so teachers should be aware of their students and work with them based on specific individuals' needs. In particular, understanding disabled individuals' needs can improve their education in school and their lives in general. This clearly confirms the criticism and change of the 'deficit' view of disability and the transfer to another perspective for a more inclusive education and learning environment for disabled students. Hence, the special education teachers in this study seemed aware of the encouraging and supportive approach that seeks to understand disabled students effectively and inclusively.

Following this line of thought, these beliefs clearly show and indicate a change in the attitudes of special education teachers in this study of their perspectives of disabled students. In other words, teachers classified their students in the beginning based on the nature of their disability, but as the discussion moved, their views and explanations showed their other perspectives and understanding of disabled students as they needed additional support and assistance and different approaches for teaching to achieve a high level of performance as their peer of non-disabled students. Thus, this change in teachers' ideas leads to clarifying the conceptualisation of disabled people and disabilities in general into different views.

This position concurs with that of scholars of disability who criticised the medical 'deficit' model, which views disabilities as physical or mental deficits. Instead, they advocated for inclusive education and concentrated on the education system and schools' organisation (Oliver, 1990; Fougeyollas and Beauregard, 2001; Slee and Allan, 2001). In other words, the proponents of the social model assume that it is society's responsibility to remove barriers, including educational and learning environment obstacles, that might hinder or isolate disabled students from learning and living independently (Oliver, 1999; Goodley, 2011, 2017; Oliver and Barnes, 2012). Moreover, the social model maintains that teachers and communities should adapt the educational environment and include different teaching methods and strategies suitable for disabled students and remove the environmental difficulties that disabled students face, which is the key purpose of successful inclusive education for disabled students (Smith and Smith, 2000; Villa and Thousand, 2005). Equally importantly, the social model transfers the focus of the individual problems to the school environment and classroom setting and evaluates disability as a socially constructed issue that hinders the learning and teaching of disabled people (Ainscow, 2005).

Moreover, teachers favouring the definition of disabled students as requiring additional support for their learning and the adaptation of the learning environment reflect how the view of 'deficits' and beliefs in the previous understanding of the medical model has changed and shifted to support disabled students in different ways in their learning. Therefore, teachers'

views of adapting teaching strategies, using multiple technological tools and removing barriers that could hinder disabled students from learning effectively and sufficiently, could be seen as affected by the social model view of disability. In fact, the social model of disability seeks to remove any social and environmental barriers that could hinder disabled students from learning in an encouraging environment (Taylor, 1999). This view corroborates with what was mentioned by Villa and Thousand (2005), the social model aims to eliminate any educational barriers and adapt varying teaching methods and strategies that support disabled students in the educational learning environment. Furthermore, according to Taylor (1999), the social model approach seeks to reduce any educational system obstacles to make the environments more accessible and suitable to each student's needs.

Consequently, according to this view of the social model, the special education teachers in this research believe the changes in the educational setting of their teaching and the inclusion of various strategies and methods could enhance disabled students' development and improve their learning and academic skills. Most importantly, concerning the Saudi context and the educational environment for disabled students, I will briefly illuminate the key points of disabled students' learning and teaching environments and frameworks in mainstream schools to understand the situation clearly.

The Saudi Learning Environment for Disabled Students

Mainstream schools in the Saudi Arabian context are known as governmental and public schools for both disabled and non-disabled students (Al-Mousa, 2010; Alquraini, 2011; Aldabas, 2015). The Saudi Ministry of Education refers to them for 'educating children with special educational needs in regular education schools and providing them with special education services' (Al-Mousa, 2010, p. 17). Therefore, this statement clearly shows that disabled students must be taught within the framework of special education services and interventions. Furthermore, as mentioned previously, the RRSEP policy in Saudi Arabia confirms that mainstream schools are the best option and a suitable environment for disabled

students' inclusive educational settings and opportunities for social interaction. This legislation also seeks to protect and foster assorted aspects of the rights of disabled students, such as healthcare, employment and inclusive education. Thus, the policy emphasises the importance of inclusive education and the location where disabled students must learn. Given the insight from chapter two on these two pieces of legislation (the Disability Code and the RRSEP) and the United Nations Convention on the Rights of Persons with Disabilities (CRPD) in 2008, it is worth revisiting Article 24 (b)- Education, the CRPD to further emphasise and affirm the right of disabled people to receive equal access to education, emphasizing inclusivity, equality, quality, and community integration regardless of their disability (United Nations, 2006).

However, as fully discussed and explained in Chapter Two, the full form of inclusive education has not yet applied in mainstream Saudi education. In other words, disabled students still receive their education in separate classrooms in mainstream schools. In brief, according to the RRSEP's policy, there are two models and options within mainstream schools for disabled students' 1) mainstream classrooms with resource room support and self-contained special education classrooms. Further discussion of these two models by the RRSEP's policy was mentioned in Chapter Two. Nevertheless, referring to the terminologies used in distinct countries and cultures, this could be seen and understood by Saudi culture and society as forms of inclusion, such as the full inclusion and the partial inclusion of disabled students in mainstream schools. As Slee (2012) mentioned, many people and groups within society have a common understanding and view of inclusion as placing students together with and without disabilities in the same schools and physical learning environment. However, according to Hodgkinson (2010), this view shows a limited understanding of inclusion and true inclusion involves and addresses other critical aspects, such as: curriculum adjustments, social interaction, adapted teaching methods and support services.

Given this short description, clearly, disabled students still lack a fully inclusive education in mainstream schools in Saudi Arabia. In other words, inclusive education is perceived by scholars of disability studies and inclusive education as celebrating diversity, bringing together

high-quality teaching and learning experiences for educating disabled and non-disabled students alike in the same classrooms and environments for the entirety of the school day and being recognised by all members of the school and society as a whole (Hodge, 2017). As explained by Barton (1997, p. 233), “Inclusive education is about responding to diversity; it is about listening to unfamiliar voices, being open, empowering all members and celebrating “difference” in dignified ways”. However, disabled students’ education has not yet reached this objective of inclusion in Saudi Arabia.

Nonetheless, teachers’ views, beliefs and attitudes towards disabled students and working with them to support them with various strategies, tools and methods, the main focus of this research, confirm their welcome and readiness for enhancing and supporting disabled students successfully and removing barriers from their social and academic learning. Such encouraging attitudes are encompassed by the social model of disability.

Drawing on this argument, considering teachers’ viewpoint of encouraging the use of multiple supports and strategies in their instruction, the teachers in this research all seemed aware of the importance of considering multiple resources, teaching methods, techniques, technologies and individualised educational plans (IEP) for their teaching processes to help disabled students learn effectively and successfully. This result corroborates research revealing that the use of technological tools is one approach that could be considered to help disabled students enhance their skills and become successful (Baglama et al., 2017). In addition, according to Ahmed (2018), a teacher’s ability to adapt and include diverse resources and technology helps create an accessible environment for disabled students. In fact, Ekeh et al. (2014) demanded the removal of all obstacles that could hinder or prevent the learning of disabled students to achieve positive outcomes and augment their academic performance.

For example, according to teachers’ responses in the workshops, IEPs for disabled students are an important approach that was suggested and emphasised by most special education teachers. Indeed, IEPs play a fundamental role in the academic literature on special education

and disability studies. For instance, teachers mentioned *'[...] they (disabled students) need specific educational programmes. [...] These could include an individualised educational plan that uses technology and different tools and methods to support each student's specific needs [...]'*. Moreover, *'[...] the ones (disabled students) who need programmes, plans and strategies planned specifically for them and for their learning abilities, [...] whether these include the teaching methods, an individualised educational plan, [...]'*. Thus, teachers seem to recognise the significance of including IEPs in their teaching of disabled students, which are planned according to each student's specific needs to support them. In other words, the IEP is a written document designed by a multidisciplinary team whose participation is considered beneficial and valuable for setting educational goals and delivering suitable educational and supportive services for disabled students (Debbag, 2017, Tran et al., 2018).

In fact, the 2001 RRSEP regulation in Saudi Arabia requires schools to consider the IEP as one of the most important educational services in Saudi mainstream education for disabled students who are designated as eligible for receiving special education services. Moreover, as further explained in Chapter Two, the RRSEP asserted that a multidisciplinary team as well as families should collaborate to develop an IEP that is suitable, addresses each individual's needs and describes several elements and components that are included in the IEP for the disabled student, such as general information, the current performance and level of the student, the educational services and methods that the student needs and the professionals who are included and who participate in the plan. Subsequently, the IEP should be reviewed and measured annually to indicate whether the aims and educational outcomes have been met or not (Alqurni, 2013; Al-Shammari and Hornby, 2020). However, many more details of IEPs' development and implementation as well as evaluation and assessment procedures for disabled students are highlighted in the RRSEP regulation to clarify the long process and its decision making (Almoghyrah, 2021).

In a similar view, the IEP approach is asserted in the Individuals with Disabilities Education Improvement Act (DEIA) (United States, 2004). This legislation emphasises that a

multidisciplinary team that could include the child's general and special education teachers, parents, therapists and counsellors must consider, prepare, develop, implement and finally evaluate an IEP for each student based on that child's individual strengths, weaknesses, interests, likes and dislikes. An IEP also includes strategies and methods to help children be more interactive and to support their specialised needs (Mitchell et al., 2010).

Undoubtedly, the implementation of IEPs was regulated in Saudi Arabia's mainstream education. Correspondingly, the special education teachers in this research are expected to recognise and acknowledge the IEP as a crucial element and educational strategy that must be implemented in their classroom settings and in the organisation of teaching disabled students. These findings highlight that the teachers effectively implemented a unique IEP approach in the student learning environment, perhaps due to their high educational level and the subject knowledge they have obtained from their teaching experience.

However, according to the academic literature in the context of Saudi Arabia, the IEP policy has not always been executed properly for disabled students at some point (Almoghyrah, 2021). More precisely, according to Alquraini (2011), the assessment process, for example to determine the specific needs of the student, was not completed by a multidisciplinary team, which means there is insufficient cooperation among team members. Instead, special education teachers and school psychologists are the most responsible ones for defining a student's eligibility for special education services. Additionally, Al-Nahdi (2007) demonstrated that assessment tools, such as IQ tests, adaptive behaviour scales and academic scales, are not adjusted to Saudi cultural standards to suit all disabled students; instead, these assessment tools are difficult to use and inaccurate for assessing disabled students. Nevertheless, the teachers in this study portrayed their willingness to support and work with disabled students to extend the use of a variety of teaching support methods, such as IEPs.

Consequently, it is clear that the IEP is one of the most fundamental educational services in primary education schools, and it is specifically mentioned and recognised as an additional support designed for each disabled student (Alquraini, 2011).

Overall, given the knowledge I have acquired from teachers regarding their effective and comprehensive insights, it can be recognised there is something positive and effective linked to special education teachers' beliefs and understandings of disabled students. Even more clearly, even though the teachers seem to be exposed to following the medical model more often due to Saudi Arabia's legislation and education system for disabled students, their beliefs and attitudes towards disabled students can be dichotomised into two perspectives that relate to the medical and social perspectives. However, teachers are more likely to advocate for inclusive approaches that meet the aim and the principles of the social model, although they have not been exposed to it in Saudi Arabia. In particular, teachers believe their main goal is to support disabled students as much as possible and remove barriers from their academic lives, as well as from students' social experiences in the schools, to some extent. This belief system is also reflected in how teachers tried to change other individuals' views and beliefs that perceive disabled students as having a 'deficit'. These teachers encouraged individuals to enhance this group in disparate ways to help them live successfully and independently.

Additionally, the teachers' responses in this study assert their focus on organisational factors, teaching methods and multiple resources to support disabled students. An analysis of the following subthemes assists with interpreting their experiences with and attitudes about disabled students.

6.6.2 Subtheme Two: Teachers' Attitudes About and Experiences Regarding Working with Disabled Students

This subtheme aims to explore special education teachers' attitudes and beliefs towards teaching and working with disabled students. This is because teachers' attitudes towards teaching are considered a key factor that is consistently repeated in the academic literature as being associated with students' outcomes, whether positively or negatively (Lautenbach

and Heyder, 2019; Tarantino et al., 2022). Correspondingly, through online discussions hosted by Google Meet, teachers were asked in the workshops to share their overall experiences with and thoughts about disabled students and working with them. Accordingly, the data analysis revealed that most teachers exhibited positive attitudes and beliefs regarding their experiences working with disabled students. For example, Amal stated the following:

“I have chosen to work in the field of special education and find working with students with SEND enjoyable and valuable. I can be creative and create new approaches and strategies for teaching based on each child’s specific needs. Even though I teach the same students every year, I am still creative and develop new plans based on individual differences”.

Another teacher, Majd, added the following:

“First, I chose to study and graduate in the special education field, so of course my attitude towards SEND and working with them is positive and wonderful! I would like to help and support these students as much as possible. I try to include different techniques and strategies to ease the tasks and create an interactive environment to help them to learn, improve and develop new skills in their academics and life in general”.

Wejdan expressed a similar opinion:

“As a teacher in the field of special education, I understand that SEND students need extra support, and I enjoy working with SEND students. I can try anything that might help and encourage SEND students to learn and improve. I try to include different strategies, technologies and learning styles to simplify and justify the tasks and help them learn more effectively and become successful. Working with SEND students is very rewarding!”

The above examples revealed a clear emphasis on the teachers’ satisfaction with disabled students that was showcased in such phrases as *‘positive and wonderful’* and *‘rewarding’*. In addition, teachers mentioned their choice of the field of special education influences their positive attitudes toward disabled students and their work with them.

Field Qualifications and Educational Background as an Influencing Factor

According to the above teachers' examples, teachers emphasise their field qualifications and educational backgrounds as factors that influence their positive attitudes towards disabled students and working with them. In other words, their choice of university programme influenced their decision to become special education teachers, which then affected their attitudes towards working with disabled students.

This similarity among the teachers is supported by Yuker (1988), who found that a high level of education can be associated with positive attitudes towards people with disabilities. Furthermore, Parasuram (2006) and Wilczenski (1991) pointed out that the duration of the preparation and obtaining of a high-level qualification is determined to exhibit a positive correlation between teachers' attitudes and teaching. Thus, the preparation for teaching in their university programmes seemed to influence the confidence and positive attitudes of the special education teachers in this research.

It is essential to emphasise and draw attention to this point more clearly, teachers displayed their strong confidence in teaching disabled students, undoubtedly due to their university programme in Special Education. In particular, during their studies in that programme in the final year, there is a training semester, which takes place during their last semester before graduation, prepares future teachers with fieldwork in special education as pre-service training to foster teachers' skills, understand disabled students and build their confidence. This is the standard of higher education in special education for one's university studies in Saudi Arabia. Hence, teachers have completed a wide range of multiple modules and are prepared to work with disabled students. For example, teachers are required to learn and develop professional skills for implementing IEPs for disabled students, which could be considered practical preparation for teachers. Subsequently, it would be expected that special education teachers will develop their attitudes and perspectives positively towards disabled students and support them effectively and individually.

Teacher Self-Efficacy and Attitudes as Influencing Factors

In addition to the above, teachers highlighted their ability and self-efficacy to work with disabled students as being due to their knowledge and understanding as special education teachers. For instance, teachers stated, *'[...] I try to include different techniques and strategies to ease the tasks and create an interactive environment [...]', '[...] I can be creative and create new approaches and strategies for teaching [...]' and '[...] I can try anything that might help and encourage SEND students to learn and improve [...]'.* These results correspond with the research of Brady and Woolfson (2008), who found that teachers' self-efficacy and competency could influence their attitudes towards working with disabled students and successfully facilitating their learning. In fact, teaching efficacy is related and refers to an individual's feelings about his/her ability to facilitate learning successfully (Brady and Woolfson, 2008). Similarly, according to Bandura (1997, p.3), "teachers' self-efficacy may be conceptualized as individual teachers' beliefs in their own (personal) ability to plan, organize, and carry out activities that is required to attain given educational goals".

Attitude, on the other hand, in broader terms according to Eagly and Chaiken, 1993, p. 1, is a "psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour". As a result, according to Savolainen et al. (2012), there is a positive correlation between teachers' attitudes and their self-efficacy. That is, teachers who believe in applying inclusive practices with a range of teaching methods can develop more positive and effective attitudes. Furthermore, according to Stein and Wang (1988), teachers with strong self-efficacy beliefs are more likely to adapt and modify teaching methods and learning environments to fit each individual's specific needs. This is also confirmed by Al-Alwan and Mahasneh, 2014, who noted that teacher's self-efficacy perception is critical as this affects different aspects of teaching, including the use of different and effective methods and strategies in teaching, which ultimately impacts students' motivation, outcomes and achievements in the classroom. This is also consistent with many teachers' perspectives in this research, as mentioned previously by the teacher. For example, *"I try to include different*

strategies, technologies and learning styles to simplify and justify the tasks and help them learn more effectively and become successful”.

Overall, teachers' attitudes, which are also influenced by their knowledge of disability, are significant for the implementation of inclusive practices that support disabled students with diverse teaching methods and strategies in an encouraging environment (Savolainen et al., 2022). Accordingly, teachers seem to recognise their teaching requires a lot of work to support disabled students. However, teachers illustrated their acceptance of and willingness to work and interact with their students positively.

Reflecting back on the discussion in Chapter four, these findings are supported by the cognitive and affective components of Eagly and Chaiken's (1993) attitude model. Thus, the cognitive component is related to individuals' thinking and beliefs, while the affective component concerns how an individual feels about an idea or notion (Eagly and Chaiken, 1993). In this research, this attitude appeared in teachers' feelings of acceptance of disabled students and their ideas to work and include a range of approaches and strategies.

Overall, the findings indicate that teachers are highly confident about their ability and skills in working with disabled students successfully in their classrooms. Furthermore, it is clear that teachers' attitudes and self-efficacy stem from their educational backgrounds and field qualifications. These findings also confirmed that these special education teachers' thoughts reflect their favourable feelings and confidence about working and interacting with disabled students. For example, most teachers explained that they were interested in special education programmes and work in that field. Hence, their decisions to study and work in the special education field shaped their positive attitudes towards working with disabled students.

Teaching Experience as an Influencing Factor

In addition to the field qualification and educational background and teacher self-efficacy and attitudes that the data suggested and that was discussed above, the data analysis revealed another influential factor that affects teachers' attitudes. In other words, a few teachers

emphasised that their positive attitudes towards teaching disabled students originated from their years of teaching experience. Majd expressed the following opinion:

“I have been working as a special teacher with SEND students for 13 years, and I understand how much work I must do with these students to support them. I find that working with them encourages me to learn and build new strategies and skills that I can apply to our teaching environments and classrooms. [...] For instance, at the beginning of my teaching career, I was not interested in adopting or including multiple tools and technology in teaching, but now I feel I cannot teach without using technology!”

A similar thought was expressed by the teacher Maha.

“My teaching experience in the school has been around nine years with SEND students, so I learned a lot. I mean, I learned how to interact with my students differently and create a positive classroom environment. For instance, if the student could not learn by listening to my instruction, I could visualise the information and use colourful cards or even now use technology more often these days”.

Sarah also reported this:

“My long years of teaching experience and working with SEND students has helped me a lot. I have had nine years of teaching experience since I graduated from university. Each year, I can better understand SEND students and their needs and, accordingly, provide them with the best support. For example, I discovered that it is beneficial to plan and display a timetable for each student to prepare them for what is going to happen and what is to be done throughout the day. If the students do their tasks, I reward them immediately. This makes it exciting for my students to see their progress! Previously, I had used just one timetable for all the students, which was much less effective”.

These examples clearly demonstrate another significant reference point that the teachers mentioned for this subtheme, which is the extent of teachers' experiences. For example, *‘I have been working as a special teacher with SEND students for 13 years’*, *‘My teaching experience in the school has been around nine years’* and *‘I have had nine years of teaching experience since I graduated from university’*. Thus, the teachers in this research demonstrated that the experience that they gained by teaching and working with disabled students is another predictor of their favourable attitudes towards working with and supporting these students.

These experiences helped them learn more about their students and what they should include and exclude from their teaching environment.

The academic literature reveals that teachers with more instructional experience are more likely to support their students than teachers without experience or teachers with little experience (Monsen and Frederickson, 2004). Similarly, Tarantino et al. (2022) noted an alignment between teachers' attitudes and their years of teaching experience: The more years of experience they have, the more positive a perspective they hold. Likewise, Casebolt and Hodge (2010) suggested that teachers with more years of support for disabled students have a stronger positive sense of working with these students.

Therefore, the literature acknowledged that the more years of teaching experience that teachers have, the more their attitudes are enhanced towards disabled students and, accordingly, working with them (Hersman and Hodge, 2010; Hodge et al., 2009).

Summarising the outcomes of these findings, there is growing consensus that teachers' individual and personal factors, such as their background knowledge, their field, their qualification in special education and their years of teaching experience, do shape teachers' attitudes on such issues. In other words, these findings depict that teachers' personal and professional experiences are obvious components and indicators of their positive attitudes towards disabled students and working with them. Although the personal and professional influences of the study's subjects differed slightly, they shared common ideas about being strong advocates for disabled students and supporting their learning and education. Whether via their course of study, self-efficacy and attitudes, professional teaching experience or a combination of both, they had strongly positive attitudes towards disabled students and working with this student population. In fact, teachers described their work with students with disabilities as *'enjoyable and valuable'*, *'positive and wonderful'* and *'rewarding'*. The literature supports this conclusion. For instance, these results correspond with the cognitive and affective

components of Eagly and Chaiken's (1993) attitude model, which is further explained in the literature review chapter four (Figure 4-1).

Regarding teachers' perspectives thus far, another significant finding found in this study concerns other individuals' and non-disabled students' attitudes towards disabled students. Having analysed and discussed two subthemes in this chapter, the final one, which I explicate in the next section, relates to other individuals and non-disabled students in mainstream schools' attitudes and their beliefs about disabled students from special education teachers' perspectives.

6.6.3 Subtheme Three: Teachers' Attitudes Towards the Negative Experiences of Their Disabled Students

This last subtheme in this chapter critically explores teachers' attitudes towards the negative experiences of disabled students. The subtheme was developed from analysis of teachers' answers and discussion in the online workshops. Consequently, the focus of this subtheme is to explore the experiences of disabled students in mainstream schools from the teachers' perspectives. As a result, teachers' discussions during the online workshops shifted to address and confirm this issue because, as they mentioned, they always pay attention to disabled students and their experiences with neglect and difficult social experiences, specifically, in school, and they would support them positively. Moreover, they mentioned that it is vital to raise awareness and build positive attitudes towards disabled students in society to change negative attitudes and some kind of exclusion. Vygotsky (1995) believed that teachers should seek a high level to change other individuals' negative attitudes towards disabled students, as this would be influential and would be passed onto future generations' attitudes (Gellman, 1960). Hence, this lack of awareness is introduced in distinct ways in Saudi society through the viewpoints of the teachers in this research. For instance, most perspectives that emerged from the data analysis of teachers' views related to rejection, fear, bullying, and discrimination towards disabled students from non-disabled students and other individuals in society. That is, most teachers agreed that non-disabled students or other individuals in society seem to

display a passive attitude and less social acceptance of disabled students. This can build to explicitly difficult social experiences, such as verbal and non-verbal bullying, or implicitly difficult social experiences, such as rejection, prejudice, and discrimination. For example, the teacher Maha shared one example on this topic:

“One normal student in the school passed by the classroom of my students with special needs and told me that she felt afraid when she saw the special needs students. I tried to talk with her and find out why she felt like that. I told her that they were students just like her, and there was no reason to be afraid of them, especially because she had not talked or interacted with them, so why should she feel like that?!”.

In a similar sense, the teacher Amal had a similar comment:

“I can see normal students in school avoiding coming to talk or play with special needs students and feeling afraid, and of course, this can affect my students’ feeling of confidence and their personality negatively and show less acceptance with each other”.

Teacher Majed expanded on this remark by stating the following:

“I sometimes see normal students running away when they see students with special needs. These students can recognise if others accept them or fear them, which can reflect in their confidence and how they behave”.

These examples clearly demonstrated that disabled students encountered less acceptance and some kind of prejudice and discrimination from non-disabled students in the schools through the eyes of the teachers in this research. For example, *‘she felt afraid when she saw the special needs students [...] [S]he had not talked or interacted with them’, ‘avoiding coming to talk or play with special needs students and feeling afraid’ and ‘running away’.*

Based on these examples, it is evident that such behaviours and perspectives, without being based on evidence and witnessed interactions on the parts of non-disabled students, can affect the inner well-being and development of disabled students and make them think that they do not belong to the same community and environment and that they are different (Villa and Thousand, 2002; Broomhead, 2019). Correspondingly, academic research that contributes to both psychology and disability and rehabilitation studies (Armstrong et al., 2016;

Wilson and Scior, 2014) has found that some kinds of behaviour that non-disabled students present can convey their negative attitudes towards disabled students, for instance feeling uncomfortable during interactions, avoiding playing and sending passive signals through body language or eye contact. Furthermore, according to Okagaki et al. (1998), frequent interaction and sharing activities during free time between both disabled and non-disabled students are important and can signify non-disabled students' attitudes toward disabled people.

Accordingly, the actions and perspectives that non-disabled students displayed as teachers mentioned demonstrated their passive and unfavourable interaction and communication with disabled students.

The teachers also reported that actions and attitudes related to difficult social acceptance experiences could have a negative impact on disabled students' confidence and how they act. In other words, non-disabled students who avoid contact or interaction with disabled students, including those who even run away when they see disabled students, can cause harmful social consequences for disabled students. This corroborates the findings of Baglieri and Shapiro (2012), who noted that a negative reaction from non-disabled students could have a significant impact on the self-esteem and feelings of inferiority of disabled students and could affect their relationships and interactions in public spaces (Butler and Bowiby, 1997). Furthermore, a range of academic literature indicates that less and low acceptance of disabled students impacts and causes difficult academic experiences as well as socio-emotionally challenging experiences as students grow (Roffey et al., 1994; Walker et al., 2001; Odom et al., 2006).

Moreover, Sarah narrated a story that showed how some behaviours can consistently reflect and lead to the means of abuse and harm for disabled students and could impact their self-confidence:

"I remember when I went on a mission to teach at another school for one year. One day, I suddenly could not find one student in the classroom. After a while, I found her hidden under the table and over time realised that she did this constantly. It turned out that when her classmates passed by the resource room, she wanted to hide, so they could not see her studying there

because they were bullying her about it. So, as a teacher, I tried to explain to her why she was studying there and build her self-confidence so that she could talk with her classmates”.

This example also shows the ways in which disabled students can be subjected to harmful abuse and bullying by their classmates. According to Lindsay and McPherson (2012, p. 101), ‘bullying’ refers to “intentionally harming another through verbal harassment, physical assault, exclusion or other methods of coercion”. Thus, the teacher seemed to recognise the possible harm from bullying that the student would experience from non-disabled students that could impact the disabled student negatively; the teacher tried to build her self-confidence accordingly by explaining and talking with the student. This coincides with Lindsay and McPhersons (2012) results, which indicate that disabled students often experience difficult social outcomes regarding bullying from their peers in school. Such outcomes often appear as a lack of confidence on the part of disabled students. Moreover, according to Vreeman and Carroll (2007), disabled students who experience bullying face negative social consequences related to disruptive behaviour, low-quality friendships and a lack of social skills and confidence.

Notably, then, these examples of teachers’ viewpoints show that disabled students often encounter difficult social experiences and hostility towards their disability from non-disabled students, whether explicitly or implicitly. This was also recognised by Ainscow (2004), Oliver (1990), Barnes (2012) and Munyi (2012), who found that disabled students are likely to experience difficulties in school settings. These difficulties and challenges should be recognised and the teachers should be aware of their role in supporting and increasing awareness and acceptance of non-disabled students towards disabled ones; accordingly, they can be used to develop policies on bullying prevention and intervention to improve interactions between students and reduce such negative attitudes (Lindsay and McPhersons, 2012).

Based on the negative feelings towards disabled students that non-disabled students often have, they tend to avoid or minimise contact with them, which can decrease opportunities for disabled people to have positive experiences in their social lives.

In other words, disabled people who lack successful social experiences with non-disabled people are more likely to face challenges such as expectation of failure and negative moods (McFarlin and Blaskovich, 1981; Walker et al., 2001) as well as loneliness and possibly disruptive behaviour (Broomhead, 2019). Furthermore, disabled people who experience low levels of acceptance from non-disabled individuals can have weakened social and emotional development and problems building relationships (Walker et al., 2001). In contrast, disabled people who feel welcomed and accepted by others are more likely to get involved and be sociable (Lindsay and McPhersons, 2012).

In addition, even though special education teachers displayed their own acceptance of disabled students and enthusiasm for working with them, the teachers were fully aware that other people, whether non-disabled students in the school or other individuals in society, often exhibited avoidant behavior towards disabled students.

Other significant examples that teachers addressed were relevant to disabled students' experience of some kind of discrimination and how disabled students are recognised differently by others. For instance, Afnan, a teacher, stated the following:

“I have noticed that people, whether in school or society, still have negative attitudes towards students with special needs. For instance, they are less accepting and sometimes reject students. They may even block their participation in activities and events”.

Similarly, the teacher Wejdan expressed the following:

“I have observed that others have less favourable attitudes towards special needs students being involved in social activities”.

According to the teachers' perspectives, these examples revealed how disabled people still suffer from non-engagement and exclusion in social activities and events. In line with these

findings, Kumashiro (2000) and Goodley (2014) argued that discriminatory attitudes are part of disabled students' experiences in schools. In this context, 'discrimination' means excluding disabled people from becoming involved in and engaging in common public social spaces and limiting their participation in social life (Szumski et al., 2020). Thus, a possible explanation could be that the non-disabled and other individuals in the Saudi community must raise awareness and understanding of disabled students and disability rights and justice in general to change their attitudes positively. Henry et al. (1996) confirmed that the view of the broader community is important and shapes positive and favourable attitudes towards disabled students, which can impact their daily living and social participation (Rillotta and Nettelbeck, 2007). In addition, it can be seen that the teachers in this study tried to understand the reasons behind the poor interaction between non-disabled and disabled students in schools, and they used this knowledge to encourage better connections between these two groups of students.

Drawing on the above, the key possible explanation here for these findings and some kinds of negative attitudes in Saudi society towards disabled students is the lack of a clear overarching understanding of the meanings of disability and disabled people. For example, the medical model of disability is inherent in Saudi Arabia, which could be viewed as contributing to the cause of passive attitudes and discrimination towards disabled students. To clarify, the medical model view of disability as an individual defect that needs to be fixed can contribute to negative stereotypes and misconceptions about disability and disabled individuals, which then can lead to social exclusion, bullying, and discrimination. Further to this, disabled people can experience marginalization because they are not given equal opportunities to participate and interact in social activities and educational environments as others.

In addition, the education system for disabled students in Saudi Arabia mainstream schools could play a role. More specifically, school systems with self-contained or special classrooms for disabled students in mainstream schools and the inadequate awareness and knowledge in Saudi schools could be perceived as a clear influence of less acceptance and participation in schools and society that cause negative attitudes toward disabled. In other words, the

placement of disabled students in self-contained classrooms within mainstream schools, neglecting the benefits and the significance of inclusion and interaction with non-disabled students, could actively result in less acceptance towards disabled students and increased bullying and social exclusion. Al-Faiz (2006, p. 21) explained and supported this concept, stating the following:

“lacking of awareness and training among public school teachers about students with disabilities, the fear that students with disabilities may endanger students in the population, the notion of educators that the equal but separate theory is the best way teach students with and without disabilities”.

Thus, all these reasons and their placement in self-contained classrooms could result in negative attitudes and less acceptance of disabled students.

Equally important, these self-contained classrooms in mainstream schools for disabled students can send a message to non-disabled students that they are different and do not belong in the same non-disabled environment and public spaces. Accordingly, the non-disabled students treat them differently. Other research studies have shown a positive correlation between non-disabled students' attitudes and being and learning in inclusive settings. Consequently, non-disabled students learning alongside disabled students have significantly better attitudes towards disabled students (Boer et al., 2012; MacMillan et al., 2014). In addition, Thurneck (2008) suggested that non-disabled students' attitudes towards disabled students can improve with the time these students spend with each other in inclusive classrooms. In addition, positive attitudes can be built towards disabled students successfully by adapting the physical space, the environment and activities to be suitable for all (Jinnah-Ghelani and Stoneman, 2009).

Therefore, despite the many policies in Saudi Arabia that seek to address the rights and well-being of disabled students in academic and social life, disabled students still experience and suffer from societal challenges, particularly including the mainstream schools they attend. Hence, negative attitudes could be the most significant barrier in this context that impacts

disabled students' social experiences and their full participation in schools and communities. Therefore, comprehensive changes and critical efforts are necessary to dispel such negative attitudes, achieve the improvement and success and develop a better understanding of disability and disabled students.

In summary, given the insights of this data analysis in this chapter, I have argued that the social model provides insight into and a critical understanding of the reasons for the discrimination that disabled students experience in school and in society in general. In other words, the negative attitudes and perspectives that disabled students face in educational environments can be attributed to society's negative perceptions. Accordingly, the social model identifies societal attitudes and practices as the main contributory factors to the exclusion of disabled students.

Significantly, the focus of this subtheme discussed the difficult social experiences of disabled students from the perspective of their teachers in mainstream schools. The difficult social experiences according to teachers could affect disabled students' daily life experiences in Saudi Arabian schools and society, not only non-academically but also socially.

These findings and the aforementioned arguments can reveal and connect to attitudinal components, including cognitive, affective and behavioural components (Eagly and Chaiken, 1993). In other words, how other individuals think, feel and react towards disabled students clearly demonstrates their attitudes.

In addition, teachers portrayed how other individuals predominantly and differently display negative attitudes towards disabled students in schools. For example, the teachers in this research reported several stories of many actions, whether explicit or implicit, and how disabled students were discriminated against not only by non-disabled students but also by other individuals in society, such as prejudice, discrimination, negative views and rejection. Disabled students are also subjected to non-verbal negative attitudes and discrimination from non-disabled students and other individuals in society, as reported by teachers.

6.2 Chapter Summary

In this chapter, I covered the first main theme of the findings of my research, which concerned understanding the experiences of disabled students through the eyes of special education teachers. This theme discussed teachers' general perceptions and understanding of disabled students and how they learn, as well as their learning environments in mainstream schools. It also focused on teachers' attitudes and experiences working with and supporting disabled students. The first subtheme focused on teachers' understanding of and beliefs about disabled students. It was found that teachers presented two perspectives relevant to the medical and social models of disability. To clarify, teachers' understanding of the medical model of disability appeared in their descriptive language and use of terms such as 'normal' and classification language (e.g., intellectual disability and learning disability) when referring to disabled students. In other words, the influence of the medical model is evident in the language used, particularly in terms such as 'normal' and classification terminology. However, they are likely to encourage and work with the social model of disability and remove barriers to enhance disabled students' learning, even though they were not previously exposed to this model in Saudi Arabia. The second sub-theme targeted teachers' attitudes towards and experiences with working with disabled students. It was found that teachers have strongly positive and accepting attitudes and enjoyed their experiences with disabled students that were influenced by different factors such as their educational backgrounds, subject knowledge, self-efficacy and attitudes, and years of teaching experience in special education. The third and last subtheme focused on teachers' attitudes towards the negative experiences of disabled students and how their students encountered kinds of negative social experiences from non-disabled students and other individuals in society. Although this study did not aim to explore this issue at the outset, the teachers confirmed their need to address it to raise awareness and build positive attitudes towards disabled students. The results of this finding discerned that disabled students face multiple negative attitudes, less acceptance and a lack of awareness in the schools in particular and the broader community.

Chapter 7: Data Analysis and Findings: Teachers' understanding and Experiences of Assistive Technology Before, During, and After the COVID-19 Pandemic

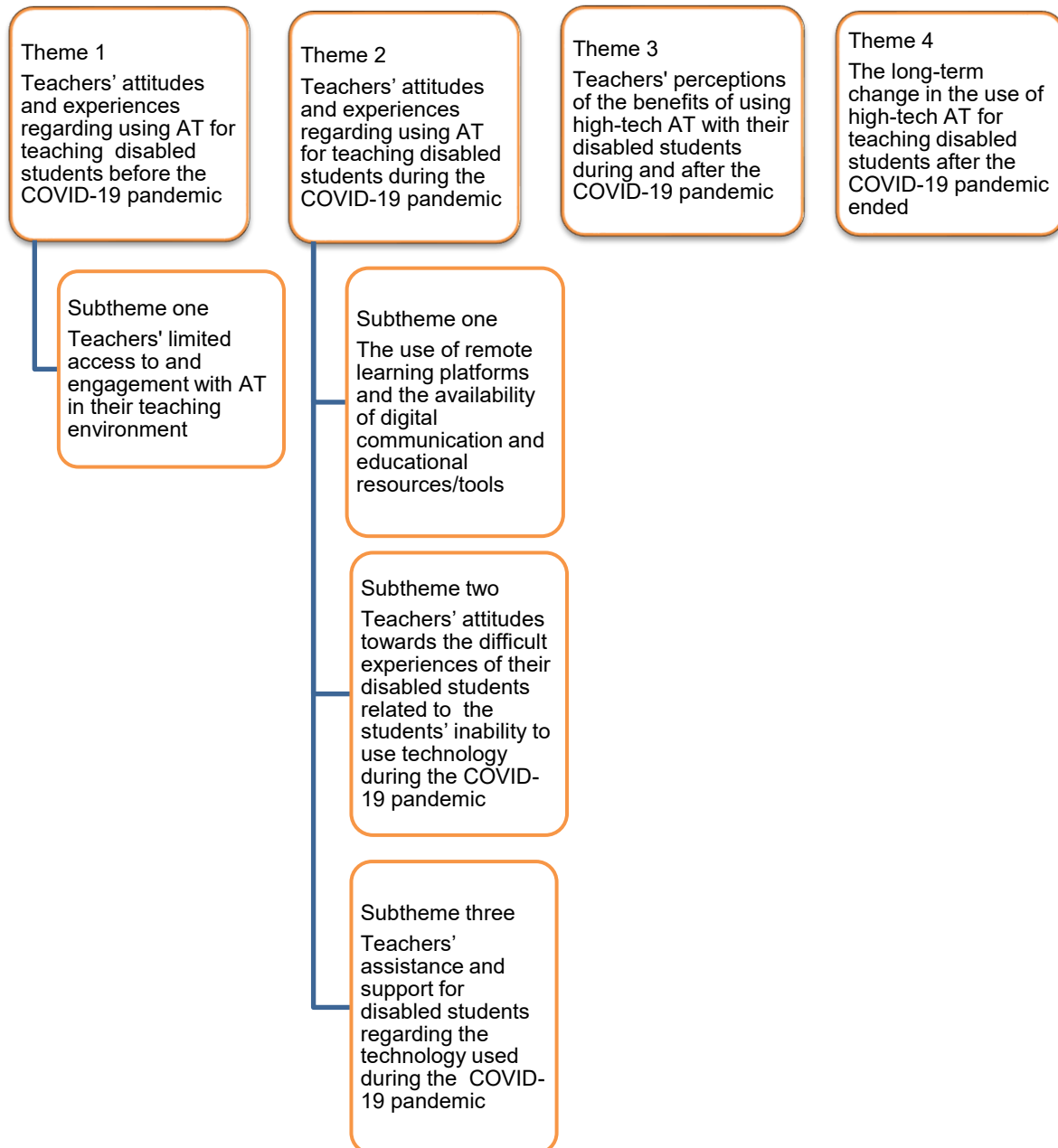
7.0 Introduction

The previous chapter covered the findings of this research's first theme and its related subthemes, which focused on teachers' general understanding, experiences, and perceptions of disabled students, how they learn, and their learning environments in mainstream schools in Saudi Arabia. In this chapter, I will critically explore the teachers' understanding and experiences of using assistive technology (here by AT) for teaching disabled students before, during, and after the COVID-19 pandemic period. Through the three online workshops conducted with special education teachers via the Google Meet platform, multiple themes and relevant subthemes emerged from the data analysis. The first theme in this chapter explores how special education teachers used AT in their teaching environment under face-to-face teaching conditions prior to the COVID-19 pandemic. The teachers were asked to describe their experiences regarding the use of AT and how they used AT to support their teaching and communication with disabled students (Figure 7-1). The one related subtheme relevant to the teachers' limited access to and engagement with AT in their teaching environment. Similarly, the second theme derived from the thematic analysis focuses on teachers' attitudes and experiences regarding using AT for teaching disabled students when the education and communication necessarily transitioned to remote during the COVID-19 pandemic. Three subthemes were developed as follows: (1) the use of remote learning platforms and the availability of digital communication and educational resources/tools, (2) teachers' attitudes towards the difficult experiences of their disabled students related to the students' inability to use technology, and (3) teachers' assistance and support for disabled students regarding technological challenges.

The third theme in this chapter focuses on the teachers' perceptions of the benefits of using high-tech AT with their disabled students during and after the COVID-19 pandemic. The final

fourth theme in this chapter discusses the long-term change in the use of high-tech AT for teaching disabled students after the COVID-19 pandemic. In the following sections, each main theme and its related subthemes are described, discussed, and interpreted in detail.

Figure 7-1 Main themes and related subthemes



7.1 Theme One: Teachers' Attitudes and Experiences Regarding Using AT for Teaching Students with SEND Before the COVID-19 Pandemic

This theme emerged from seeking an understanding of teachers' experiences regarding their use of AT in teaching disabled students face-to-face in their classrooms and how teachers taught and communicated with their students via AT before the pandemic.

7.7.1 Subtheme One: Teachers' Limited Access to and Engagement with AT in their Teaching Environment

This subtheme arose from the question of how special education teachers used AT in their teaching environment under traditional teaching conditions prior to the COVID-19 pandemic. Before exploring this further, it is important to note that there are multiple meanings and explanations of AT in the academic literature. The AT that is used in the educational process with disabled students has been classified in the special education literature in different ways (Chukwuemeka and Samaila, 2020). To start, AT has been classified into low technology (low-tech), medium technology (mid-tech), and high technology (high-tech) forms (Nsofor and Bello, 2015). According to Chukwuemeka and Samaila (2020) and Aldehami (2022), low-tech AT includes items that are available, inexpensive, easy to use and adapt for disabled students, and do not require electricity, power, or training. Examples are items such as pencil grips, print books, highlighters, pens, worksheets, large print cardholders, communication picture boards, and visual schedules. Mid-tech is the next level of AT and is more complex than low-tech but remains uncomplicated, has a moderate cost, and requires little training. This includes tools such as audiotape recorders, talking calculators, personal spelling devices, and electronic dictionaries (Alkahtani, 2013; Nsofor and Bello, 2015). High-tech AT is the most expensive and complex, is generally difficult to find in schools, requires ongoing maintenance, and demands more training and advanced skills to be able to use. High-tech AT includes electronic and complex devices such as computers, portable dictionaries, electronic tablets such as iPads and other advanced tablet computers, interactive whiteboards, and alternative keyboards (Nsofor and Bello 2015; Aldehami, 2022).

The use of AT can be viewed from several different aspects in addition to its complexity level, such as 1) the types of disabilities (intellectual, hearing, and learning) that the AT is suited to assist; 2) the types of tasks, such as reading, writing, and communication, that the AT is able to support; and 3) the frequency of AT use in the classroom. Indeed, all of these aspects are important and can support disabled students in different ways (Alghayth, 2019); however, to maintain a clear focus for this research, the discussion with teachers was centred on the categories of AT used in classrooms, with a specific focus on the high-tech forms of AT. Therefore, during the online workshops, the teachers were asked to describe their experiences and engagement with high-technology AT devices in teaching and how they used them to support their teaching process and their disabled students in the classroom and learning environment. The teachers were asked about the complexity level of the AT they used with their disabled students, about the high-tech AT tools that were available to them, and specifically what AT they used in their classrooms when teaching disabled students in mainstream primary schools.

The data analysis revealed that most of the teachers presented similar experiences of limited use and engagement with high-technology AT in their pre-pandemic SEND classrooms. They reported a dependence on low-technology AT and traditional tools. For example, a teacher named Majd said:

“Before the pandemic, the teaching and learning of students with SEND depended on real things and sensory tools such as the board and cards [...] technology was not often used due to a shortage of technology in the classrooms, and whether I used it depended on my teaching goal. So, it was a teacher’s choice to use technology or not.”

Another teacher named Maha described a shortage of technology in the classroom:

“Before COVID, I did not always use modern technological devices, such as a laptop, iPad, and projector, as I use them now, due to unavailability in the classroom. My use depended on my lesson plan and goals. Instead, I usually used physical objects and traditional tools because they were more accessible.”

The teachers Afnan and Amal expressed similar ideas related to their pre-pandemic teaching with traditional tools:

“Before the pandemic, my use of technology was restricted due to its limited availability in the school [...] I can say my teaching and the education for students with SEND relied on real things, sensory tools, and instruments; for example, we used books, cards, sand, sponge letters and numbers, worksheets, and pictures.” (Afnan)

“Although I used technology such as a computer and iPad before COVID, the focus was more on sensory and traditional tools, such as a board, cards, books, stickers, numbers, sponge letters, and letters on worksheets.” (Amal)

These teachers’ comments clearly revealed their pre-pandemic limited engagement with ‘modern’ high-technology AT in their classrooms and teaching environment; instead, they described their use of “real things,” meaning physical objects and sensory tools, such as books, cards, toys, sand, boards, and sponge letters when teaching disabled students. In fact, it seems that the teachers believed that disabled students needed these tools to touch, hold, and play with to sense, learn, perform crucial tasks, and develop their fine motor skills as well as enrich the learning environment for disabled students.

Of course, these physical and non-electronic devices and tools can be considered low-technology AT, and it has been observed that low-tech AT is the most common form of AT used among teachers when teaching disabled students due to the reasonable cost of these items and materials, as well as their easy availability (Aldehami, 2022). Accordingly, the teachers in this research reported having a focus on and usage of low-tech AT with their disabled students more often than other types of AT. Although they mentioned choosing to use their personal devices sometimes, they added that it was infrequent due to inaccessibility in their schools and classrooms.

These results concur with those of other studies. For instance, a study conducted by Abu-Alghayth (2019) in Saudi Arabia used mixed methods to explore teachers’ perspectives on the use of AT with students with severe intellectual disabilities and the effectiveness of AT. A total of 92 teachers from four special education schools were surveyed, and five teachers were

interviewed online. The results showed that a majority of the teachers (64.1%) used low-tech AT almost every day with their students, which was greater than their use of mid- and high-tech AT. Only 28% of the teachers used mid-tech devices, and only 2–3 days per week, while 47% of the teachers reported never using high-tech AT with their students due to the lack of these devices. Another study used a survey completed by 51 teachers from 166 schools to investigate special education teachers' use of AT types with disabled students. The findings of this study showed that teachers used low-tech AT most frequently and that high-tech devices were “never being used” (Flanagan et al., 2013, p. 29). These findings clearly show substantial usage of low-tech AT among teachers of disabled students, and a corresponding lack of high-tech AT usage and availability in schools. This is in accordance with the findings of this research.

However, these kinds of low-tech AT are seen as not fully supporting and encouraging disabled students' learning in the classroom. In other words, with the technological advancement and even revolution of recent decades, low-tech AT is seen as a basic primary resource and more of a crutch than an effective academic support tool (Rowlands, 2015). In addition, one significant goal of including AT in the teaching process is to help disabled students become more independent in learning and communication (Mechling, 2011). So, disabled students rely on their teachers to support them and provide them with appropriate and necessary tools and strategies to help them learn independently and successfully. This means that teachers play a critical role in the integration and implementation of AT in the educational setting and advocate for the necessity of including AT in classrooms for disabled students (Alghayth, 2019).

It is obvious that there is a need for more high-tech AT in Saudi public schools and classrooms to support disabled students' learning. The lack of AT devices in classrooms for students with SEND prevents teachers from offering effective lessons to properly meet their students' differing needs in the classroom. Regarding this research, it is notable that there was a clear lack of teachers' use of high-tech AT before the pandemic. To clarify, the teachers cited a lack

of availability of high-tech AT devices and equipment in their schools and classrooms as the main significant barrier preventing them from using AT and encouraging their students to use it. The phrases *“due to unavailability in the classroom,” “due to a shortage of technology in the classrooms,”* and *“limited availability in the school”* clearly exemplify the teachers’ experiences with high-tech AT before the pandemic. These results are in line with other studies, such as one conducted in Riyadh by Al-Moghyrah (2017) to explore special education teachers’ attitudes regarding their use of AT with students with Down’s Syndrome. That study surveyed a total of 50 teachers from five mainstream schools, and the results showed that teachers believe that AT is a beneficial tool that can be used to support the academic and social lives of students with Down’s Syndrome. However, the teachers in that study described having a lack of support for and use of AT resources in their schools. Another study that revealed a similar finding focused on elementary special education teachers’ knowledge and use of AT in schools with disabled students (Alharbi, 2018). That study demonstrated that most teachers have a fundamental understanding of how to use AT, but they reported that they do not often use AT with their students due to limited access to AT in their schools. In the same vein, according to Ajuwon and Chitiyo (2016), the biggest obstacles that teachers faced in schools at that time related to the use of AT were a lack of AT in classrooms, financial constraints, and a lack of training.

To summarise, the different studies that have been conducted to investigate the status of AT usability in teaching have all highlighted and confirmed that the main challenge faced by teachers working with disabled students that hinders their effective use of AT is the lack of availability of high-tech AT in their schools and classroom environments. Likewise, the thematic analysis of the workshops in this research resulted in acknowledging and identifying limited support for high-tech AT as the main concern that teachers experienced in their teaching environment before the COVID-19 pandemic. The teachers in this research indicated that their approaches to teaching disabled students depended on physical objects and sensory tools, which means they engaged their students with low-tech AT when teaching before the

pandemic due to its availability and the difficulty of finding high-tech AT in the classrooms. Nevertheless, it is worth mentioning again that the teachers in this research demonstrated and emphasised their self-efficacy, strong positive attitudes, and deeply held beliefs in supporting and working with disabled students in their schools and classrooms. This included using AT and a variety of teaching methods to help them learn and succeed in their academic lives, despite not having access to the best technology resources.

The possible reasons behind the insights that teachers provided regarding the limited availability of AT in Saudi Arabian schools should be discussed and explained. As explained in Chapter Two, it seems that official support from the Ministry of Education (MoE) for the use of AT and the provision of AT for disabled students is currently a relatively low area of priority in Saudi Arabia (Abu-Alghayth, 2020). Many countries around the world have created regulations and legislation to ensure the rights and provide for the needs of disabled people; there are also laws that address the need for AT in educational environments (Abu-Alghayth, 2020). In fact, according to Al-Mousa (2010), Saudi Arabia is one of those countries that created, enhanced, and guaranteed the rights of disabled people to receive a free, appropriate, and public education in the least restrictive environment (indicated by the Disability Code of 2000 and RRSEP in 2001, described in depth in Chapter Two). However, these changes to Saudi Arabian laws still do not clearly address the use and inclusion of high-tech AT by teachers of disabled students in mainstream schools (Abu-Alghayth, 2020). As Alquraini (2013, p. 608) stated:

“The RESEP does not underscore technology as an important service that should be provided for students with disabilities. Therefore, the schools in Saudi Arabia provide neither AT services nor devices to be integrated in the effective teaching strategies and that can support students with disabilities to live independently and access the general curriculum”.

As extensively covered and discussed in Chapters Two and Four, the special education policy that was developed and introduced in the RRSEP came from reviewing the United States' special education policies, such as the U.S. Education for All Handicapped Children Act (EHA)

in 1975, which was later amended to the U.S. Individuals with Disabilities Education Act (IDEA) in 1990. In fact, this latter act emphasises the inclusion of high-tech AT devices and services for disabled people when needed (Aldakhil, 2017). However, despite using the U.S. IDEA as a foundation, the Saudi RRSEP legislation does not include specific details, such as integrating technology and services to support special education services and learning for disabled students, as the U.S. IDEA does (Alquraini, 2013). Furthermore, the U.S. IDEA emphasises that the use of AT must be incorporated into the student's Individualized Education Plan (IEP) developed by multidisciplinary team members. This includes the child's general and special education teachers, parents, therapists, and counsellors, who together decide the why, what, how, when, and where of students' AT use (Abu-Alghayth, 2019).

In Saudi Arabia, however, even though the IEP is regulated and is considered one of the most important educational services in Saudi mainstream education for disabled students, and teachers are required to implement IEPs with their students, it lacks support for the integration of high-tech AT. This absence of guiding legislation has resulted in the lack of availability and implementation of high-tech AT among special education teachers for their IEP students in particular and in schools in general. In fact, the teachers in this research, as discussed in the previous chapter, indicated their readiness and strong positive attitudes to include multiple teaching methods and technologies, including IEP educational strategies, in their teaching processes to help disabled students learn effectively. They are fully aware of the importance of the IEP, but as the RRSEP regulation does not indicate the inclusion of high-tech AT as a specific resource, teachers found that their need for AT support and resource tools cannot be included in their IEP. In her study, Alkahtani (2013) noted a severe lack of high-tech AT in the IEPs created for students by special education teachers in Saudi Arabia. She surveyed 127 teachers and conducted interviews with three teachers to explore their knowledge and use of AT when planning students' IEPs. She found that approximately 94% of the teachers did not consider including high-tech AT devices and services in their students' IEPs, and around 91.3% indicated that AT devices were not available in their schools. Furthermore, the recent

study by Abu-Alghayth (2019) confirms the previous findings and explains the rationale behind the lack of implementation of AT in the IEP. For instance, there are neither sufficient details nor accurate planning and guidance regarding the inclusion of AT in the IEP that teachers must follow; instead, teachers in Saudi Arabia have to follow the specified format for the IEP, which simply asks a general question whether the teachers use AT without requiring further details. Another reason is insufficient collaboration among multidisciplinary team members, which can affect the overall IEP process, including preparations for and implementation of the use of AT. As Smith (2007) confirmed, the successful use of IEP with disabled students requires a real partnership among IEP team members, which is often lacking in the Saudi IEP model.

In addition, several studies suggest that disabled students, especially in Saudi Arabia, have not yet received the support of AT services and devices to the degree that would be expected in the learning and teaching environment. These arguments all provide clear evidence that the teachers' experiences of primarily using low-tech AT with their disabled students prior to the pandemic were due to a shortage of high-tech resources and services in the schools. In other words, the analysis in this research reveals that the education system's support for AT has been surprisingly negligible. Therefore, there is a critical need for better policies and regulations to provide and include high-tech AT tools and services in Saudi public schools to support disabled students.

Having reviewed the teachers' experiences of AT use with disabled students prior to the pandemic, it is also critical to understand how teachers experienced teaching and supporting disabled students when they faced urgent changes in the education system during the COVID-19 pandemic and its necessary transition to online teaching approach.

7.2 Theme Two: Teachers' Attitudes and Experiences Regarding using AT for Teaching Students with SEND During the COVID-19 Pandemic

This theme emerged from seeking an understanding of how teachers and their students communicated and learned via AT during the pandemic. It also explores the teachers' and

disabled students' experiences of transitioning to the new learning approach used during the COVID-19 pandemic and their use of the remote learning and communication platforms and tools. This theme also covers the availability of AT-based educational and communication tools and resources. Several subthemes arose from the thematic analysis.

Three related subthemes were extracted from the data analysis as follows: (1) the use of remote learning platforms and the availability of digital communication and educational resources/tools, (2) teachers' attitudes towards the difficult experiences of their disabled students related to the students' inability to use technology, and (3) teachers' assistance and support for disabled students regarding technological challenges.

7.7.1 Subtheme One: The Use of Remote Learning Platforms and the Availability of Digital Communication and Educational Tools

The focus of this subtheme is the teachers' new and unique experiences in the transition from face-to-face teaching and communication to an online approach, especially in relation to their use of high-tech AT in teaching. During the online workshop, the questioning shifted to asking teachers to share in detail their experiences and opinions of the transition to an online teaching approach and how they modified their communication with their disabled students. They were also asked to discuss their use of AT devices and tools with their students when education worldwide shifted online, especially as they mentioned that high-tech AT was not available prior to the COVID-19 pandemic. Follow-up questions related to the supported platforms and resources they used to teach and communicate with disabled students.

The Tools and Resources Available for Effective Communication and Education

Following the outbreak of the COVID-19 pandemic in 2020 and the lockdowns associated with it, the education system in Saudi Arabia, as in all other countries, was forced to move online (Sidi et al., 2023). It was mandatory that teaching and communicating with students and their families become completely online at all educational levels. Saudi Arabia's Ministry of Education made the decision to convert all face-to-face teaching and educational

communication into an online format on 8 March 2020 (Shishah, 2021). Special education teachers were asked for their input about the AT tools, devices, platforms, and programmes that were available and could be used during the COVID-19 pandemic to complete the virtual teaching process and communication with disabled students.

As expected, the data analysis in this research revealed that most of the participating teachers said that high-tech AT became their primary teaching and communication tool, and they could use various tools and personal devices, such as laptop computers, mobile phones, WhatsApp, and iPads, in their teaching and communication with disabled students. For example, Maha reported:

“During the pandemic, there was a massive change in teaching and communication because everything went online. Education depended on technology, so it instantly became the primary tool for teaching and communication between students and teachers in virtual classrooms. In this period, we relied on computers, tablet devices, mobile phones, WhatsApp, and the internet for teaching and learning, and for assignments and assessments.”

The other teachers in the workshop had similar responses and experiences, as shown by the following examples:

“During the pandemic, I completely relied on technology to interact with my students due to the shift to online education. I used technology to teach and display various activities and videos using a computer and an iPad. [...] I also sometimes used WhatsApp to contact students, send announcements and tasks, or call the mothers of students and answer questions.” (Sarah)

“For me, communication and teaching completely went online during the pandemic, so I used a computer or iPad to display PowerPoints, videos, and audio recordings. Technology is a great tool that makes a positive change in teaching. I also used WhatsApp to communicate with my students and their families, send announcements, and/or record students’ voices for assessment purposes.” (Amal)

“Life changed during the pandemic, and communication and education became reliant on technology, so the iPad was the most effective tool I used in teaching. I also used WhatsApp for answering questions, communicating,

sending assignments, and doing some assessments of my students via voice recordings.” (Majd)

“During the pandemic and also after, I mostly rely on my personal laptop and the iPad for teaching students with special needs. I occasionally used WhatsApp for updating and answering questions, making assessments, and communicating.” (Afnan)

The teachers reported that the most effective tools they used during that period were their laptop computers, iPads, and the WhatsApp application on their smartphones. Indeed, these types of AT are considered high-tech AT and communication tools (Nsofor and Bello, 2015); therefore, the teachers finally had the opportunity to demonstrate their engagement, knowledge, and skills with different types of high-tech AT and a variety of activities conducted in teaching by using these devices and communication applications. In other words, prior to the COVID-19 pandemic, the teachers interacted more with traditional methods and low-tech AT, but during the period of online learning, the teachers quickly accepted the need to use high-tech AT and this acceptance resulted changes in their teaching and communication methodology as will be discussed further. In fact, this reflects their positive attitudes and knowledge toward the use of AT in teaching disabled students. To clarify, the teachers' expression in this research showed a strong acceptance of using their personal devices and tools for communication and teaching. They used these tools to display slideshows and videos, make announcements, play audio recordings, record their voices and request voice recordings from students, send tasks and assignments, make assessments, interact with students, and communicate with students' families when needed. In fact, they realised that online education and communication can create an effective learning and teaching environment (Zengin et al., 2011)

WhatsApp: Digital Communication and Educational Tool

These examples show the variety of activities that teachers conducted using high-tech AT via tools such as their laptops, iPads, and WhatsApp on their smartphones. Furthermore, based on the sample statements above, the teachers reported that they used a variety of educational

and communication tools to provide information and communication with their students and their families. However, this focus and preference for WhatsApp in these quotes might be because disabled students need additional support from their families to understand their assignments and tasks and to be able to complete them, especially during the new experience of studying online and the emergency closure of school buildings. These findings are consistent with other findings in the academic literature. For instance, Kosaretskii and Chernyshova (2013) demonstrated that WhatsApp could be seen as a communication tool between teachers and students for discussions, transmitting information, giving topic updates, making announcements, and announcing submission deadlines, all of which help students and their parents stay updated and informed (Kurtz 2014; Famularsih, 2020). Furthermore, WhatsApp proved to be a beneficial tool for teachers to use with their students during the time of physical distancing (Ramdhani and Nandiyanto, 2021). In line with this, teacher Sarah in this research also mentioned:

“For one of my students, if I contact her mother by WhatsApp, she can recognise it is me because of the photo beside my name. The same thing happens in school; if the student needs to contact her mother by WhatsApp, she recognises her mother from the photo without having to read her name or remember her phone number. That’s another way that technology can help us support students with SEND.”

Furthermore, the statement made by a teacher about a disabled student using WhatsApp to contact her mother or if the teacher contacted her is a great example of the role of technology in providing enhanced features and services that can support independence and communication skills for disabled students and reduce their reliance on others for basic communication needs. In other words, alongside the use of AT for teaching and learning, another aim of using technology for disabled students is to reinforce their independence in learning and communication. In this case, the use of WhatsApp with photo recognition achieved this purpose. As Devi and Sarkar (2019) mentioned, the use of technology helps disabled individuals to learn, grow, and access opportunities that might otherwise be inaccessible.

Accordingly, both the academic literature and this research's analysis show that WhatsApp can be a beneficial tool for teaching and has had a positive impact on communication between teachers and their disabled students, even though the direct communication could be with the family of disabled students due to their need for additional support and guidance. Notably, WhatsApp is considered a universal form of communication tool, so it is used globally and is popular in Saudi society as well (Aldakhil, 2017).

WhatsApp

According to Wasserman and Zwebner (2017), WhatsApp is the most popular communication and messaging smartphone application for sending immediate messages, photos, video clips, and documents that was established in 2009 by Jan Koum and Brian Acton (Yeboah and Ewur, 2014). Furthermore, WhatsApp is the most accessible and preferred communication tool among teachers of disabled students and their families (Yazici, 2015; Wasserman and Zwebner, 2017). In particular, in the Saudi context, during the COVID-19 pandemic, WhatsApp serves as a vital tool for both personal and educational communication, supporting social connections and enabling the sharing of assignments, tasks and feedback between family and teachers. According to the company itself (WhatsApp, 2017), WhatsApp Messenger is a flexible and secure application:

"[It is] a cross-platform mobile messaging app which allows you to exchange messages without having to pay for SMS. WhatsApp Messenger is available for iPhone, BlackBerry, Android, Windows Phone, and Nokia, and yes, those phones can all message each other! Because WhatsApp Messenger uses the same internet data plan that you use for email and web browsing, there is no cost to message and stay in touch with your friends."

"When end-to-end encrypted, your messages, photos, videos, voice messages, documents, and calls are secured from falling into the wrong hands. WhatsApp's end-to-end encryption ensures only you and the person you're communicating with can read what is sent, and nobody in between, not even WhatsApp. This is because your messages are secured with a lock, and only the recipient and you have the special key needed to unlock and read them. For added protection, every message you send has its own unique lock and key. All of this happens automatically: no need to turn on settings or set up special secret chats to secure your messages."

Accordingly, WhatsApp has an important feature that provides robust end-to-end encryption to secure data and ensures that only the communicating users can read the message sent between them (Bouhnik and Deshen, 2014). Therefore, it seems that WhatsApp is well suited for special education teachers to use for different purposes, such as communication, announcements, and answering mothers' questions. As affirmed by the participants, for instance, *"I also used WhatsApp for answering questions, communicating, sending assignments, and doing some assessments of my students via voice recordings."* *"I also used WhatsApp [...], send announcements, and/or record students' voices for assessment purposes."* To clarify, as teachers noted in these examples, the use of WhatsApp is varied, but the topics of conversations concentrate on important and essential issues. In other words, the conversations and discussions are related to the students' learning and academic situations. Prior to the pandemic, these conversations would have been done via personal meetings requiring attendance in the schools, but since the pandemic started, they are now done via a telephone call or a message on WhatsApp. Furthermore, another way the teachers used WhatsApp was to send daily reminders to the students' parents about the learning assignments so that the parents could stay immediately updated. Even though the App is convenient and has privacy settings that can help protect users' information, it should ideally be used alongside other educational platforms to ensure stronger protective measures. Therefore, achieving this balance is essential. Hence, further discussion about additional educational platforms can be found later in the chapter.

Overall, findings from this research showed how WhatsApp is being used to effectively support the education and communication aspects of disabled students.

In this way, the teachers were able to show their immediate shift towards incorporating technology, in this case, WhatsApp into education to enhance learning and communication between teachers and students. Also, teachers in their use of WhatsApp, were able to show interest in maintaining communication and collaboration with their students and their families

as part of meeting their needs as well as providing essential teaching and learning support during the COVID-19 pandemic. As Mayangsari and Aprianti (2017) noted, the use of WhatsApp maintains communication between teachers and students, which helps to build positive relationships that benefit the education and learning process. Overall, based on the above examples, it can be seen that WhatsApp played a critical role in facilitating educational interactions between teachers and their disabled students, fostering learning and communication, and providing immediate responses.

This section discussed teachers' experiences using WhatsApp as a digital communication and educational tool that was used for teaching, learning and communication during the COVID-19 pandemic. Following that, it is critical to explore, describe, and analyse the teachers' experiences of the other effective virtual platforms and tools that were designed and available for teaching disabled students during the COVID-19 pandemic, specifically the Madrasati platform and the iEN national e-portal. In other words, it's necessary to understand to what extent teachers could use and integrate AT into the learning/teaching process and design effective learning opportunities using their knowledge and skill with these platforms. In particular, we need to explore teachers' experiences during the COVID-19 pandemic and their effective use of high AT in terms of the competencies of the Technological Pedagogical Content Knowledge (TPACK) framework (Kohler and Mishra 2005).

The Madrasati Platform and Microsoft Teams as Synchronous Virtual Classrooms

After the teachers gave their insights into using the communication and educational tools, the discussion shifted to their experiences of the other virtual platforms and tools that were designed and available for teaching disabled students during the pandemic, specifically the Madrasati platform and the iEN national e-portal.

These two tools were established by the Saudi Ministry of Education during the COVID-19 pandemic as the primary virtual classroom and effective learning environment to enable teachers to teach students at all levels (elementary, intermediate, and secondary), including

disabled students. The teachers were also tasked with helping their students benefit from these online sources. The Madrasati platform and the iEN national e-portal were the main support resources and learning management systems that were used by teachers to teach and support disabled students. Several of the teachers offered their experiences and opinions on these platforms:

“During the pandemic, I mostly used a laptop and an iPad to log on to the Madrasati platform and Microsoft Teams. [...] The Ministry of Education offered the national education portal iEN, which enabled students and teachers to benefit from lessons on TV and YouTube with explanations and illustrations of different subjects and modules.” (Afnan)

“During the pandemic, I mostly used a computer and mobile phone to log on to the Madrasati platform and Microsoft Teams. This was the method we used to teach students online and to display videos, PowerPoints, pictures, and other activities. In addition, we all benefitted from the iEN national education portal, which provides explanations and illustrations of different subjects.” (Wejdan)

“[...] In the pandemic period, we relied on computers, tablet devices, mobile phones, and the internet for teaching and learning. We could use different programmes, links, and video clips through the Madrasati platform to support our teaching and students’ learning. Also, we could use the national education portal called iEN to learn about various topics on TV and YouTube. This portal is used as a supportive resource and is available for teachers and students.” (Maha)

“During the pandemic, the teaching process shifted to become mandatory online through the Madrasati platform. We could continue to teach and support students through this platform, which included different subjects, activities, and homework. This was effective and helpful because I could display PowerPoints, videos, etc. to help students learn and keep them in contact with the teacher.” (Majd)

“We entirely relied on technology during the pandemic. [...] We were able to continue teaching despite the pandemic through some online platforms and programmes, such as the Madrasati platform and the iEN portal. [...] They include attendance tools, activities, assignments and assessments and homework that enabled teachers to teach and interact with their students in the virtual classrooms.” (Amal)

It can be seen from these sample statements that the teachers’ reliance on the learning management systems; in particular, the Madrasati platform and iEN channels were essential to create, deliver, support and manage online teaching and educational content. In other

words, teachers used their personal devices, such as laptop computers, iPads, and smartphones, to access the internet and these services. These learning tools enabled teachers to organise and display content, present slide shows, give assignments, show videos and pictures, record attendance, and make assessments (Table 7-1).

Table 7-1 Summary of the types, description and examples of technologies the teachers used during the pandemic

Type	Description*	Examples
Communication application	“Applications that facilitate communication through public postings to group of enrolled users, private message, and the sharing of links, documents and images”	WhatsApp
Learning management system	“Online platforms that store assignments and lesson materials as well as indicators of progress, such as scores and grades”	Madrasati platform, iEN national e-portal
Presentation software	“Applications that enable information to be shared in the form of a slide show”	Google Slides, PowerPoint
Video conferencing system	“Telecommunications platforms that support conversations over distance with voice and video options”	Microsoft Teams

* Descriptions from Rice (2022, p. 319)

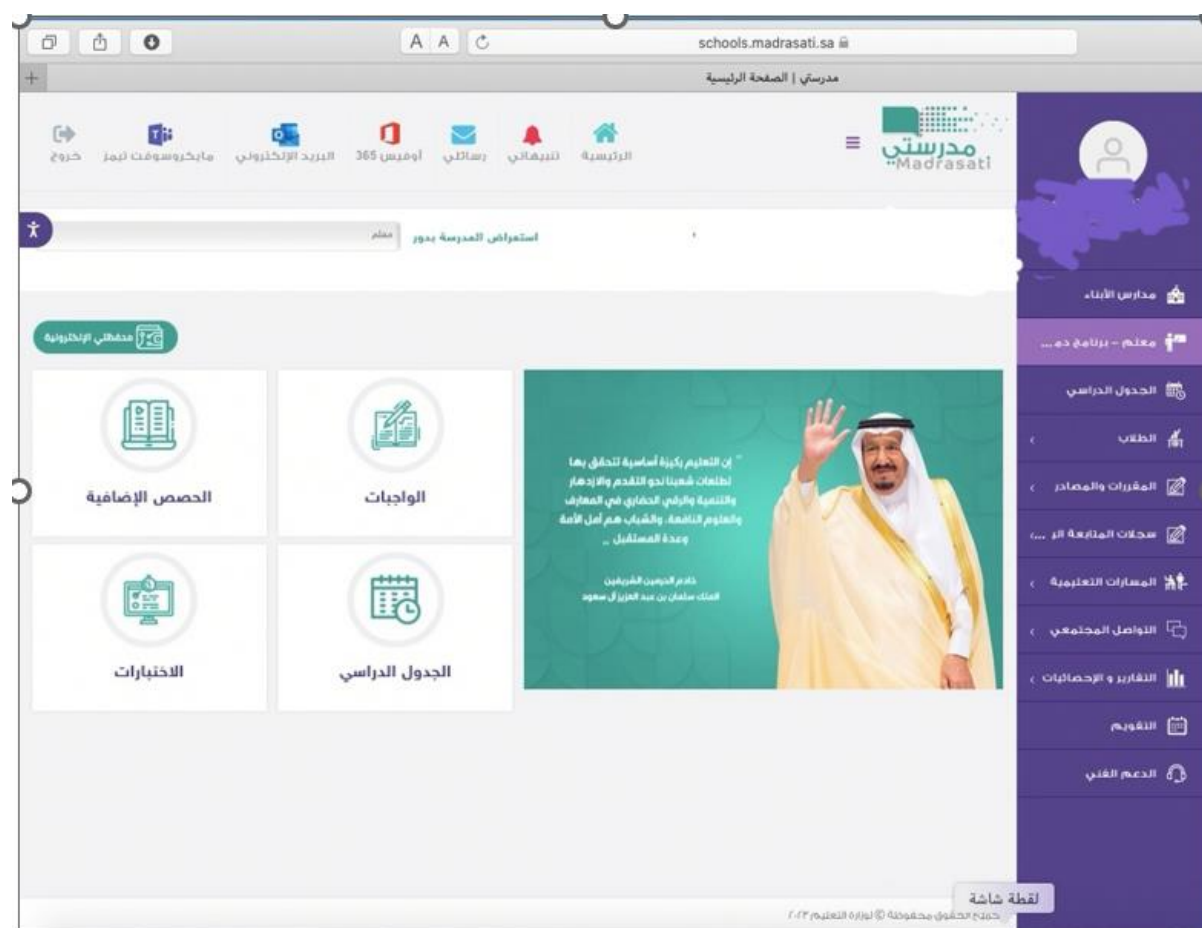
The Madrasati Learning Platform

The Madrasati platform is an e-learning system with many interactive tools and programmes, including Microsoft Teams tools that support the learning and teaching process for all education levels from the 1st to 12th grades (Ministry of Education, 2021). Established in the academic year 2020–2021, the Madrasati platform is considered the new gateway to distance teaching and learning environments for all education levels in Saudi Arabia, and it was intended to function as a virtual classroom during the swift shift to online teaching. In line with this, the Saudi MoE designed the Madrasati platform to allow teachers to teach courses by constructing virtual classes and providing students with a wide range of content, such as educational videos, presentations, textbooks, and exercises at all levels and for 1st to 12th grades (Shishah, 2021). The platform contains 450,000 electronic lesson plans and 45,000 educational topics. In addition to the educational content it provides, the Madrasati platform features a package of educational tools to support the teaching and learning process. For example, it includes the Microsoft Office programme (365), which includes a variety of tools,

including Teams, OneNote, Outlook Email, OneNote classrooms, Assignments, and other channels for communication among students, teachers, and parents.

Most importantly, the Madrasati platform is designed to meet the needs of disabled students. Indeed, it contains tools that enable special education teachers to design and plan lessons according to each student's individual needs; these supplementary tools support the teachers' varied teaching methods (Ministry of Education, 2021) (Figure 7-2).

Figure 7-2 screenshot of the Madrasati platform from a participating teacher



In summary, the teachers in this research expressed satisfaction with this platform, which contains multiple features and tools that enabled them to teach and interact with their disabled students during the pandemic. Thanks to Madrasati, they were able to help their students

communicate and learn, acquire new skills, knowledge, and values, and complete the educational process as a whole.

Microsoft Teams as Synchronous Virtual Classrooms

In addition to its usefulness as a source of educational materials and tools, there are two types of virtual classrooms associated with the Madrasati platform that teachers and students can use: asynchronous and synchronous virtual classrooms. The meaning of the term “virtual classroom” in this context is a classroom that is accessed through the internet, whether via a website or application (Hegazy and Muhammed, 2016; Aldossry, 2021). While a synchronous virtual classroom requires the teacher and students to all be connected at the same time, an asynchronous virtual classroom does not require the simultaneous attendance of teachers and students; instead, the educational content is pre-recorded and uploaded as video and/or audio files, so there is flexibility in learning time and location. Despite this benefit, one disadvantage of asynchronous classrooms is the lack of interaction; as the synchronous virtual classroom requires everyone to be present online at the same time, students can ask questions in real time via a microphone, a chat function, or a webcam by using videoconferencing tools such as Zoom, Google Meet, and Microsoft Teams (Hegazy and Muhammed, 2016).

Following that, the teachers in this research seemed to use both types of virtual classrooms in their distance teaching, through Microsoft Teams and the iEN channels, but they found they could effectively encourage their students more by using the synchronous virtual classroom via Microsoft Teams on the Madrasati platform. This also gave them the opportunity for direct connection and communication. Teachers commented, *“I mostly used a laptop and an iPad to log on to the Madrasati platform and Microsoft Teams,”* and *“I mostly used a computer and mobile phone to log on to the Madrasati platform and Microsoft Teams.”* During the live sessions on the Microsoft Teams videoconferencing platform, the teachers and students could interact, ask questions, use live chat, and receive immediate responses, all of which supported the learning objectives. Based on the teachers’ experiences, the Microsoft Teams is the

distance-learning method and communication tool for both teachers and disabled students to be together online synchronously; it encourages participation and communication to the greatest possible extent, sharing documents and many other features that could be helpful for online learning, as it is linked with the Madrasati platform and recommended by the Saudi MoE.

On the other hand, the teachers and their students sometimes had circumstances or faced difficulties that affected their accessing and logging into the Madrasati platform and Microsoft Teams for the live sessions. In these cases, they can benefit from and rely on the recorded study materials or the online self-study that is available in asynchronous virtual classrooms. To clarify, the asynchronous virtual classroom is more flexible in terms of learning time and location; the sessions are recorded, and the students can join at any time that suits them and benefit from it. Therefore, the iEN national e-portal and the iEN channels are great examples of this type of asynchronous virtual classroom used by teachers and students in Saudi Arabia during the COVID-19 pandemic (Aldossry, 2021). The following section discusses this in more detail.

The iEN National E-portal and iEN Channels as Asynchronous Virtual Classrooms

During the research's online workshops, the teachers discussed the iEN national e-portal and the iEN satellite lesson channels (available on both television and YouTube) that helped them with their teaching during the COVID-19 pandemic. They gave statements such as, *"iEN enabled students and teachers to benefit from lessons on TV and YouTube with explanations and illustrations of different subjects and modules,"* and *"we could use the national education portal called iEN to learn about various topics on TV and YouTube,"* and *"We all benefitted from iEN, which provides explanations and illustrations of different subjects."*

As the teachers stated, whether accessed via television or YouTube, these channels were seen as extra support. The MoE provides these extra useful virtual learning channels to benefit students, teachers, and parents, especially in cases such as if the students encounter problems logging into the Madrasati platform, if the teacher is absent, or if some other difficulty arises. Of course, these channels are also useful for teachers as additional sources of teaching material to include in their daily lessons. In other words, via a link from the Madrasati platform, teachers can also use the iEN channels during their synchronous virtual classroom live sessions to add further activities and sources to make their lessons more interactive and interesting.

In detail, this service includes the iEN TV and YouTube channels, which contain 23 channels that are divided into six channels for elementary education, three channels for intermediate education, ten channels for secondary education, three channels for special education, and one continuing education channel, which is designed for individuals who have not previously completed their education and are now interested in completing it. Importantly, all of these channels are supported by sign language for deaf and hard-of-hearing individuals, and they are available 24 hours a day, stated as “iEN channels: the eye of education that never sleeps” (Ministry of Education, 2021, p. 130), meaning that these channels are always active, and both teachers and students can benefit from watching them. To sum up, the teachers view these channels as extra support and supplementary sources to bring variety to their lessons, as well as useful resources for when synchronous teaching isn’t possible (Figure 7-3).

Figure 7-3 Information from the Ministry of Education (2021, p. 132) about the organization of the iEN YouTube Channel home page.



Even though these channels were able to easily deliver educational content to students at all educational levels, they needed some improvements. For example, the Ministry of Education (2021) said that the illustrated cartoons in the videos should be animated to encourage students and make the content more attractive. They also mentioned including subtitles to enable students to more easily understand the concept in case they lose sound or have trouble hearing or understanding. Finally, they said that commenting should be available while displaying the lesson to activate cooperative learning.

Teachers' Technological Pedagogical Content Knowledge Competencies

After the teachers provided a comprehension description of the main teaching and learning platforms and tools that were available for them and their students during the COVID-19 pandemic, other important findings that emerged from the data analysis are: 1) the transition to teaching students online with the use of different devices, including tablet devices and laptop computers. The teachers explained, *"I mostly used a laptop and an iPad"* and *"In the pandemic period, we relied on computers, tablet devices, mobile phones, and the internet for teaching and learning"*. and 2) the teachers' capability to access and effectively utilise the

Madrasati platform, iEN channels and videoconferencing tools since the beginning of the epidemic. *“We could use different programmes, links, and video clips through the Madrasati platform,” “We were able to continue teaching despite the pandemic through some online platforms and programmes, such as the Madrasati platform and the iEN portal,” and “We could continue to teach and support students through this platform.”* So, this ability to engage with the new online teaching method and platforms demonstrates and confirms the teachers’ confidence, positive experiences, attitudes, and, most importantly, teachers’ knowledge and familiarity with the use of high-tech AT in general and these platforms in particular. In other words, it was found that teachers relied on the Madrasati platform and iEN channels, two primary sources launched recently by the Saudi MoE as a result of the COVID-19 pandemic. They were designed for all teachers and students to use for remote teaching and learning for pedagogical purposes, including to support disabled students. Indeed, the findings make clear that the teachers’ experiences of teaching during the COVID-19 pandemic are different from their experiences prior to COVID-19 regarding technology use and availability. In other words, the findings demonstrate that the teachers considered themselves competent with technology, knew what materials and platforms were available for them, why and when they should be used, and how to integrate different tools and devices into the learning/teaching process for online education and communication.

Before proceeding further, the concept of competency in both a general sense and in this context needs to be defined. A competency is the “range of knowledge, abilities and commitment needed to do something well and efficiently or to achieve professional goals” (Uerz et al., 2018, p.14). This definition encompasses the main aspects of competency, including skills, knowledge, attitudes, and beliefs. In fact, all these aspects are important for teachers to be able to integrate technology into their teaching practice. Furthermore, technological competency is defined as “proficiency in using technology in general, or [...] proficiency in using specific kinds of technologies” (Uerz et al., 2018, p.17). Therefore, the Technological Pedagogical and Content Knowledge (TPACK) framework is used in this

research to further assist teachers in their competency and knowledge in various dimensions of TPACK, including technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK), as they are commonly employed as teaching practice models to help plan and understand the integration of technology into the teaching/learning environment (Voogt et al., 2013). Additionally, it is argued that the effectiveness of technology integration depends on the teacher's TPACK level and their ability to blend these types of knowledge (Kohler and Mishra, 2005). Hence, TPACK is the conceptual framework underlying this research, particularly for the themes related to during and after the COVID-19 pandemic.

TPACK Theoretical Framework

The TPACK refers to the different types of knowledge that teachers need to be able to integrate technology into the teaching process effectively and successfully to present the pedagogical content in a meaningful way (Kohler and Mishra 2005).

It was previously known as the TPCK framework (Kohler and Mishra 2005), but in 2007, the term was changed to TPACK (Voogt et al. 2013) to more accurately portray the interaction of the three types of knowledge (Thompson and Mishra, 2007). The TPACK framework, which builds on Shulman's (1986) seminal work on pedagogical content knowledge (PCK) (Santos and Castro 2021), aims to describe the three main concepts of knowledge required by teachers for successful integration of technology into the teaching environment in any content area. These three concepts are content knowledge, pedagogical knowledge, and technological knowledge, each of which has a specific definition. Content knowledge refers to a teachers' understanding and knowledge about the subject area, such as theories, concepts, ideas, and proofs. Pedagogical knowledge is related to a teacher's knowledge of different teaching and assessment methods as well as strategies and techniques that can be used in the classroom. Pedagogical knowledge also demands an in-depth understanding of various theories of learning, whether cognitive, social, or developmental (Kohler and Mishra 2005). The PCK model, developed without the addition of technological knowledge, is considered a

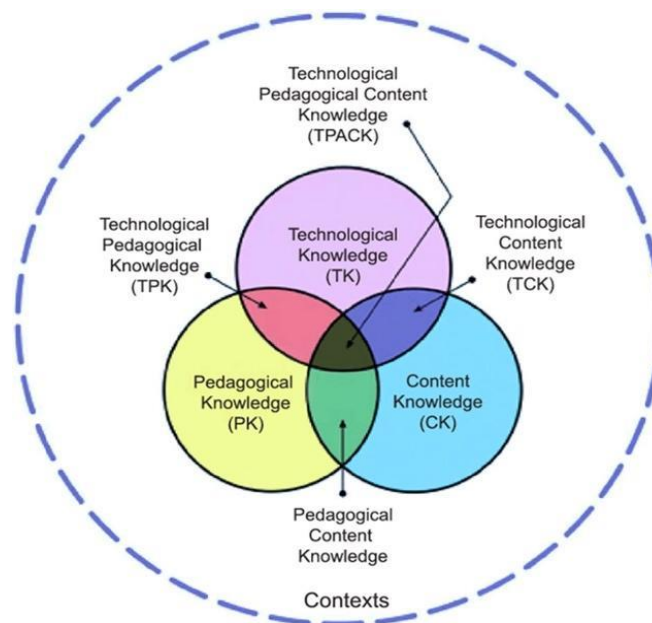
unique system that guides teachers toward integrating domain knowledge with appropriate pedagogical approaches to help students understand a subject effectively (Guo 2021). However, in the 21st century, technology plays a fundamental role as a productive tool in helping both teachers and students in lesson planning and learning in an effective environment. Thus, the technological knowledge component was added to the framework to indicate teachers' knowledge of technology and how it can be integrated into their teaching processes. Adding technology into PCK created technological content knowledge (TCK), which refers to how technology can be fully used and applied in different subject areas in the classroom with students (Santos and Castro 2021). In addition, technological knowledge is seen as a new knowledge form alongside the others (Guo 2021), which led to the full TPACK framework with all four composite components of a teacher's knowledge: pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and all combined together to make TPACK. The model is illustrated diagrammatically in Figure 7-4 (Santos and Castro 2021). Ideally, teachers should understand the interactive relationship among these three bodies of knowledge and how they can be coordinated in a specific context (Guo 2021).

In general, the combination of a teacher's general knowledge, pedagogical knowledge, and content knowledge is no longer enough to support and encourage students to learn; instead, a teacher needs all the components of TPACK to be able to implement AT effectively into students' learning environments, make content more accessible to all students, and increase student motivation (Kohler and Mishra, 2005). It has been shown that the TPACK framework is an effective teaching concept that requires teachers to have broad knowledge and strong organizational abilities. Therefore, teachers should be guided to develop their skills based on the TPACK framework in order to teach effectively with technology to meet and support students' needs.

To summarize, this section explained the TPACK framework and its effectiveness to include appropriate technology to help disabled students in their learning.

As the TPACK framework shows the importance of the technological knowledge that teachers need to teach effectively, reflecting on how well the teachers in this study combine these three competencies and use AT in teaching can highlight the significance of TPACK integration in framing effective teaching practice in digital learning.

Figure 7- 4 The TPACK framework. Adapted from <http://tpack.org>



Thus, it is useful to provide some examples that illustrate how teachers align with the principles of the TPACK framework to integrate their technological, pedagogical, and content knowledge to enhance their teaching.

One great example that showcases their use of technological knowledge, Pedagogical knowledge, and content knowledge in their teaching practices is the teachers' capabilities and skills to access and effectively use the Madrasati platform, Microsoft Teams videoconferencing tool, and iEN channels that were established and recommended by the Saudi MoE during the COVID-19 pandemic. In other words, the teachers demonstrated their proficiency in accessing resources, creating and sharing content, and most importantly integrating technology with pedagogy and content knowledge; they also successfully utilized these tools to teach in a manner aligned with the principles of the TPACK framework.

For example, during the period of online teaching, the teachers reported their use of Microsoft Teams as a synchronous virtual classroom for teaching and its features within the Madrasati platform, which contained tools that enabled them to design and plan lessons according to each student's individual needs and support the teachers' varied teaching methods. Therefore, the Microsoft Teams tools enabled teachers to organise and deliver content aligned with the curriculum and relevant to their subject matter, share files and screens, and use chat and video conferencing. Furthermore, by using Microsoft Teams, the teachers applied their pedagogical knowledge by implementing different instructional strategies and methods that supported their learning objectives. For instance, teachers mentioned their use of various digital tools and presentation software such as PowerPoint to present slide shows and show videos and pictures and commented that its use facilitated the teaching and learning process. Hence, by designing and integrating PowerPoint slides that incorporate images and videos into their lessons, the teachers were able to deliver subject content in different ways to meet the diverse needs of their disabled students, support different learning styles, and increase student engagement. In this way, the teachers applied different teaching strategies and provided support by using appropriate software technology (in this case, presentation software) related to their lesson subjects. Furthermore, the teachers could also prepare assessments, give assignments, and provide feedback by using the Madrasati platform and Microsoft Teams tools. Overall, this example illustrates how the teachers' use of Microsoft Teams and its tools follows the principles of the TPACK framework to integrate technological, pedagogical, and content knowledge to teach and communicate with students effectively during the COVID-19 pandemic.

Another example that showcases the combination of technology, pedagogy, and content knowledge within the TPACK framework is the pre-recorded iEN channel lessons on YouTube. By using Microsoft Teams within the Madrasati platform, teachers were able to view, select, navigate, and share pre-recorded videos to add further illustrations and demonstrations to their online teaching; these helped to reinforce learning and support students' understanding.

This use of visual aids also helped make their lessons more interesting, interactive, and enjoyable, whether the video was part of their synchronous lesson or used as supplementary asynchronous materials, like the iEN channel lessons on YouTube. One teacher commented, *“We could use the national education portal called iEN, on TV or YouTube, to teach various topics to our students.”* They also mentioned being able to use any other relevant external videos aligned with their teaching lesson and subject, saying, *“We could use different programmes, links, and video clips through the Madrasati platform”*. Therefore, the teachers effectively showed their proficiency in integrating technology with pedagogy and content knowledge, which aligns with the principles of the TPACK framework.

Taking all of the above findings into consideration, it can be acknowledged that, for emergency remote teaching, Saudi Arabia adopted a variety of effective platforms and resources to facilitate learning and enhance the educational sphere. This effort by the MoE offers a great online learning environment that simulates the real school environment by delivering educational content using new teaching and learning methods, tools, and technologies. With these resources, it can be argued that the teachers’ experiences and acceptance of the transition to online teaching and their use of the high-tech AT and new platforms showed their successful and valuable experience of teaching online, and demonstrated their high proficiency in utilising and integrating high AT into their teaching practice. Among the possible reasons for the results obtained regarding the teachers’ competence and effectiveness in utilising and integrating various digital tools, two stand out. First, the teachers seem to recognize the importance of technology and digital skills in the modern digital age and tend to use technology themselves. In other words, developing technological skills is crucial for individuals to remain competitive and successful in various aspects of life and work (Riandi et al., 2018). In line with this, according to Akbaba, 2013; Uerz et al. (2018), teachers need to be adept with technology themselves to be able to integrate it into the education and learning process. Furthermore, our findings corroborate the research findings of Olugbade and Olurinola (2021), which states that teachers with prior experience and exposure to technology

had a very positive attitude toward online learning and teaching. In addition, according to Kuyumcu et al. (2018), technology has become such an essential part of all aspects of our lives that it is essential for teachers to be able to use and integrate various types of technology in the educational process. The second reason is that the Saudi MoE provided intensive and urgent training, preparation, resources, and orientation to support and prepare all target individuals, including teachers, students, and parents, for the online learning and teaching process. Some examples of support offered by the Saudi MoE include:

- organising workshops and meetings;
- sending SMS messages;
- providing educational and heuristic guides, course training, online videos, and simplified explanations and examples of the Madrasati platform with illustrations; and
- activating communication and social channels, such as email addresses, text messages, and social media applications;

The Ministry used social media applications to send videos, pictures, and guidance messages on how to deal with difficult situations and inform citizens of the progress of educational changes (Ministry of Education, 2020a). With all of these resources, it is clear that teachers were the most important link between the government-supplied resources and information and the students and their families. The teachers had the resources to be ready for and take charge of online teaching and to ensure that they were able to help their students facing any issues. As a result, the teachers all expressed that teaching online during the COVID-19 pandemic was efficient and successful, and they felt that were able to complete the teaching process.

On the contrary, special education teachers in other countries did not receive enough direction, training, or guidance on using and navigating online systems to be able to teach, and integrate digital tools in teaching online and experience new teaching methods. For instance, Parmigiani et al. (2020) noted that teachers of disabled students in Italy were interested in teaching, creating, and including different activities both synchronously and

asynchronously, but they lacked sufficient experience and support. Similarly, in the United States, An et al. (2021) explored teachers' feelings, experiences, and perspectives regarding online teaching during the COVID-19 pandemic and confirmed that teachers experienced a lack of preparation, institutional support, and professional development training regarding the technology used for teaching in online classrooms. Furthermore, according to Wan (2020), during the COVID-19 pandemic, most teachers in Malaysia did not have adequate technological knowledge or skills; therefore, they were not able to provide effective teaching lessons.

Following that, teachers were asked to describe their experience regarding any challenges to the use of AT during the COVID-19 pandemic. However, the teachers' descriptions and discussions were related to their students and their challenges regarding using the AT and studying online.

7.7.2 Subtheme Two: Teachers' Attitudes Towards the Difficult Experiences of their Disabled Students Related to the Inability to Use Technology During the COVID-19 Pandemic

This subtheme emerged from discussions about the teachers' perspectives on the challenges and barriers that disabled students experienced with regard to the use of AT during the COVID-19 pandemic. Moreover, it focuses on the structural issues related to the students' inability to use technology, including poor access, no training, and limited access to resources.

This subtheme is related to critically exploring, analysing, and interpreting the main challenges encountered by disabled students during the swift shift to online learning, based on their teachers' perspectives. Studying online was considered a new experience for both teachers and students, and it was understood to be even more challenging for disabled students, who often need additional support and learning strategies as well as hands-on activities to focus and learn compared to non-disabled students. With this in mind, the teachers were concerned about supporting them successfully and tried to remove any barriers that might hinder their disabled students from learning and interacting. In the workshop discussions held via Google

Meet, the teachers were asked to share their thoughts on the main challenges that their disabled students faced during the transition to online learning and teaching. The teachers reported that by far the most significant challenge students faced was related to the unavailability of technological devices for studying and accessing virtual classrooms. Other issues the students had were not knowing how to use the technology or how to access the learning platform. The teachers gave the following examples:

“During the pandemic, some students did not have devices or computers. We faced some technical issues, such as unstable internet connections and audio problems. [...] In the beginning, students faced some difficulties using the platform and accessing the virtual classroom [...]” (Majd)

“The challenges during the pandemic were related to the shortage of technology, devices, and sometimes internet access for the students to learn and have access to the Madrasati platform.” (Afnan)

“At the beginning of the pandemic, my students did not have devices or internet access to study online, which meant they could not log into the platform to study, and this could lead to other problems.” (Amal)

“The challenges during the pandemic were quite varied. There was a shortage of devices for the students with SEND, which prevented them from accessing the Madrasati platform [...]. After the students had received their devices from the school, they experienced difficult access to the platform or internet connection problems.” (Maha)

“[...] I observed the problems for students with SEND and their families in using technology and the platform. One group of students had devices and computers, but they did not have much experience with technology and its use or how to log into the platform. Another group of students had some experience with technology, but they did not have devices or internet access.” (Afnan)

From the teachers' standpoints in these examples, it is clear that disabled students did not have AT electronic devices or tablets at the time that the educational process became mandatory online, which led to other difficulties, such as unwillingness to study online or access the Madrasati platform as a virtual classroom. There were also issues with unreliable or unavailable internet connections. In other words, for students to be able to learn and participate in online classes, they need internet access and devices. Therefore, teachers reported that their students face difficulties because they do not have enough devices or

internet connections. In fact, the teachers focused on these issues of their students' lack of AT devices and internet access as issues to be recognised and addressed because these directly affect how much the students can benefit from the online educational resources.

In line with these findings, several studies have acknowledged the same issues, whether in Saudi Arabia or globally. For instance, according to Jeste et al. (2020), the COVID-19 pandemic restrictions greatly affected disabled students' ability to access services, including AT of different levels (low-mid-high AT). In the same vein, Tlili et al. (2021) noted that disabled students need to participate actively to learn, even when the education shifts online, and they reported difficulties with providing active learning due to the unavailability of resources such as AT devices, internet access, and support equipment. This is supported by Al-Qarini and Al-Harhi (2020), who indicated that technical and internet issues limited disabled students from using online learning during the COVID-19 pandemic. Another example consistent with the findings in this research is that of Long et al. (2021), who highlighted several challenges of online learning for disabled students during the COVID-19 pandemic, including the difficulty of finding the necessary AT devices as well as internet connectivity to study remotely. Furthermore, according to Al Otaibi (2020), the lack of sufficient equipment available for disabled students during the COVID-19 pandemic was a significant issue of distance education that hindered them from learning. As Shahenn and Watulak (2019) stated, "Inaccessible technologies are as problematic for disabled people as inaccessible buildings" (p. 187).

It seems clear from this research and others that the technical problems that disabled students faced, primarily device unavailability and internet disruption, were the most common issues recognised during the COVID-19 pandemic for disabled students. These limitations led directly to other challenges and barriers for the students, such as reduced access to online educational platforms and absence from their virtual classrooms.

In fact, this issue could stem from the financial difficulties faced by many families. So, the internet and devices needed for online learning are expensive and difficult to obtain. For those with limited financial means, acquiring devices or internet access can be challenging. As a result, students encounter difficulties in both obtaining devices and participating in online classes. In line with this, Wan (2020) highlighted that online learning requires both internet connection and devices. However, in many cases, students are sharing devices, which limits their participation in lessons and slow internet connection, while others face a complete lack of devices and limited internet access. In addition, according to Ullah et al. (2021), financial barriers pose a critical challenge for students in Pakistan, with many students unable to afford the necessary internet access.

Another concern that some teachers raised was related to logging into and using the Madrasati platform. Teachers commented that *“In the beginning, students faced some difficulties using the platform and accessing the virtual classroom,” “they could not log into the platform to study,” “after the students received their devices from the school, they experienced difficulty accessing the platform,” and “they did not have much experience using technology and did not know how to log into the platform.”* Therefore, from the teachers’ perspectives, it emerged that disabled students seemed to face two critical issues. The first was a lack of technical knowledge or training related to using the Madrasati platform as a virtual classroom. This issue was completely predictable, as they had no prior experience or knowledge of how to use such technology. The second critical issue was the issue of students logging into their accounts on the Madrasati platform. In other words, the distribution of login IDs and passwords was problematic, and many students had access problems even when using the platform correctly.

To illustrate, in Saudi Arabia, to be able to log into the Madrasati platform, students first have to register through a government programme called Tawakelna, which then requests a username and password for them from a central government service (Aldossry, 2021). Therefore, with this complex system, disabled students needed their teachers’ help to be able

to log in and study online. Shishah (2021) noted that this registration process takes time, so it should have been done prior to opening the platform for virtual classrooms to avoid technical issues that lead to user frustration. In fact, as this platform had just been adopted for the Saudi education system following the onset of COVID-19, it is understandable that there would be some backend technical issues and occasional system suspensions, but these normal issues exacerbated the frustration that the students and their families experienced.

The results of this study correspond with those of Aldossry (2021), who found that students in elementary schools often encountered challenges using the platform due to insufficient experience and prior knowledge of technology. Similarly, according to Al-Amri (2022), insufficient knowledge and training for disabled students can cause difficulty in using distance education platforms and virtual classroom technologies. Similarly, Kim (2020) mentioned that school-age students may have limited experience with online learning tools and platforms, so they have difficulty accessing and studying online and require adult supervision.

According to these findings, teachers seem to recognise the challenges their disabled students faced during the COVID-19 pandemic that could prevent them from learning and accessing the Madrasati platform. Disabled students who did not have electronic devices to log into the Madrasati platform could not benefit from the virtual classrooms, which led to further technical knowledge problems, reduced learning and little experience with the Madrasati platform. These findings reveal that the teachers understood their disabled students' new experiences of studying online and the subsequent challenges they faced, and recognised that these challenges could not be solved by the students themselves. The students and their families naturally sought help from their teachers, but different approaches and practical solutions to technical issues could have minimized the problems. Further discussion about those approaches can be found in the following subtheme.

It is worth pointing out that these issues were recognised by officials in the Saudi MoE as well. The whole process of transitioning to an online education system was challenging and had to

be accomplished quickly, so neither schools nor families were prepared. The Saudi MoE tried to reduce these challenges as much as possible by providing alternatives and additional support.

After discussing these barriers, the thematic analysis revealed that teachers identified various solutions and implemented a range of strategies to support their students in overcoming the difficulties of remote learning and using the Madrasati platform successfully.

7.7.3 Subtheme Three: Teachers' Assistance and Support for Disabled Students Regarding the Technology Use During the COVID-19 Pandemic

This subtheme derived from the thematic analysis of teachers' experiences dealing with the challenges of supporting disabled students while teaching online during the challenging time of COVID-19. Following the discussion of the challenges disabled students encountered during the COVID-19 pandemic, it is critical and beneficial to understand how teachers responded to and supported disabled students in overcoming these challenges. Accordingly, the teachers were asked to share their experiences with any methods, strategies, practical solutions or educational support services that were available for disabled students and their families to deal with the technological challenges they encountered during the COVID-19 pandemic. In fact, even though the unexpected breakout of COVID-19 and the lack of preparedness for an entirely online approach revealed challenges with technology availability and platform usability in Saudi Arabia, this difficult experience ended with improved management. To illustrate, the teachers reported the following narrative examples:

“During the pandemic, the school provided the students with some devices. [...] The school specified one day during the week to help students and their families if they faced challenges using the platform and technology. The Ministry of Education enabled students and teachers to benefit from the national education portal and TV channels, called iEN, to watch the explanations and illustrations of different subjects and modules on television and YouTube”. (Maha)

“During the pandemic, the school provided devices for the students, and invited the students and their families to come to the school if they needed help and support. The school specified one day each week to show them how to use the iEN portal and Madrasati platform. [...] The Ministry of Education provided the iEN educational channels on television and YouTube.” (Amal)

“[...]. However, both groups (students) were invited to come to school to learn how they could use computers and log onto the Madrasati platform to study. The Ministry of Education offered the national education portal and channels, called iEN, for students and teachers to benefit from and watch the explanations and illustrations of different subjects and modules. After a while, both groups of students could study remotely and use the platform without needing to come to the school because the school provided the students with devices and training.” (Afnan)

“During the pandemic, the Ministry of Education and the school specified one day during the week for teachers to come to school to solve problems and answer any questions the students or their families might have. The school provided the students with some devices, and we provided help and explained how to use the platform and attend the online lessons. [...] The iEN national education portal from the Ministry of Education, which offers educational content and IEN channels over television and YouTube, was a benefit for students and teachers alike. So, finally, the students were able to learn and study through the online virtual classroom.” (Majd)

According to these statements, it is clear that there were multiple methods and educational support services that were put in place to help disabled students overcome their challenges and be able to study online during the COVID-19 pandemic. The teachers mentioned that the schools provided electronic devices which were distributed from the MoE to students who lacked computer access to eliminate the shortage of AT among disabled students. In fact, numerous initiatives and government solutions were organised in Saudi Arabia and globally during the COVID-19 pandemic to overcome these challenges.

Collaborative Government and Ministry of Education Support: Solutions that Foster Online Learning

The Saudi MoE tried to make the online distance learning and teaching experience unique and successful; the MoE worked closely with other ministries such as the Ministry of Communications and Information Technology and with governmental organisations such as Tawakkalna to help students successfully complete the academic school year via online

learning by providing them with the necessary support, advice, devices, tools, and instructions (Al Mayman, 2020). To illustrate, the Saudi MoE distributed 2700 Braille devices, 12,750 hearing aids, and more than 14,000 tablets and computers to students who needed them during the pandemic. Similar approaches were taken in other countries. In Italy, for example, the government allocated funds to equip schools with digital tools and give disadvantaged students electronic devices on free loan, and in Hungary, some companies in the information and communication technology sector worked with the ministry to offer services like free technical support and free access to platforms for a specified number of months, all to support education and facilitate the transmission of teaching during the pandemic (Ferri et al., 2020). In contrast, according to Bhuana and Apriliyanti (2021), some challenges related to the students' issue of technological access during the pandemic were dealt with by schools and teachers by providing students with printed worksheets and modules instead of technology-based tools that could be used to learn independently.

Another practical governmental solution from the Saudi MoE for all students who faced technological challenges, including disabled students, was the broadcasting of educational materials for all ages and educational levels on television and YouTube. For students who encountered challenges with using the Madrasati platform or lacked internet access, the iEN's channels on television or YouTube were the best alternative support for continued learning. Likewise, in Croatia and Serbia, the governments facilitated the broadcasting of educational material for primary school students via television channels in case they encountered challenges using the online educational services (Ferri et al., 2020). Overall, this positive television approach that was used during the COVID-19 pandemic reflects the practical use of a medium that is globally available and accessible to all students and their families. Indeed, the use of a multiplatform approach including television and YouTube, among various other technologies, plays a critical role in boosting facilities for online learning and teaching.

A further practical solution by the Saudi MoE for all students who faced technological challenges, including disabled students, was allocating one day each week for both teachers

and students to come to the schools to seek help and ask for support accessing the Madrasati platform, whether their issues were technical or about their user accounts. For instance, teachers said, *“The school specified one day during the week to help students and their families if they faced challenges using the platform and technology,”* and *“students were invited to come to school to learn how to use computers and log onto the Madrasati platform.”* In this way, these challenges were resolved, and the students gained the ability to log into and use the Madrasati platform independently. The teachers stated, *“Students could study remotely and use the platform without needing to come to the school,”* and *“Finally, the students were able to learn and study through the online virtual classroom.”*

In particular, the Saudi MoE created a policy to help all students during the COVID-19 pandemic have equal opportunity by facilitating timetables; they scheduled morning hours for intermediate and secondary students to study and have classes online, while afternoon hours were for elementary students. This was to enable parents to follow up with the students in distance learning and provide support.

Based on the above statements, it seems that the teachers were aware of their role and responsibility in providing hands-on guidance for their disabled students with technology issues and use of the Madrasati platform so that they could become more proficient in using the Madrasati platform and studying online. Indeed, teachers are considered the most responsible for the success of the educational process as they lead the classrooms and are in the strongest position to interact with their students directly; therefore, they need to be fully prepared, knowledgeable and confident to take charge of the class (Kim, 2020).

The teachers in this research expressed that they felt fully prepared, skilled and knowledgeable to provide effective technological support for their disabled students regarding the use of the Madrasati platform during the COVID-19 pandemic. Indeed, this is due to the teachers’ desire for digital tools and intensive support and preparation they received from the MoE as discussed earlier. This result is consistent with Alolaywi (2021), who found that

teachers dealt well with technical problems thanks to the sufficient skills and training they received to conduct online lessons.

In contrast, special education teachers in other countries, such as Turkey, were not able to support and resolve the students' issues regarding using and navigating online systems to be able to answer and meet their students' challenges and needs; they suffered from being unprepared to advise students in regard to digital technology, which resulted in their inability to monitor students to improve their digital skills and online learning capabilities (Demir et al., 2022). Similarly, Todd (2020) reported that, among the many challenges encountered by teachers during the time of COVID-19 and online teaching, one large challenge was device issues that prevented teachers from using web applications, thereby making it difficult to offer stimulating activities to support their students' learning needs.

Along with all these methods for support of online education, the Saudi MoE also made arrangements so that students could go to school to get education face-to-face while still maintaining distance and safety rules to ensure that the students and teachers were protected.

To summarise these findings, even though some barriers appeared that affected education during the COVID-19 pandemic, there was obvious support and interest in the educational process from the Saudi MoE to encourage both teachers and students, to help students learn, and to make the educational system as a whole be successful. The teachers recognised that the Saudi MoE attempted to assist teachers, students, and families by coordinating information in various ways. The Ministry provided diverse modalities for both teachers and students to access the online learning environments and better benefit from them in the time of digital learning.

Additionally, these findings indicate that the teachers felt ready and equipped to handle the virtual teaching environment, use virtual education technology, and convey this learning to their students. As a result, the teachers' positive reactions towards the support of disabled students' learning with regard to technological and platform issues are also indicated in the

findings. The teachers' reactions to their students were obvious and immediately addressed during the difficult situation of online learning by reinforcing positive support and serving their disabled students successfully to meet their needs, which ended without the need to come to school and seek help. Without question, the teachers provided great support for their disabled students in regard to their use of AT during the COVID-19 pandemic. They showed their students how to use the teaching platform and the benefits of using multiple resources.

7.3 Theme Three: Teachers' Perceptions of the Benefits of Using High-Tech AT with their Students During and After COVID-19

The concepts that arose to create this theme related to teachers' attitudes towards the benefits of using high-tech AT in their teaching process based on their experiences and engagement during the COVID-19 pandemic. In fact, it is because of the COVID-19 crisis that the use of technology is now considered necessary for fostering the teaching and learning process, as well as improving the quality of learning (Aycicek and Karafil, 2021). The teachers were asked to discuss the benefits of using high-tech AT based on their experiences of that use during the COVID-19 pandemic. Accordingly, the teachers reported several advantages of using high-tech AT resulting from their online teaching experiences with disabled students. For example, the teachers had the following insights:

“By using technology, we saved time and effort, found information fast and easily, and developed interaction and enthusiasm in the students due to the new things they discovered and learned. Especially after the pandemic, the technology made communication and information sharing easier in the classroom and helped demonstrate the students' learning improvements.” (Amal)

“During the pandemic, our knowledge of how to use technology in teaching increased. This motivates both students and teachers to discover new things when using technology [...]. Teachers can use different resources and strategies when teaching. I realised that using technology saves time and effort and allows me to deliver information easily.” (Maha)

“During the pandemic, I was able to use technology in different ways, such as PowerPoint slides, videos, YouTube, and audio files. Technology facilitates new digital learning strategies, allows for different learning styles,

and saves time and effort. After the pandemic, technology made teaching more enjoyable and accessible, and communication between teachers and students' families became easier." (Sarah)

"Technology eased the process of learning and teaching, and a variety of resources and strategies were accessible through technology. As it saves time and effort, the teaching becomes more enjoyable, accessible, and effective." (Afnan)

"Through technology, information and concepts can be delivered easily and quickly by using multiple resources and strategies. [...] so, technology makes learning and teaching more enjoyable and useful." (Majd)

These statements show that the majority of the teachers agreed on several benefits they observed through using high-tech AT in their teaching, whether during or after the pandemic. They all mentioned saving time, having enhanced access to different sources of information and knowledge, improving engagement, and finding opportunities to use different technological tools. Other teachers stated, *"Technology facilitates new digital learning strategies, allows for different learning styles, and saves time and effort," "We saved time and effort, found information fast and easily," "technology eased the process of learning and teaching, and a variety of resources and strategies were made accessible through technology," and "my knowledge of how to use technology in teaching increased."*

These findings seem to be consistent with other research explored in the literature review, which found that the multiple online resources and materials that teachers can access, such as videos and textbooks, can help reduce the time spent on creating and preparing teaching content (Hoq, 2020). In the same vein, Dhawan (2020) highlighted the benefits of using technology in teaching during the COVID-19 era, including the availability of multiple online tools and strategies and the use of a combination of media in text, video, and audio formats. The same result was found by Alasmari (2022), who demonstrated that the advantages of using high-tech AT in teaching included saving time and effort for both teachers and students. Likewise, according to Khan and Abid (2021), teachers revealed that the use of technology in teaching and learning during the COVID-19 pandemic helped them access different digital tools and enhanced their technological skills.

In line with these findings, Tamah et al. (2020) and Yi and Jang (2020) stated that the majority of teachers who experienced virtual teaching even for a short period of time were able to develop the necessary technological knowledge. Similarly, according to Alolaywi (2021), teachers indicated that having to use online technology in the teaching process reinforced their technical skills and enabled them to develop new digital teaching styles.

The teachers in this research seemed to recognise other benefits of high-tech AT related to communication with and support of students, even after the COVID-19 pandemic ended. They made statements such as, *“especially after the pandemic, the technology made communication and information sharing easier in the classroom and helped demonstrate the students’ learning improvements,”* and *“after the pandemic, technology made teaching more enjoyable and accessible, and communication between teachers and students’ families became easier.”*. This means that technology has facilitated better teaching and communication between teachers, students, and their families, and it has also simplified the sharing of resources and information. Taking this information alongside the benefits mentioned in the literature, these results correspond with the research of Rahayu and Wirza (2020), who found that technology enables teachers to communicate with their students more easily and share useful study materials, which in turn allows the students to stay updated and learn about any changes immediately. Kim (2020) noted that the integration of appropriate technology enhances communication among students, not just between teachers and students. Furthermore, according to Lemay and Doleck (2020), the videoconferencing tools, media applications, and social media that are used can foster communication between teachers and students’ families and make the sharing of learning materials simpler and more valuable.

Considering all of these factors, the situation of the global pandemic pushed schools and teachers towards the use of high-tech AT, which has had a positive impact on teaching and learning practices for disabled students, particularly in this research. The next section will critically discuss and interpret this observation.

7.4 Theme Four: The long-term change in the use of high-tech AT for teaching disabled students after the COVID-19 ended

Further data analysis in this research showed findings related to the long-term change in the use of high-tech AT for teaching disabled students, specifically after the COVID-19 ended. The long-term support for using high-tech AT in teaching underscores its positive impact on teacher and student outcomes, including teachers' enhanced use of digital tools and students' increased engagement and motivation. To clarify, teachers' experiences with the technology and collaborative tools used during the COVID-19 pandemic in teaching and learning had various immediate benefits, which have led to long-term improvements in teaching practices and in students' learning and interaction. This can be seen from the teachers' statements, in which they describe the positive impacts of using high-tech AT in their teaching. Teachers mentioned that their skills had developed, and this resulted in them continuing to explore the use of different tools. They also reported that they thought students could focus better, and, most importantly, a greater use of technology in the teaching process for disabled students to support them successfully. The teacher, Wejdan, said simply, "We cannot do without it!" and the other teachers expressed similar views:

"After the pandemic and returning to schools, we realised the benefit and the importance of using technology, and we have become to rely on it. I have realised that students can focus more and interact better with me when I use technology in the classroom. Unfortunately, there is not much available in the school, so I bring personal devices and tools." (Afnan)

"After the pandemic, I realised the necessity of continuing to use technology in the classroom due to its effectiveness. In the beginning, we thought technology would cause distractions, and students would not focus, but it turned out to be the opposite. Students can interact and remember better if I use technology. [...] I kept using it, and it became more enjoyable. Even though there is no technology in my classroom, I bring my laptop and iPad and display the PowerPoints and videos that are suitable for my students and my teaching goals." (Majd)

"After the pandemic, my skills had developed, and I could continue to use technology to teach students with SEND. I think a lesson without technology would be boring. As soon as I open the iPad, I can see a change in the attention and focus of my students with SEND. The technology attracts their attention." (Maha)

“Since the pandemic ended, I have continued using technology, such as a computer, iPad devices, as I realised its benefits for teaching my students with SEND. However, these tools are not available in my classroom. [...] I continually try to improve or include different programmes and tools to attract our students’ attention and help them learn more effectively. [...] I rely entirely on technology, as it helps me to explain and illustrate the information and materials to my students with SEND in an effective and interesting way.” (Wejdan)

“[...] after the pandemic and returning to school, I am still using technology for teaching. I have no doubt of its importance and benefits in education and the improvement of students’ learning. Technology helps students focus more while learning and attracts their attention, so I can use a computer or the iPad to display PowerPoints, videos, and audio recordings.” (Amal)

“I remember several years ago, I had a student with a moderate to severe disability, so her ability to remember information was weak. To help her as much as possible, one day I used the iPad to play videos because she would focus more on the iPad than on the other tools. Interestingly, the next day, the student could not remember anything about the lesson, but she could name the characters from the video.” (Amal)

It is clear that the teachers’ personal experiences of using high-tech AT and online teaching platforms during the COVID-19 pandemic have increased their awareness of the effectiveness of including technology in their classroom teaching practice, and they have grown and supplemented their teaching skills. Furthermore, the teachers noticed an increase in their students’ engagement, positive interaction, and outcomes when they used technology in the lessons. Consequently, the teachers emphasised their effective use of technology in teaching students face-to-face, despite the shortage of these technologies in their classrooms and the necessity of them bringing their own devices and tools.

Overall, the first significant positive impact of using high-tech AT in teaching disabled students that emerged from the data analysis was the focus on student engagement and learning outcomes. This is based on the teachers’ comments, “*students can focus more and interact with me better when I use technology in the classroom,*” and “*I can see a change in the attention and focus of my students with SEND. The technology attracts their attention,*”

“students can interact and remember better if I use technology,” and “the next day, the student could not remember anything about the lesson, but she could name the characters from the video.”

In fact, Martin (2006) claimed that preparing today’s generation for tomorrow requires using technology. Hence, it is necessary that it be included in teaching practice to support student learning. According to these findings, students can focus, interact, and understand better with technology integrated into their lessons in a meaningful way. These results are supported by Johnson (2013), who demonstrated that using technological devices, such as the iPad, plays a role in enhancing motivation and individualising instruction, which can result in improved competencies for disabled students. Also, as stated by Aycicek and Karafil (2021), the integration of technology into the classroom environment for disabled students makes a positive contribution to the teaching and learning process, as it encourages student interaction. Furthermore, Alzrayer and Banda (2017) indicated that using the proper technology tools with disabled students could promote engagement in learning, which would then enhance confidence in learning. For example, the use of interactive whiteboards enhances the learning process, helps students focus, and fosters student engagement (Chan et al., 2016; Daniel and Tivener, 2016). Therefore, technology implementation is considered beneficial and effective in fostering students’ learning, thereby enhancing their interest and motivation.

Another related positive impact of using technology in teaching that emerged from the data analysis is the teachers’ continued interest in using technology after the pandemic. The comments, *“I kept using it, and it became more enjoyable,” “I could continue to use technology to teach students with SEND,” “I am still using technology for teaching,” and “We cannot do without it!”* all speak to the teacher’s newfound enjoyment of using technology for teaching.

These expressions clearly emphasise that the teachers have continued to use high-tech AT because they recognise technology’s role in creating more inclusive and accessible learning environments for disabled students. Furthermore, teachers perceive it as a valuable tool to

use in their classrooms. In other words, the teachers see technology integration as an integral part of their teaching practice for enhancing teaching and supporting diverse student needs. The teachers perceive technology as an indispensable part of their classrooms and choose to maintain the use of technology as needed. In line with this, Coppola (2004) found that teachers are inclined to use technology if they completely believe in its value. He noted that “technology integration requires so much work that only a teacher who already sees its value will carry it out. [...] the teacher had to be sold on the idea that computers could be instructionally worthwhile before he or she would dig into the hard work of integrating them with instruction” (p. 108). In the same vein, according to Snoeyink and Ertmer (2002), when teachers realize the value and usefulness of technology for educational purposes, they are more likely to continue utilising it despite the barriers that exist. Therefore, it is obvious that, after their experiences teaching online, the teachers in this research grew to value AT enough to incorporate it into their teaching practices. Nevertheless, they also frequently commented on the need for high-tech AT to be available in their classrooms so that they are not required to buy and bring their own devices and tools to school.

To summarise, most teachers recognised their own skill development from using high-tech AT during the COVID-19 pandemic and emphasised the benefits that arose from their use of high-tech AT. Moreover, these benefits provided positive outcomes and advantages for both the disabled students and the teachers. Thus, most of the teachers confirmed they would continue to use high-tech AT in their teaching after the pandemic rather than reverting to their pre-pandemic teaching methods, even though they all had concerns about the lack of school-provided technology in their classrooms.

Drawing on this chapter’s findings, it is important to recall that this research aimed to explore special education teachers’ beliefs, attitudes, and knowledge towards the use of AT in teaching disabled students in primary education, and the teachers expressed their strongly positive beliefs and attitudes and knowledge towards using technology in teaching. The focus of this study was specifically on teachers, because teachers play a critical role in implementing

technology-related activities in the classroom with their disabled students. In particular, teachers' beliefs and knowledge shape their attitudes towards the use of technology and determine whether teachers will use and integrate technology into their classroom practices and instruction (Deng et al., 2014). As confirmed by Zhao (2007), the teachers' opinions regarding technology implementation affected their use in teaching practice.

Since the pandemic ended, the teachers have become more engaged and satisfied with their use of technology in teaching. In other words, the teachers' experiences of being required to teach online during the COVID-19 pandemic led to positive outcomes.

7.5 Chapter Summary

This chapter covered the second main theme of the findings of this study, which concerns teachers' understanding and experiences of using AT with disabled students in their teaching environments before, during, and after the COVID-19 pandemic. The focus was on the AT that assisted education and communication between teachers and students in these three sequential stages.

The first theme of this chapter related to teachers' attitudes and experiences regarding using AT for teaching disabled students prior to the COVID-19 pandemic and how they integrate the AT in their classroom teaching. It was found that teachers showed limited access and engagement with high-tech AT due to its unavailability in the classrooms and their familiarity with low-tech AT. The second theme focused on teachers' attitudes and experiences regarding using AT for teaching disabled students during the COVID-19 pandemic and the transition to online teaching and communication methods. The first subtheme explored their use of different remote learning management systems and educational and communication digital tools. Thus, it was found that the teachers utilised a variety of tools and devices alongside the two primary learning platforms, including WhatsApp, laptop computers, smartphones, iPads, the Madrasati platform, Microsoft Teams, and the iEN channels. It was found that teachers were encouraged to use WhatsApp as a communication and educational tool with their disabled students due to

the additional support that students need during their new learning experiences. In addition, it was found that teachers used the Madrasati platform and Microsoft Teams as synchronous virtual classrooms as well as the iEN national e-portal and iEN channels as asynchronous virtual classrooms for supplementary online learning. Furthermore, the teachers expressed enjoyment, acceptance, and knowledge of online teaching approaches and use of the Madrasati platform and iEN channels, and they reported being able to support their students' learning and the technical problems their students faced, which reflected their proficiency in TPACK competencies.

The second subtheme in this chapter focused on the teachers' attitudes towards the challenges their students encountered during the pandemic, such as structural issues that led to the students' inability to use technology. In particular. It was found that disabled students did not have devices, which made it difficult for them to log in and use the Madrasati platform properly. Even for students who had suitable devices, another issue was that they didn't know how to use them in order to benefit from the Madrasati platform and iEN channels. However, the third subtheme, related to teachers' assistance and support for their students regarding the technology used, revealed that teachers were able to solve these issues so that their disabled students were ultimately supported effectively. The issues were managed by providing their students with appropriate support, including actual devices that were distributed by the MoE.

The third theme was about teachers' attitudes towards the benefits of using high-tech AT with disabled students both during and after the pandemic. It was found that teachers recognized several benefits of using high-tech AT, whether during or after the pandemic. This included reinforcement of their technical and digital skills, communication with and support of their students, development of new digital teaching styles, and enhanced access to different sources of information and knowledge.

The final and fourth theme in this chapter confirmed the positive impact of COVID-19 on the use of high-tech AT in the teaching environment and on increasing teachers' skills, especially after the overall positive experiences they expressed regarding teaching online during the COVID-19 pandemic. However, the teachers commented on having to continue using their personal devices and tools in their post-COVID-19 classrooms because of the lack of school-provided technology.

Chapter 8: Data Analysis and Findings: Exploring teachers' perspectives on factors that could facilitate the implementation of AT as a teaching tool in the classrooms

8.0 Introduction

This chapter is the third and final findings chapter focusing on the main theme, which aims to explore teachers' perspectives on the facilitating factors that can significantly impact the successful implementation of AT in SEND classrooms and support disabled students moving forward. This main theme also addresses my final research question about approaches and support strategies that would enable Saudi special education teachers to implement AT in their SEND classrooms. In other words, it looks to the future improvement of the teaching conditions and educational environments for disabled students in mainstream schools in Saudi Arabia.

The participating teachers were asked in the workshops to share their opinions and thoughts. To help them explore their perspectives and generate ideas, they were asked to do a "complete the sentences" activity during the online workshop. For example, they provided completions to prompts like "It would be amazing if...", "I wish I had...", and "If I could change one thing...", and then discussed their responses. The teachers' responses varied, but they mostly agreed on certain thoughts and views about implementing AT and supporting disabled students in improving and developing. Hence, two themes and related subthemes emerged from the data analysis. The first theme relates to teaching quality and learning facilities, and the related subtheme is the resources needed in the classroom and learning environment, such as AT devices and tools. The second theme derived from the data analysis focuses on promoting inclusivity and the teachers' visions for classroom diversity and acceptance of disabled students. The related subtheme is about fostering inclusivity in education and the societal acceptance of disabled students. Each of these will be discussed in more detail in the following sections.

8.1 Theme One: Teaching Quality and Learning Facilities

This theme reveals teachers' perspectives on the teaching quality and learning facilities for disabled students in Saudi Arabia. The goal is to identify areas for improvement in the teaching environment and to use the teachers' recommendations to enhance the teaching process and the educational experience for disabled students. One subtheme emerged from the data analysis.

8.8.1 Subtheme One: Resources Needed in the Learning Environment

This subtheme is useful for critically analysing and interpreting the most important practical factor that facilitates teachers' use of AT tools and devices and supports disabled students in the classroom setting, based on teachers' perspectives. In the online workshop discussions held via Google Meet, the teachers were asked to share their opinions and ideas on what can help them to implement AT as a tool in their SEND classrooms to better support the educational experiences of disabled students and enhance the teaching and learning environment. Accordingly, the teachers had earlier regularly expressed disappointment in the lack of high-level AT in their classrooms; therefore, they mostly revealed their wishes for classrooms that were better prepared and equipped with high AT technologies to enable them to teach with effective tools. Wejdan, Majd, Afnan, and Amal expressed strong desires for improved AT in their classrooms. For example,

"I wish I had a school and classroom that were equipped with multiple technologies for students with SEND, such as computers, projectors, and interactive whiteboards to use in teaching and supporting SEND students' learning." (Wejdan)

"It would be amazing if the classrooms were equipped with technology such as computers, interactive whiteboards, and projectors. [...] My life would be better if I could have suitable technology in the classroom to make teaching enjoyable and to improve learning outcomes for students with SEND." (Majd)

“It would be amazing if the classrooms were equipped with technology such as computers, interactive whiteboards, and other technologies to support the unique needs of our students and enhance their learning experience.”
(Afnan)

“My life would be better if our wishes for students with SEND became real: for them to have classes with modern technology, such as computers and interactive whiteboards, to help them learn and improve their academic skills.” (Amal)

From the teachers’ perspectives in these examples, it is clear that the teachers have a strong desire to have access to technological resources and, in particular, to high AT technology in their classrooms, such as computers, projectors, and interactive whiteboards (IWBs). Indeed, it seems that teachers recognise these high AT technologies as valuable tools that can be used to enhance the educational sphere and promote positive results for disabled students’ learning. Several other studies have highlighted the importance of utilising and implementing high AT technology in teaching and learning environments. For example, according to Nope (2017), the use of high AT technology enables teachers to include various strategies due to its flexibility and accessibility options, including text-to-speech, screen readers, and auditory output. To demonstrate, teachers can benefit from the features that can transform written text into spoken words to help disabled students who have difficulties in reading or difficulties with vision. As a result, the technology used in classrooms is seen as a valuable tool that helps students achieve the best learning practice that was previously either difficult or impossible (Ottenbreit-Leftwich et al., 2010). Similarly, Khan and Emara (2018) indicated that numerous technological tools being used in teaching, including IWBs, document cameras, and projectors, help teachers in various ways, such as to access and demonstrate knowledge in audio, video, text, and image formats, and to support task structures through the use of features that allow teachers to visually plan and organise tasks. Therefore, it is obvious how technologies with different functions can support the variety of purposes needed to teach and support students.

In addition, according to the above examples, the teachers focused on these specific kinds of high AT technologies (computers, IWBs, and projectors), as they believed that implementing these high AT technologies in teaching and learning environments could enhance and support disabled students' learning and academic experiences, as well as improve their academic skills and outcomes. For instance, *"to improve learning outcomes for students with SEND," "to support the unique needs of students and enhance their learning experience,"* and *"to help them learn and improve their academic skills"* are all views expressed by the participant teachers related to the benefits of high AT tools. These results are in line with other studies in the academic literature. For example, according to Adebisi et al. (2015), the implementation of high AT technology in the teaching environment could facilitate a wide range of support strategies and create alternative instruction that would enable disabled students to participate and improve their academic skills. Each of the three specific types of high AT tools has a valuable place in the SEND classroom.

1) Computers

According to Wehmeyer et al. (2004), electronic and information technologies, such as computers, have become an integral part of the educational process, aiding functions such as instruction, promotion of academic progress, and achievement of disabled students. In addition, utilising computers in an educational environment allows both teachers and students to keep more efficient records and track academic progress (Weber and Demchak, 1996). The teachers in this research seemed to recognise the importance of including and using the computer as an assistance educational tool in the teaching of disabled students and for their students' individual educational development.

Additionally, according to Hasselbring and Glaser (2000), disabled students can acquire and enhance their academic and learning skills when computer technology is used to deliver well-designed lesson materials and instructions. In line with these findings, Thormann et al. (1987)

reported that teachers must be aware that the use of computers is intended to enhance instructional delivery rather than to replace traditional teaching methods. Furthermore, Hasselbring and Glaser (2000) emphasised that the use of different types of computer activities in classrooms, such as word processing, word prediction, communication, and networking, can have multiple educational benefits to meet the variety of needs of disabled students with different levels of disability. For instance, the effectiveness of word processing software as a learning tool for disabled students, specifically those who have difficulty in written language skills, includes its feature of revising the text and producing clean text. This makes students feel they have a sense of authorship, which ultimately leads to improved writing skills. In addition, according to Hannaford (1993), using computers in teaching could increase disabled students' motivation and attention to accomplish their tasks. As a result, teachers should use technology in ways that are supportive and "doing what's best for kids" (Coppola, 2004, p. 136). In the classroom, computers can be beneficial tools that positively enhance teaching processes and facilitate a broad range of educational activities to meet the wide-ranging needs of disabled students and help them become active learners.

The critical discussions about the use of computers in the classroom focused on computers as an example of high AT. In other words, teachers in the above example focused on computers as one type of important high AT technology. This led to the discussion of the second type of high AT that teachers wished to have in the classroom environment, namely IWB.

2) IWB Technology

Alongside computer-based tools, teachers also emphasised the usefulness of IWBs to be used in the classrooms and implemented in the educational process. For instance, one teacher commented, *"It would be amazing if the classrooms were equipped with technology such as computers, interactive whiteboards, and projectors."* In fact, in today's digital age, the IWB is seen as an indispensable technological tool that produces enlarged images,

animations, and text for teaching and learning purposes (Baran, 2010). In addition, the IWB is considered a powerful and popular educational tool that can support instruction and the level of student interaction in classrooms (Mildenhall et al., 2010).

According to Wong et al. (2013, p. 1), an IWB is “a stand-alone board that functions in conjunction with a computer ... a multi-touch, multi-user interactive learning board that allows groups of children to work simultaneously on its surface”. IWBs are controlled by a computer and are generally connected to a projector; however, some IWBs are equipped with a built-in projector, which eliminates the need for a separate projector device (Sundeen and Sundeen, 2013).

To illustrate, the IWB, whether connected to an external projector or equipped with a built-in projector, is often used to project computer-generated content onto its surface. This results in larger and more visible content, contributing to the creation of an interactive, attractive, and effective learning environment for disabled students. It seems that teachers in this research recognised the value and benefits of utilising IWB in enhancing the teaching process and supporting the learning process of disabled students, and their opinions are supported by research and academic literature. A number of studies have highlighted the significance of using IWB in teaching and supporting disabled students. For instance, according to Whitby et al. (2012), IWBs, as effective teaching tools, can address multiple learning styles for disabled students and increase learner motivation, interaction, participation, and academic engagement. Therefore, with appropriate use, large-screen IWBs that clearly display large letters, colours, and pictures could help students with poor vision or behaviour disorders to rearrange letters to make words and solve other problems in a visual and kinaesthetic way.

Indeed, the usefulness of the IWB can readily be seen in its ability to display engaging presentations, reinforce knowledge, and organise resources (Karsenti, 2016), as well as its functionality of immediate access to websites and useful online resources (Allsopp et al., 2012). In addition, according to Smith et al. (2005), the IWB is a great tool to captivate

students' attention in the classroom and enhance their engagement more than other resources, leading to a decrease in disruptive behaviours that might hinder students' learning. As a result, for these important and multiple features of IWBs, teachers of disabled students in this research wish for their classrooms to be equipped with such valuable technological tools. In another study, teachers expressed that the IWB is a fundamental tool for teaching a variety of subjects to help students with SEND in their learning (Türel and Johnson 2012).

However, it is essential to highlight that, as with any technological tool, there are some issues and challenges that teachers can encounter. For instance, according to Fekonja-Pekljaj and Marjanovič-Umek (2015) and Karsenti (2016), the major challenge teachers face while using IWB is technical problems that can lead to wasted time spent solving the problem. Furthermore, preparing lessons to make the best use of an IWB can take a lot of time due to both limited knowledge on the part of teachers and a lack of support from their schools (Karsenti, 2016). However, these challenges can be overcome with time and teacher training (Balta and Duran, 2015) and, therefore, make the use of IWBs a net positive.

The final effective and valuable educational tool that the teachers expressed a desire to use in their classrooms and believe in its benefits is the projector technology.

3) Projector Technology

In conjunction with computers and IWB technologies, the teachers also confirmed their strong desire for the availability of a third technological tool, a projector device, in their schools and classrooms. They believe this AT can enhance learning and teaching experiences as well as keep learning interactive and enjoyable for disabled students. According to Mason and Kulinna (2022, p. 22), the projector is "a device for transferring photographic and other images in an enlarged form onto a viewing screen". Furthermore, according to Raja and Nagasubramani (2018), visual content tends to have a strong impact on learning compared to written or spoken words; therefore, using projector devices is a great tool that helps students think and engage

with lesson materials and topics. The teachers in this research seemed to be aware of the significance and the value of projectors in enhancing their teaching process.

In fact, projectors have been used in educational settings and integrated into classrooms since the late 1800s (Akanegbu, 2013), and the common goal of integrating different types of projectors into lessons is to transmit images or moving images onto a surface (Mason and Kulinna, 2022). Naturally, projectors have evolved in design and weight since they were first introduced into classrooms. To clarify, according to Akanegbu (2013), there are multiple types of projectors that have been used and gradually improved over the years to support the teaching process and students' learning. For instance, introduced in the late 1800s, the magic lantern was the first type of projector, and it projected images from glass slides. This was the first projector used by teachers and photographers, and it later became popular as a form of entertainment. Second, in the 1920s, the filmstrip projector was widely used in classrooms to display educational films. This type of projector allowed teachers to pause presentations by turning a knob for classroom discussions and exchanging ideas. Then, in the 1960s, the overhead projector, also known as the slide projector, was introduced. This projector used transparency slides that allowed light to pass through the image to display images on a screen or on a wall in the classroom. The slide projector has evolved over the years to have three types of slide projectors: 1) carousel projectors, 2) dual slide projectors, and 3) single projectors. These three types of projectors contain small built-in screens that enable viewing presentations immediately and anywhere. However, manufacturers have stopped producing the overhead/slide projector as digital cameras, video/DVD players, and televisions have replaced them. (Gautam and Agrawal, 2012). In the 1980s, the first data projector was used to display images on a projection screen from a computer, document camera, or video cassette player. In other words, this projector takes signals from a video source and projects those images on a screen (Akanegbu, 2013). Indeed, in the 21st century, with more modern technology and innovation in classrooms, it is valuable to have these superior and more advanced types of digital projectors. Besides the data projector, another type of digital

projector that has become commonly used is the digital light processing (DLP) projector. The DLP projector is gaining popularity in classrooms, conferences, and universities for giving PowerPoint presentations and displaying images (Gautam and Agrawal, 2012). The main feature of this type of projector is that the image produced can be larger than most television screens; as a result, the students who are sitting at any side of the classroom have the opportunity to access the projected image clearly and without hindrance (Sundeen and Sundeen, 2013).

Only a few different types of projectors with brief descriptions of their features and how they were improved over the years have been mentioned. In addition, there is a broad selection of projectors that could be used for other purposes, such as mobile phone projectors, DLP notebook companion projectors, and DLP multimedia pocket projectors (Gautam and Agrawal, 2012). As a result, the choice of projector should be aligned with the purpose of its use to suit certain tasks and environments.

These varied types of projectors have been used in classrooms during different periods to help students see learning in a new approach (Akanegbu, 2013). As the projector enables visual content to be displayed, it helps to keep learning interactive and interesting, as well as improve students' motivation (Raja and Nagasubramani, 2018). Furthermore, the projector can be used to project a variety of activities that are prepared on computers, including slide presentations, photographs, and instructions (Can-Yasar et al., 2012). Hence, projectors have become the hub resource of the classroom to display visual materials of all types. In other words, it is vital to note that this device technology is one major medium in today's modern teaching that helps teachers to make the lesson more interactive and interesting and makes learning effective and enjoyable for their students, ultimately making teaching and learning more convenient, interactive, and effective. Of course, this valuable technology cannot replace the teachers' role or the instruction, but it can be used to enhance the teaching and learning experience for both teachers and disabled students (Sundeen and Sundeen, 2013).

Overall, these findings confirmed that computers were identified by the teachers to have a critical role in teaching disabled students, closely followed by IWBs and projectors. In particular, these technologies play a pivotal role in supporting instruction and fostering the academic growth and success of disabled students. Moreover, these technologies are perceived by teachers as having the greatest potential for enhancing learning and improving future education for disabled students (Sundeen and Sundeen, 2013).

Furthermore, according to the above argument, it is obvious that in the discussions, the teachers showed their strong beliefs, hopes, and overwhelming positivity, to have such great resources to enhance their experiences in teaching and their students' learning. Moreover, the teachers showed their recognition of the significance of these three specific forms of high AT in the classroom. In other words, computers, IWBs, and projectors are the top three technological tools that teachers focus on and emphasise needing in their schools and classrooms. In fact, these three devices work alongside each other to support educational settings. According to Sundeen and Sundeen (2013), technological devices, including computers, IWBs, and projectors, can be seen as instructional technologies that make positive changes in education and students' learning to positively impact education. They have been reported to play a critical role in improving academic performance, increasing engagement, and ultimately enhancing student outcomes. In other words, instructional technology encompasses the "use of technology for teaching and learning" (Ottenbreit-Leftwich et al., 2010, p. 1322).

Significantly, the availability of high AT technology in the classrooms was the key factor that these teachers emphasised in order to improve their teaching. In other words, the teachers in this research emphasised their need for high AT technology and a desire to integrate it effectively into their teaching environment and within their curriculum for disabled students. Thus, the teachers' perspectives about the use and implementation of high AT technology were positive, and they believed it could greatly enhance teaching and learning for disabled students.

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With this in mind, it is important to emphasise that the teachers' statements are not merely complaints, but rather a call to action and improvement. In other words, these statements reflect the teachers' aspirations and desires for positive change in the educational environment in which they teach and interact with disabled students. In fact, their wishes imply a call for the Saudi Ministry of Education to re-evaluate and expand the provision of high AT technologies in the classrooms and schools where they teach, as they believe these resources are essential for enhancing the learning experiences and outcomes of disabled students.

Therefore, the teachers in this study are advocating for the implementation of a policy and practical procedures in primary education related to advanced AT, including computers, IWBs, and projectors. This is to ensure that there are adequate and up-to-date technology facilities for all students in classrooms in Saudi Arabia.

8.2 Theme Two: Promoting Inclusivity

This theme arose from discussions on teachers' perspectives on diversity and the acceptance of disabled students in mainstream schools in Saudi Arabia. Some of the underlying concepts of this theme are 1) inclusive practice should accommodate all students, including disabled students; 2) curricular instruction should also be inclusive; 3) teaching strategies and methods should support the learning styles and abilities of all students, including implementation of AT; and 4) societal acceptance of disabled students, whether in schools or outside the school setting, needs improvement (Salisbury et al., 1994; Barton, 2003; Slee 2011). The goal is to promote inclusion and change negative attitudes towards disabled students by using the teachers' viewpoints and recommendations to foster inclusivity and enhance positive educational and social experiences for disabled students. Therefore, the ultimate goal is to propose effective strategies and initiatives that can help foster the inclusivity and social acceptance of disabled students. The following subtheme arose from the data analysis:

8.8.2 Subtheme One: Fostering Inclusivity in Education and Social Acceptance of Disabled Students

To start with a clarification, while this subtheme on inclusivity and societal attitudes may seem separate from and not directly related to the broader theme of this chapter, which focuses on the specific support strategies for the comprehensive implementation of AT in teaching disabled students, it is closely linked and connected in one crucial way. The concepts of inclusion and societal attitudes significantly impact the success of AT integration in classrooms. Critically, acting inclusively and having positive attitudes towards disabled students and disabilities in general often leads to better support and increased advocacy for the rights and needs of disabled students, resulting in better funding, resources, and policies that support the integration of AT in educational settings and the implementation of AT in classrooms. Therefore, this last subtheme, developed from the teachers' discussion in the Google Meet online workshops, focuses on this important topic.

This subtheme is based on extracting the teachers' insights into the support and effective strategies they believe are crucial for fostering inclusivity within educational environments and enhancing positive attitudes and societal acceptance of disabled students within schools and society.

Building on the analysis in Chapter Six, which explored teachers' attitudes towards the negative experiences of disabled students, this section extends that discussion by highlighting teachers' own reactions and expressions to these negative attitudes, particularly highlighting teachers' perspectives and effective strategies for fostering inclusivity and enhancing positive attitudes and societal acceptance of disabled students within schools and society.

During the workshops, most of the teachers consistently expressed disappointment in the lack of societal acceptance and negative attitudes towards disabled students, both within and outside schools, and wished for it to change. Furthermore, some teachers emphasised the right of disabled students to be educated, welcomed, and included alongside their peers of non-disabled students in mainstream schools. For instance, Maha stated that:

"I hate when individuals in society or normal students in school show negative attitudes and fear towards students with SEND. If I could change one thing, it would be the negative attitudes people have towards students with SEND".

Amal and Majd expressed similar views:

"I hate when people in society or normal students in school show their negative attitudes towards students with SEND and their low acceptance, too." (Amal)

"I would like to change the individuals' negative attitudes towards students with SEND in society and normal students in schools; they have a right to education and acceptance by others." (Majd)

And teacher Sarah added:

"If I could change one thing, it would be the negative perception towards students with SEND that normal students show in school; they have a right to be educated, have equal opportunities, and be accepted by others in both social and academic activities."

Indeed, these teachers clearly expressed a deep and strong frustration and dissatisfaction towards the negative attitudes that non-disabled students and other individuals in society show and hold towards disabled students. For instance, *"I hate when individuals in society or normal students in school show negative attitudes and fear towards students with SEND"* and *"I hate when people in society or normal students in school show their negative attitudes towards students with SEND"* are two clear statements of dissatisfaction with the status quo.

This frustration on their part comes about because the negative attitudes of non-disabled students have been found to influence disabled students' self-worth (Baglieri and Shapiro, 2012), their unimpeded mobility, and their active participation and involvement in public areas (Butler and Bowiby, 1997; Hemmingson and Borell, 2002). In fact, the teachers in this research recognised and reported their concern about different forms of social negative attitudes, fear, and less acceptance, whether explicitly or implicitly, that non-disabled students in schools and other individuals in society show, such as exclusion, bullying, limited acceptance, prejudice, and discrimination, as illustrated and discussed in depth previously in Chapter Six. As a result,

the teachers expressed their strong desires to change these negative social attitudes, with statements like, *“If I could change one thing, it would be the negative attitudes people have towards students with SEND,” “I would like to change the individuals’ negative attitude towards students with SEND in society and normal students in schools,”* and *“If I could change one thing, it would be the negative perception towards students with SEND that normal students showed in school.”*

Thus, the teachers’ statements clearly reflect their strong positive attitudes and advocacy for changing negative societal views and creating a more inclusive, social, and accepting environment for disabled students. The inclusion of disabled students in different domains, such as in arts, sports, school activities, and community processes, can help eliminate negative attitudes and discrimination and enhance social inclusion (Lundberg et al., 2011). Furthermore, promoting social inclusion means that disabled individuals can have meaningful roles in society, which encourages equality (Khasnabis et al., 2010). Indeed, social inclusion is defined as the “process of improving the terms of participation in society, particularly for people who are disadvantaged, through enhancing opportunities access to resources, voice, and respect for rights” (United Nations, 2016, p. 17). Disabled people are a key group that often encounters disadvantages, such as negative attitudes and exclusion from society (Saran et al., 2023).

Additionally, according to the Convention on the Rights of Persons with Disabilities (CRPD), social inclusion of disabled people is recognised as a fundamental right that includes “participation in cultural life, recreation, leisure, and sport” (Article 30) and “participation in political and public life” (Article 29). The Convention further stipulates that disabled people “should enjoy a full and decent life, in conditions which ensure dignity, promote self-reliance and facilitate the child’s active participation in the community” (Article 23). In the same vein, the Disability Code 2000 of Saudi Arabia confirmed disabled people’s rights in different areas, including social domains, cultural, and sports fields, media, and areas of complementary services, as mentioned previously in this thesis. Accordingly, it is clear that there is a strong

emphasis on social inclusion as an entitlement right for disabled people, and this emphasis clearly supports the fulfilment of rights for disabled students across different areas, including social aspects. In fact, social inclusion and interaction are also considered key aspects of the broad meaning of inclusive education, which enables disabled students to learn and interact alongside their peers in a totally inclusive setting (Beckett, 2009). In other words, without social inclusion, other rights of disabled individuals, such as the right to education, might not be realised or recognised (Saran et al., 2023).

Despite the current level of acknowledgement and granting of disabled people's rights across various aspects, including social inclusion and its significance for disabled development, disabled students, as indicated in this research's findings, from teachers' point of view still experience some form of discrimination, bullying, and limited acceptance within mainstream schools from non-disabled students and other individuals in society. Consequently, teachers wish for these negative social attitudes and fears to shift towards a more supportive and collaborative social environment in which disabled students can be recognised, valued, and actively included in different activities. In other words, teachers wish for these negative attitudes to be replaced with learning and understanding of disability and disabled people's differences, increased friendships, and reduced instances of social exclusion or bullying. They want to build positive attitudes towards disabled students, support diversity, and create a social and inclusive environment for disabled students.

This is consistent with Capper and Pickett (1994) and Cole et al. (2004), who found that creating a socially inclusive environment is beneficial for both disabled and non-disabled students, as it helps raise awareness and respect for human differences, thereby promoting opportunities for interaction, acceptance, and friendship regardless of disabled differences (Vygotsky, 1978). Furthermore, according to Nakken and Pijl (2000), schools and teachers should play a fundamental role in creating great opportunities within school activities to facilitate increased interaction between disabled and non-disabled students. Schools are considered crucial places for developing social networks and peer friendships and building

positive attitudes (Lindsay and McPherson, 2012). Therefore, teachers should create and support opportunities for social interaction and engage disabled students in the decision-making process of choosing the type of activity in which they want to take part, as this can add value for both disabled and non-disabled students (Falkmer et al., 2012).

In addition, the teachers' statements in this study about advocating for changing negative attitudes implied a demand for more social inclusion strategies and interventions that enhance social inclusivity, address diverse student needs, and promote acceptance. Therefore, developing and implementing multiple types of interventions could be beneficial to encourage more social inclusion and limit social exclusion and low acceptance. However, it is vital to recognise and understand the types of barriers that disabled people encounter and the reasons why they exist to be able to select appropriate interventions that support social inclusion (Saran et al., 2023). According to this research's findings, the predominant type of barrier occurs at the community level. Consequently, the following section illustrates and discusses some interventions that are specifically related to society's negative attitudes and beliefs towards disabled people, with some examples to improve the social inclusion aspect.

Interventions to Improve the Social Inclusion of Disabled Students

The main goal of this section is to explore and discuss the possible interventions that could reduce or eliminate different forms of negative social attitudes and beliefs among non-disabled students and community members, as well as support and enable disabled people to participate fully and actively in school and society. A range of interventions have been identified that play a critical role in supporting the social inclusion of disabled individuals.

Among the interventions that help to construct positive images and roles towards disabled people are 1) promoting awareness, 2) spreading information and knowledge through the media, networks, and organisations that hold events, and 3) establishing connections with local stakeholders for assistance and support (Khasnabis et al., 2010). In other words, it is critical to increase education and awareness campaigns in schools and communities to

promote inclusivity and spread understanding of disability and disabled students' differences at various levels. One possible intervention that could facilitate full participation and social inclusion and promote awareness of disabled people is improved access to cultural activities, such as events and services offered by museums, libraries, cinemas, television programs, and tourism services. Even the simple step of having sign language interpreters at cultural events not only makes them more accessible for disabled people, but also helps to normalise the concept of disability (Khasnabis et al., 2010). This means organising cultural programs that celebrate diversity, engaging disabled people in visual arts and dramatic activities, and adapting inclusive art programs (United Nation, 2007). According to Saran et al. (2023), one example of a group that provides supportive programs and activities is the Friends of Children with Disability for their Integration into the Community (FANDIC); even though this programme offers fantastic opportunities for the disabled to develop their physical and artistic abilities, it can be seen as a valuable opportunity to support disabled people and help them be included and welcomed in society.

Overall, these various positive interventions could contribute to enhancing social inclusion and helping disabled people be recognised and fully participate in different aspects of social life.

In addition to the teachers' advocacy for social inclusion and the ways to promote social inclusion that were discussed, a few teachers in this research also emphasised the important concepts of equality and rights of disabled students. To illustrate, a few teachers' expressions specifically highlighted the concepts of equality and rights; they supported advocacy for the rights and equal opportunities of disabled students in both their educational and social spheres of life. For instance, teacher Majed said, *"They [disabled students] have a right to education and acceptance by others,"* and teacher Sarah stated, *"They [disabled students] have a right to be educated, have equal opportunities, and be accepted by others in both social and academic activities"*.

These examples demonstrate the teachers' strong positive attitudes towards the rights of disabled students, emphasizing their commitment to advocating for both the education and social acceptance of all students. Overall, the teachers in this research showed strong positive attitudes towards supporting disabled students when talking about the use of AT in their classrooms and towards inclusion in particular. It has been noted that teachers' positive attitudes, including beliefs, are considered a critical contributor to achieving inclusive education (Booth and Ainscow, 2002), and their significant contribution to the success of inclusive education has been reported (Meijer, 2003; Mantey, 2017).

In other words, these teachers' statements reflect their inherent belief that disabled students have the equal right to access education, be accepted, and learn alongside their non-disabled peers. Therefore, drawing on this argument, reflecting on the teachers' desires in these statements imparts an important message that calls for creating a more inclusive and accepting educational and academic environment for disabled students in the mainstream schools of Saudi Arabia. This is another message to consider alongside the social inclusion environment aspect discussed previously.

In particular, the teacher's statements call for an inclusive approach that recognises and values the importance of equal learning opportunities and participation for all, including disabled students, in mainstream schools and classrooms, an approach that expresses, "Come in, we celebrate differences here. You can be yourself and not struggle to fit in" (Corbett and Slee, 2000, p. 143).

The concept of inclusion, which emerged in the 1990s, expects mainstream schools to make all possible positive changes, appreciate equal participation, and reconstruct their environments to accommodate all students and respond to disabled students' unique requirements (Villa and Thousand, 2000). As Lewis (2009, p. 5) argues, inclusion is "bringing about change in the education system, by identifying and solving barriers to presence, participation, and achievement for every learner within mainstream settings". Also, Goodley

and Runswick-Cole (2015, p. 246) stated that inclusion urges “schools to rethink their priorities, their usual modes of operation and their cultural foundations”.

Furthermore, according to Hodge (2017), inclusive education aims to offer high-quality learning experiences and social opportunities while fostering justice and appreciation for everyone, regardless of their background, achievements, or abilities. Thus, the development of successful inclusion happens when learning and participation are acknowledged and include all students, which also means creating schools for all (Rouse, 2008). These concepts are all consistent with the viewpoints shared by some of the teachers in this research, as explained earlier.

In fact, inclusion in education can positively impact disabled student development, not just academically but also socially. For instance, when disabled students learn in inclusive classrooms, this gives them opportunities to learn in an encouraging and supportive atmosphere alongside their non-disabled peers, which then helps them to develop their learning skills, improve their academic progress (Bailey Jr et al., 1998). It also increases the acceptance and appreciation of differences (Ajuwon, 2008) and an awareness of the inherent value of all (Triviño-Amigo et al., 2022). As Saran et al. (2023, p.4) confirmed, “The importance of inclusion in education cannot be overstated, as education is essential for skill development”.

Inclusion in this regard is an attempt to have a more equitable and supportive environment for disabled students (Heiman, 2004). Thus, according to these integrated overviews, inclusive practice fosters a sense of belonging and equity in all aspects of education and community engagement, embracing diversity and ensuring that everyone feels welcome and included.

The teachers’ statements, which push for the academic and social rights of disabled students, are more precisely a call for inclusive practice that includes all students regardless of their disabilities or differences, and reflects the essence of the philosophy of the broader social model of disability and disability studies as represented by Oliver (1990) and Goodley (2011, 2017), as has been covered in depth in Chapters Three of the literature review.

In particular, the concepts of equality and rights are critical in the social model of disability, which requires facilitating learning for all learners regardless of differences. In other words, the teachers' responses and the words "equality" and "rights" they used reflect the social model's understanding of inclusion. The social model aims to create an inclusive space for all students and encourages the removal of all forms of disabling barriers, both physical and attitudinal, to support students and enable the active learning, participation, involvement, and inclusion of all students both academically and socially (Barton, 1997; Goodley, 2014). Furthermore, inclusion, according to the social model, acknowledges the right to education for all in mainstream classrooms, facilitates learning for all learners, and celebrates diversity to end all forms of discrimination against disabled individuals (Goodley, 2017).

Yet, as discussed and clarified in Chapter Six and discussed throughout the other chapters of this thesis, the education system of disabled students in Saudi Arabia has evolved but has not yet reached the full level of inclusivity; instead, it is mostly linked to the special education concept and the medical models of disability as shown and discussed in depth in Chapter Two and Six. In brief, disabled students in mainstream Saudi schools still receive their education in self-contained separate classrooms; in other words, they are segregated from their non-disabled peers, taught only by special education teachers, and rarely interact with non-disabled students. Therefore, disabled students have very limited opportunities to be included and taught alongside their peers, to interact and gain social skills, and to feel encouraged alongside non-disabled students in a more inclusive and supportive environment, whether academically or socially. Therefore, critical and further efficient action is needed to promote full and equal inclusion and interaction with non-disabled students.

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Indeed, the teachers' general attitudes in this research are to seek as much support as possible for disabled students' learning and interaction and to foster a sense of understanding and acceptance among non-disabled students. Despite this, the teachers' frequently express concern and dissatisfaction towards the negative attitudes that disabled students encounter;

therefore, they are looking for this to change. It can be recognised that one possible reason for these negative attitudes that disabled students experience is due to their segregation in self-contained classrooms, which leads to less acceptance, interaction, and understanding of disabilities and disabled students.

Taking all of this into consideration, the teachers' messages in this regard underscore the need for systemic changes and policies that promote an inclusive and accepting environment both within educational institutions and in broader society for disabled students. In response to the teachers' wishes for the lives of their students to be enhanced and educational success to be achieved, it is crucial to develop and reinforce a disability rights policy and promote the values of inclusive education as well as the social inclusion of disabled students in mainstream schools in Saudi Arabia.

As indicated by Barton (2003) and Villa and Thousand (2000), disability rights programs and policies should be designed to celebrate diversity, advocate for the rights of disabled students, and enhance the overall quality of education. Doing this can help deconstruct the negative beliefs towards disabled students, whether by non-disabled students in schools or individuals in society, and thereby increase disabled students' opportunities for inclusion, social acceptance, and development.

Overall, as these results show, it seems obvious that negative attitudes alongside non-inclusive education may result in discrimination against disabled students; therefore, they are unable to enjoy their rights on an equal basis with others (Saran et al., 2023). Discrimination in this context includes any form of exclusion or restriction that prevents disabled students from accessing and enjoying their rights (Mackay, 2006).

In summary, the findings show that the teachers emphasised their desire for positive change and highlighted the need for advocacy for 1) challenging negative attitudes towards disabled students and 2) creating an inclusive and equal space for all students, including disabled students, both socially and academically. They challenge the currently segregated education

system as it limits the right of social participation and access to the same learning classrooms and tools. In other words, the teachers' statements advocate for inclusive approaches that meet the aims of the social model of disability.

Before concluding this chapter, it is important to reflect on one of the limitations of the analysis, particularly the use of theoretical models to interpret participants' views. Although the social model of disability provided a useful framework for interpreting participants' views, their responses reflected a combination of both the medical and social models. For example, the influence of the medical model was clear in their use of categorising language, which remains common in the Saudi education system, where a special education approach is still widely followed. At the same time, many of their perspectives and practices also aligned with the social model, especially in their desire to have different types of advanced technology available in their schools and classrooms, support for inclusion, use of inclusive teaching strategies, and efforts to challenge negative attitudes toward disabled students.

Even though participants had not been directly exposed to the social model, their views reflected many of its core values. While I aimed to avoid forcing participants' views into specific theoretical categories, some of their perspectives naturally aligned with the principles of the social model of disability. This interpretation reflects my role as a researcher, and I recognise that my use of the social model framework influenced how I interpreted their responses. This limitation highlights a common challenge in qualitative research, illustrating how people's views on disability are shaped by the surrounding context and their personal experiences.

However, theoretical models such as the social and medical models of disability are tools that help researchers organise data, but they can also be limiting. For example, in real life, people's beliefs about disability are not always consistent or easy to fit into these models. In this study, participants often held mixed views. They spoke about removing barriers and supporting inclusion (which fits the social model), but also used labelling and classification when defining disabled students in the worksheet (which reflects the medical model). These varied

perspectives highlight the limitations of relying on a single model to interpret participants' understandings of disability.

Moreover, these models, particularly the social model, were developed primarily in Western countries. In contrast, the Saudi Arabian context differs significantly, especially in how disability and education are conceptualised. The education system in Saudi Arabia continues to be strongly influenced by the medical model, with an emphasis on diagnosis and classification. Therefore, when using these models in Saudi Arabia, it is important to consider local cultural and educational differences to ensure a more accurate and meaningful understanding of disability. Understanding these differences is essential to applying disability models in a respectful and locally meaningful way.

In addition, my role as the researcher had an impact on the analysis. Because I am familiar with both the medical and social models, and acknowledge the insights each can provide, I may have been more attuned to participants' responses that reflected the values of the social model. This is a common issue in qualitative research, where the researcher plays an active role in interpreting data (Denzin and Lincoln, 2011). I tried to remain open to all perspectives, but I acknowledge that my own background shaped how I understood and presented the findings.

This limitation also affects how the results of the study can be applied. If I rely too much on one model, I may miss the complexity of participants' beliefs and practices. In future research, it could be helpful to use approaches that are more adaptable to local contexts and reflect the specific educational environment, such as frameworks that combine elements from both the medical and social models, or those developed based on the specific educational settings of the region being studied. These approaches may allow researchers to better reflect the diversity of participants' views and make the findings more relevant for educators working in similar cultural or institutional contexts.

In conclusion, while the social model helped highlight important ideas about inclusion and barriers in schools, it also had some limitations. Participants' views were often more complicated than the model could fully explain. Being aware of this limitation makes the research more reflective and shows that theoretical models should be used carefully and critically, especially in cross-cultural contexts.

8.3 Chapter Summary

This third analysis chapter covered the third main theme of this research's findings, namely the teachers' perspectives on factors that can facilitate the fuller implementation of AT as a supportive tool in their SEND classrooms, thereby addressing the ongoing needs of disabled students. In other words, the focus of this chapter was on the teachers' voices, concerns, suggestions, and recommendations on how to best implement AT as an assistance tool in their classrooms to support the learning process of disabled students.

The first theme of this section focused on the concept of teaching quality and learning facilities and identified opportunities to enhance the teaching environment and support the learning process. It was found that technological resources, specifically high AT tools like computers, IWBs, and projectors, are crucial pieces of equipment that are fundamentally needed to reinforce teaching and improve the educational experience for disabled students. However, the teachers' descriptions of their classroom environments revealed that they all unfortunately lacked these high AT tools. Therefore, the teachers perceived these three technologies as essential resources that should be available in schools and classrooms due to their undisputed value for teaching and learning.

The second theme, focused on promoting inclusivity, is closely linked to the broad theme of factors that help to fully implement AT as a supportive tool in disabled classrooms. This includes the teachers' visions for diversity and acceptance of disabled students and the subtheme of fostering inclusivity in education and societal acceptance of disabled students. The teachers presented and highlighted their perspectives and shared their suggestions for

how to foster both social and academic inclusion and reduce negative social attitudes towards disabled students. The teachers' insights into addressing negative perceptions and fostering academic and societal acceptance are integral components of the approaches and support strategies needed for the effective implementation of AT for the teaching of disabled students.

In addition, the data reflect the teachers' significant frustration over the current social negative attitudes and limited acceptance from non-disabled students in schools and others in society. Hence, they strongly advocated for change, seeking to identify effective strategies and policies that foster inclusivity in education and societal acceptance of disabled students. These suggestions could take the form and include 1) promoting education and awareness campaigns, 2) encouraging participation in cultural activities to create a more socially inclusive environment for disabled students, and 3) championing inclusive education as a whole. These are among the most effective ways to increase inclusivity and reduce negative attitudes among non-disabled students and other individuals in the community.

In summary, the teachers indicated their wishes and strong motivation to make a change and foster inclusivity. The teachers called for 1) the provision of beneficial and adequate equipment and teaching/learning resources to support their teaching of disabled students, 2) a reduction in the general negative attitudes towards disabled students, 3) enhanced social inclusion, and 4) the adoption of an inclusive approach in Saudi schools by moving disabled students from self-contained classrooms to more inclusive classrooms alongside non-disabled students. Ultimately, the teachers' concerns in this research highlight the need for a more inclusive educational system and more accepting societal attitudes to give sufficient attention to the rights of disabled students. Therefore, this study conveys the ideas and suggestions of these experienced teachers to education officials at the Saudi MoE to take into consideration and make the necessary changes. By adopting an inclusive approach, it is possible and practicable to change these negative attitudes and make a tangible difference in the lives of disabled students.

Chapter Nine: Conclusions and Recommendations

9.0 Introduction

This final chapter of the thesis aims to outline and further explore the key findings from my research with female Saudi teachers in relation to their experiences of working with assistive technology (AT). As far as I am aware, no prior research has used a series of workshops as a qualitative method to explore teachers' beliefs, attitudes, and knowledge toward AT utilization in the educational environment, particularly in the Saudi context. This method facilitated an interactive approach that allowed for capturing the teachers' own voices and gathering rich details. It allowed the teachers to share their views and reflect on their experiences in a collaborative and engaging discussion space. This led to a comprehensive understanding of the topic and the main issues, which is crucial for improving support for education in general and inclusive practices in particular, which have not been explored thus far in the existing research.

This chapter starts by introducing the key research outcomes and summarising the major findings of the research as well as the contributions to knowledge. This is followed by my reflections on my PhD journey. Specific recommendations for the Saudi Ministry of Education and policy makers are also included. Finally, the chapter concludes with a statement of the limitations and suggestions for future research and a summary of the chapter.

9.1 Summary of Main Findings and Contributions to Knowledge

Five research questions were posed, and the data were analysed using thematic analysis. The findings were organised and presented according to the key themes identified during the thematic analysis.

Question 1: According to Saudi special education teachers' beliefs, what is the role of AT in teaching students with SEND in primary schools?

This first research question seeks to explore the beliefs of the special education teachers participating in the research about the role of AT in teaching disabled students in mainstream

schools. This is because the teachers' beliefs shape their attitudes towards the use of AT in their teaching and determine how they integrate technology into classrooms (Inan and Lowther, 2010). Based on key findings, the teachers in this research generally exhibited strong positive attitudes and a willingness to implement AT and support the learning process of disabled students. In particular, the teachers strongly believe that high AT plays a critical role and is considered a great contribution to the education and learning process by facilitating the learning process for both teachers and students. The use of these AT tools facilitates multiple teaching methods, creates engaging and interactive classroom environments, improves and develops students' learning and academic skills, and overall, can increase the engagement and positive outcomes of disabled students' learning. More precisely, the teachers emphasised the significant role of three high AT devices: computers, IWBs, and projectors.

However, the main issue teachers encountered before and after the pandemic was the lack of availability of high AT in their schools and classrooms, which prevented its usage. The teachers partially overcame this by using their own computers in their teaching, especially during and after the COVID-19 pandemic. To clarify, the teachers described their experiences with the use of AT during three phases (before, during, and after COVID-19) to explain the significant role of AT. Due to the shortage of AT, teachers were not able to use AT with their students before COVID-19. In other words, it was the teacher's choice and decision, while during COVID-19, when online education became mandatory, the teachers were more responsible for using and supporting disabled students, and the schools supported students with devices who needed them. Accordingly, teachers found that using technology brought significant and positive changes. It helps them to support disabled students, use different strategies and resources, save time, and access information quickly. After the pandemic and returning to face-to-face teaching, the teachers emphasised their strong attitudes towards the important role of high AT, as they explained that they could no longer teach without technology, even though the AT devices are not available. As the teachers explained, technology attracts students' attention, enhances engagement, and provides great

opportunities to encourage students to learn and make positive progress. In brief, teachers who give a higher value to AT and have positive attitudes are more likely to utilise technology for learners and recognise the significance of AT. As Ertmer et al. (2012) demonstrated, teachers' beliefs about the significance of technology for classrooms are considered important for the integration of technology. Overall, the research comprehensively demonstrates that special education teachers recognise the critical role of AT in enhancing the educational experience for disabled students, even in the face of challenges.

Question 2: According to Saudi special education teachers, what, if any, types of AT are available and used for students with SEND in primary schools?

This question aimed to explore different types of AT that are available and used by teachers in the teaching process, with a specific focus on the high AT type. As discussed in Chapter Seven, according to the academic literature, AT has been classified into low-mid-high-tech forms (Nsofor and Bello, 2015). According to the research findings, the teachers in this study were initially more likely to engage with low-tech AT due to an extreme shortage of high-tech resources in the schools and classrooms where they teach. However, the teachers displayed their resilience, adaptability, and commitment and took this issue into their own hands to address the technology gap personally. They brought their own devices, such as personal laptops and iPads, to provide their students with interactive learning experiences and to differentiate their instruction and teaching methods, especially after the pandemic.

They expressed positive experiences with teaching online and using technology, and they described a growing preference for its use in educational settings so much so that they rely on technology now. In addition, the teachers' initiatives were narrated by them to help create environments that support, benefit, and enhance the educational and learning experiences of disabled students despite the school's limited resources. Furthermore, the teachers' initiatives reflect their understanding of the pivotal role technology plays and their recognition of the importance of the digital age; this requires learning digital skills to prepare their disabled students to develop and acquire the essential skills needed for success in the 21st century.

In fact, the unavailability of AT in schools is a common barrier for both teachers and students worldwide, and there is a noticeable lack of high-tech AT in Saudi schools (Ajuwon and Chitiyo, 2016; Al-Moghyrah, 2017; Alharbi, 2018). This shortcoming can be attributed to inadequate support policies from the Saudi Ministry of Education for the overall use of AT and specifically the provision of AT for disabled students. Specifically, even though the Rules and Regulations of Special Education Programmes (RRSEP) legislation is an important Saudi disability rights law that emphasises the right of disabled students to have free high-quality education and social interaction opportunities within mainstream schools, it does not offer specific guidelines to improve the quality of special education services. There are no requirements in the law regarding the integration of AT devices and services to enhance special education services and learning and help disabled students easily access their curricula, which has resulted in an insufficient allocation of technological resources (Alquraini, 2013; Abu-Alghayth, 2020).

Obviously, in this modern era in which technology is found in all aspects of life, this can lead to inadequate learning experiences for students with disabilities, increase their academic difficulties, and negatively impact their educational success (Van Laarhoven and Conderman, 2011; Aldabas, 2015). Hence, this research makes a significant contribution by providing research-based evidence that Saudi mainstream schools face a lack of availability of and support for AT, which causes difficult academic experiences for both teachers and students. This research aims to influence the Saudi Ministry of Education and policy makers to focus on eliminating these barriers, thereby enhancing AT accessibility and provision of resources.

Overall, the teachers' use of high-tech AT for disabled students in Saudi schools has evolved from a predominant lack of use before COVID-19 to increased adaption and use during and after the COVID-19 pandemic.

Question 3: From the perspectives of Saudi special education teachers, what, if any, obstacles exist to the use of AT in their SEND classrooms?

This question aimed to determine the main challenges and obstacles to the use of high AT in teaching, according to teachers' perspectives. The reason behind this question is to

understand those challenges so as to provide effective solutions, improve the educational experience, enhance access to educational resources, and facilitate the teaching of disabled students (Haleem et al., 2022). As discussed previously, the core challenge that teachers face is the unavailability and inaccessibility to high AT in the schools and classrooms where they teach, which prevents them from utilising technology. Besides this, a similar challenge mentioned by teachers was related to their disabled students during the pandemic and the transfer to mandatory online education, as highlighted in Chapter Seven. Some disabled students also faced the issue of the availability of technology, as they did not have devices to study online and access the Madrasati platform. However, as the teachers reported, this challenge was solved when schools provided disabled students with devices and teachers supported them by providing instructions and demonstrations on how to access the platform and use its functions.

An additional challenge mentioned by teachers, though not directly relevant to the use of AT in their SEND classroom, was the issue of exclusion and the difficult social experience of disabled students. According to this research's findings of the teachers' perspectives, disabled students encounter different forms of negative attitudes and social acceptance from non-disabled students in schools or other individuals in society, as clarified in Chapter Six. One possible reason is the common lack of understanding of disability rights and disabled students, especially in the circumstance of the self-contained classroom model of special education that has been implemented in mainstream Saudi schools in lieu of more inclusive practices (Henry et al., 1996; Villa and Thousand, 2000; Pivik et al., 2002). These challenges of this separation, lack of understanding, and negative attitudes can negatively impact disabled people and prevent them from enjoying their right to social and academic inclusion. The negative attitudes of their peers and society are certainly consequential and can affect the social development and well-being of disabled students (Walker et al., 2001; Villa and Thousand, 2002; Broomhead, 2019). They can have a profound impact on the self-esteem of disabled students,

leaving them with feelings of inferiority (Butler and Bowiby,1997), reduced confidence, and changes in their behaviour (Baglieri and Shapiro, 2012).

In addition, the policy of placing disabled students in self-contained classrooms within mainstream Saudi schools ignores the benefits and significance of inclusion and interaction with non-disabled students. This environment could actively lower acceptance towards disabled students and increase bullying and social exclusion (Al-Faiz, 2006). These challenges, as emphasised by the social model of disability, it is more likely to be the societal structures and attitudes related to disability, rather than the disability itself, that creates barriers for disabled people (Olive, 1992). Thus, by developing an inclusive environment where all students can learn and interact, these challenges can be effectively addressed (Oliver, 1992).

Therefore, to address these challenges, this research aims to influence the Saudi Ministry of Education and policy makers to eliminate these barriers and support a model of inclusion that encourages positive interaction between disabled and non-disabled students, thereby fostering long-term inclusivity and acceptance.

Question 4: Based on the experiences of Saudi special education teachers, in what ways is the use of AT facilitated in their SEND classrooms?

The primary aim of this question was to learn from teachers how the use of AT supported the teaching of their students with SEND in the classroom. However, very little data came from this question because of the challenges revealed by the third research question. No valuable information about the use of high AT in the physical classroom can be gained when there is no high AT available to be used.

However, despite the challenges of using AT in the online environment, technology was necessary to teach during the COVID-19 pandemic. As discussed in Chapter Seven, the transfer to teach and use of AT during the COVID-19 pandemic, especially the Madrasati platform, the iEN national e-portal, and the iEN channels, facilitated online accessibility to educational content and materials in different ways for both teachers and disabled students.

For example, the Madrasati platform was designed to meet disabled individuals' needs and contained tools to support teachers in planning lessons according to each student's individual needs; these supplementary tools supported the teachers' varied teaching methods (Ministry of Education, 2021). Furthermore, this platform was designed to allow teachers to teach courses, and it also provided students with a wide range of content, such as educational videos, presentations, textbooks, and exercises at all ability levels and for all grades (1–12). By using the Madrasati platform, teachers and students could learn and interact through the use of asynchronous and synchronous virtual classrooms. These two types of virtual classrooms were used by teachers through Microsoft Teams and the iEN channels. Although teachers used both types of virtual classrooms, it was easier to engage with their students using the synchronous virtual classroom via Microsoft Teams, as this type of virtual classroom enables direct connection and communication. The asynchronous virtual classrooms on the other hand were also useful, as they are more flexible. They do not require the participants to have internet access at the same time, and the educational content can be accessed as pre-recorded and uploaded video and/or audio files. Thus, the iEN national e-portal and the iEN channels were beneficial as asynchronous virtual classrooms for both teachers and students. They were seen as extra support, especially as they included sign language for deaf and hard-of-hearing individuals. In addition, these iEN channels could be accessed via television or YouTube when teaching by synchronous virtual classrooms was not possible or convenient.

Overall, the teachers' abilities and familiarity with using high AT and computer technology in general confirmed how they considered the use of AT as that which can improve the teaching of disabled students in both online and face-to-face classrooms. It also has a positive impact on teacher confidence, positive experiences, and attitudes towards the use of AT in teaching disabled students.

Question 5: What approaches and support strategies would enable Saudi special education teachers to implement AT more fully as assistance tools in their SEND classrooms?

The primary aim of this question was to gather comprehensive insights, valuable input, and practical suggestions from the teachers who participated in this research, focusing on effective strategies that would empower them to utilise AT as assistance tools in their teaching environment. Findings showed that there are two different but related aspects to this question. The first proposal from the teachers was related to teaching quality and learning facilities. The teachers would like their teaching and disabled learning environments equipped with more high AT resources and supplies. Their second proposal was related to their vision for diversity and acceptance of disabled students in mainstream schools. In other words, it was concerned with fostering inclusive education and societal acceptance of disabled students so that they felt accepted, included, and welcomed. Facilitating a more inclusive environment and including disabled and non-disabled students in the same classrooms can positively impact, and be positively impacted by, the success of AT implementation. In particular, this can increase advocacy for disabled people's rights and needs, resulting in better funding, resources, and policies that support the integration of AT in educational settings and the implementation of AT in classrooms.

While the core contributions of this research have been discussed throughout the analysis and in relation to the research questions, this section outlines how the research specifically contributes to four key academic fields: Disability Studies, Special and Inclusive Education, Education Studies, and Assistive Technology Studies.

Disability Studies

This research contributes to Disability Studies by exploring two key ways of thinking about disability, the medical and social models, and how these shape the Saudi education system, which remains largely structured around a medical model approach, in contrast to the social

model described by Oliver (1992). The findings show that while elements of both models are present in teachers' language and thinking, their classroom practices and attitudes align more strongly with social model principles, reflecting a gradual shift toward more inclusive thinking.

Although most teachers do not explicitly refer to the medical or social model, the language they use to describe disabled students often reflects a medical or classification-based approach. However, their valuable reflections and discussions on how they teach and support disabled students are shaped by both institutional practices and their own classroom experience, including using varied teaching strategies and challenging negative attitudes toward disabled students, which align more closely with the social model of disability (Oliver, 1992). This highlights how disability discourse is shaped not only by formal theory, but also by practical experience, supporting Grue's (2015) argument that professionals often reproduce dominant understandings of disability through the everyday language they use, even when they are unaware of doing so.

By situating these insights within the Saudi context, this research contributes to a broader understanding of how ideas about disability vary across cultural and educational systems. As Shakespeare (2013) and Goodley (2011) argue, Disability Studies must address the complexity of disabled people's lives and how social, institutional, and cultural forces shape their experiences in local contexts. While this study focuses on teachers rather than disabled individuals, it responds to this call by showing how special education teachers in this research engage with and influence the forces that shape disability experience in their local context. It also supports the arguments of Slee (2011) and Villa and Thousand (2000), who call for education systems to critically examine their assumptions and structures in order to build more inclusive and socially just environments.

Special and Inclusive Education

This research contributes to the field of Special and Inclusive Education by examining teachers' attitudes and beliefs about supporting disabled students within the Saudi education

system. The findings reveal that, although the system primarily follows a special education model, many teachers demonstrate positive attitudes and a willingness to challenge negative societal perceptions of disability. Their views often align with social model principles, even if not explicitly, and reflect a desire to provide more inclusive support in both academic teaching and social engagement with disabled students.

These findings reflect the arguments of Slee (2011), who critiques traditional special education models for maintaining exclusion and calls for more inclusive educational approaches that embrace diversity and equity. Moreover, this study adds to the understanding of how teacher beliefs and motivations can influence the enactment of inclusive practices, even within education systems that remain largely structured around special education frameworks (Villa and Thousand, 2000). By highlighting teachers' implicit alignment with social model principles in a context still shaped by medicalised approaches, this research advances knowledge about the potential for inclusive change in culturally specific settings.

In doing so, it offers insight into how special and inclusive education might evolve in Saudi Arabia, encouraging a move beyond segregated models toward more socially just and inclusive schooling environments.

Education Studies

This research contributes to Education Studies by demonstrating how teachers' beliefs about supporting disabled students are shaped by their educational background in special education, their broader disciplinary training, and their practical classroom experience. These factors influence how teachers use various tools, technologies, and teaching strategies in their classrooms. The findings show that teachers' views often align implicitly with social model principles, reflecting their commitment to supporting both academic progress and social inclusion for disabled students. This aligns with Sharma and Dunay's (2016) observation that teacher education and training critically shape educators' conceptualisation of disability and inclusion. Corbett (1996) and Corbett and Slee (2000) highlight how teachers' professional experiences, shaped by institutional contexts, influence how inclusive practices are developed

and applied. Moreover, Slee (2011) critiques educational systems that maintain exclusionary practices and calls for teachers to challenge these structures to foster truly inclusive environments. By situating these findings within existing Education Studies literature, this research advances understanding of how teacher education and lived experience combine to influence inclusive teaching practices in a specific cultural context.

Assistive Technology Studies

This research contributes to Assistive Technology Studies by exploring how special education teachers in Saudi Arabia understand and use AT in primary classrooms. It focuses on advanced forms of technology that support disabled students' learning and participation. The findings reveal a gap between teachers' generally positive attitudes toward AT and the practical challenges they face, such as limited availability of resources and lack of support in schools, especially before and after the COVID-19 pandemic. These findings align with earlier research showing that while Saudi teachers often recognise the importance of AT, its successful implementation is limited due to the unavailability of resources and limited access to AT in their schools (Al-Moghyrah, 2017; Alharbi, 2018). During the pandemic, however, teachers in this study reported that platforms such as Madrasati, IEN Channels, and Microsoft Teams allowed them to continue teaching effectively and support disabled students' learning, due to strong commitment and support from the MoE. This contrasts with international findings. For example, Parmigiani et al. (2020) found that Italian teachers of disabled students were willing to implement both synchronous and asynchronous teaching approaches but lacked adequate experience and support to do so effectively. Similarly, Wan (2020) reported that teachers in Malaysia faced challenges integrating digital tools due to limited training and guidance. By situating these findings within the context of Saudi education, this research highlights the need to strengthen policy frameworks in Saudi Arabia, particularly the Rules and Regulations of Special Education Programmes (RRSEP), to formally embed AT as a vital part of effective teaching and support for disabled students.

9.2 Reflexivity

Reflection on the research journey is a critical step that adds meaningful insights and ideas to the research process. I have already addressed my positionality in detail in the methodology and methods chapter, including how my personal experience in special education influenced and informed both the research process and the analysis of the findings. This section adds further reflection on my PhD research journey as a whole. Reflexivity is an ongoing process throughout the research journey. The process of reflection involves reviewing what has been done and accomplished and critically examining it (Pillow, 2003).

Conducting this research on exploring teachers' attitudes towards the use of AT and the education of disabled students has broadened my understanding and benefitted my professional development in several ways. First of all, being surrounded by a rich and valuable environment with a wide variety of resources, including books, workshops, journal articles, PhD student seminars, training courses, lectures, and the overall academic community, has naturally expanded and deepened my understanding and knowledge. In the beginning, my focus was on the main issue of how special education teachers incorporate and implement AT in teaching environments in order to support and encourage disabled students' education and development. However, through the stage of data collection, I observed that a big challenge in utilizing the AT is the lack of support and availability of technology in schools and classrooms. Through my PhD journey and the advanced analysis stage, I realized that the unavailability of AT is part of a much larger and more complex issue. By this, I mean the Saudi education system's policy of segregating disabled students into separate classrooms within mainstream schools, as this can reinforce negative attitudes toward disabled students and contribute to their broader social exclusion; this contrasts with promoting full inclusion under which all students can learn and interact together in the same classrooms and environment and have equal learning opportunities and support as their human right. This deeper analysis led me to rethink the importance of inclusion and how schools and the education system as a whole need to change their focus to inclusion, meaning real change requires more than just improved technology. Real change requires a fundamental structural shift in how schools

approach disability and efforts to advocate for this in the educational system of disabled students.

As might be expected, my PhD journey was not free of challenges. For instance, I had planned to conduct my research in-person, and I selected interviews and classroom observation methods as the tools to gather data in the real classroom environments; however, due to restrictions imposed by the COVID-19 pandemic, I needed to adapt and shift to alternative methods, such as online workshops. Thus, even though the pandemic disrupted my initial plan, I realized that it allowed for exploration of alternative appropriate approaches methods for conducting research, particularly qualitative research. I became more flexible and adaptable as a researcher, and can now respond more easily to changing contexts and the use of digital research tools.

In addition, through my PhD journey, the Doctoral Development Programme, which was designed by the University of Sheffield and covers a combination of professional, academic, and personal skills, has added value to my PhD experience as a researcher and has enhanced my skills. For example, as PhD research is a long-term project, developing time management skills has been crucial not just for successfully navigating this doctoral research but also in my personal life. Using tools such as Google Calendar has helped me to organize my time, manage my workload, prioritize tasks, focus on my goals, schedule breaks, and balance my writing, research, meetings, and personal life. Having better time management skills helped me reduce stress, ensure personal well-being, maintain productivity, and meet the deadlines of this research effectively.

Before undertaking my PhD, my understanding of disability was shaped by the prevailing approach in the Saudi education system, which has traditionally focused on diagnosis and classification to help plan educational support. As a university lecturer preparing future special education teachers, I taught modules in disability and emphasised how to support disabled students effectively within the existing system, including placements in resource rooms or self-contained classrooms within mainstream schools. I now focus much more on encouraging

future educators to think deeply about the barriers disabled students face. I use class discussions and real examples to help them see inclusion not just as classroom placement or extra support, but as valuing disabled students as full participants in the school community.

My intentions, like those of many educators, were grounded in care, professionalism, and a deep commitment to ensuring that disabled students received their rights, education, and tailored support. Building on my earlier work and experience, my doctoral research introduced me to new ways of thinking, particularly the social model of disability and the importance of removing environmental and attitudinal barriers. This expanded my perspective: I came to see that inclusion is not only about placement in mainstream schools or access to services, but about creating shared learning spaces where all students, disabled and non-disabled, participate equally.

This new understanding has expanded and deepened my focus on inclusive education, reinforcing the importance of recognising the rights of disabled people and being aware of ways of thinking that, even unintentionally, can contribute to their exclusion. It has influenced how I teach disability-related modules, mentor future educators, and engage in professional learning.

While the medical and social models are often viewed as opposites, my experience has led me to see that they can complement each other in practice. The medical model remains important for diagnosing and providing essential support, which many educators and families rely on to meet students' individual needs. At the same time, the social model calls for removing societal and structural barriers to ensure equal participation. Even though these models do not fully agree in theory, using aspects of both can offer a practical and realistic way forward. This has become an important insight in my thinking: a balanced approach that values both medical support and social inclusion can better serve disabled students and help move towards meaningful equality.

I now see this balanced approach, combining elements of both the medical and social models, as a practical and realistic way forward, especially in systems like Saudi Arabia's, where understandings of disability and inclusion are still developing. By recognising the importance of medical support while also challenging barriers to participation, this approach can help create a more inclusive and fair education system that better meets the real needs of disabled students.

Finally, for me, this was a unique, informative, and transformative qualitative research experience that shaped my academic, professional, and personal growth and contributed to my development as a researcher and individual. It has been a distinctive learning journey that provided me with valuable knowledge, skills, and resilience and prepared me for my future research and continued work in academia.

9.3 Recommendations for the Saudi Ministry of Education

Drawing from the findings and through analysis of this research, this section focuses on the main recommendations for both the Saudi Ministry of Education and policy makers. As shown by these research findings and suggested by the special education teachers, there has been a lack of support regarding the AT for disabled students in Saudi Arabian mainstream schools. In particular, the Rules and Regulations of Special Education Programmes legislation should be revised to clearly include AT devices and services elements and to ensure suitable and sufficient AT resources are provided in classrooms to support and improve the teaching and learning process of disabled students.

In addition, this research shows that disabled people experience unpleasant and limited social interaction and acceptance and that this situation can be attributed to a lack of understanding and awareness of disability rights and disabled people. In particular, the education system for disabled students in Saudi Arabia needs to be modified to be more inclusive. The current Saudi system uses a special education model with two possible forms instead of full inclusion: 1) using a mainstream classroom with special education support in a resource room, and 2) using a self-contained special education classroom within a mainstream school, as discussed

in Chapter Two. Thus, Saudi legislation related to disability and inclusive education, specifically the Rules and Regulations of Special Education Programmes legislation, needs to be strengthened. Alongside that, Saudi Arabia is aware of the United Nations Convention on the Rights of Persons with Disabilities. Therefore, fully implementing the guidelines outlined in the Convention would enhance inclusivity for individuals with disabilities, as noted by Al-Mousa (2010), who acknowledges that the country still needs to make greater efforts for full inclusion.

The primary issue is that full implementation of inclusive practice needs to be applied in Saudi mainstream schools. Saudi Arabia has made a strong start toward inclusive practices, and this reflects a positive and powerful transformative shift toward achieving full inclusion to ensure the rights of disabled people in a way that promotes justice, equality, and human rights rather than special education and classification. Nevertheless, to ensure that this promising start leads to complete inclusion, ongoing commitment and effort are vital.

Practitioners (Teachers and School Staff)

General education teachers and school leadership teams should strengthen their collaboration with special education teachers to actively promote inclusive practices across the school. This should involve taking a more proactive role in challenging negative attitudes in mainstream settings, addressing the lack of awareness among non-disabled students, and facilitating shared activities that foster positive peer relationships and greater acceptance. These actions will contribute to creating a more welcoming and supportive environment for all students.

As revealed in this study's findings, a key area for development is addressing negative attitudes toward disabled students in mainstream settings and encouraging social interactions between disabled and non-disabled students. Placing disabled students in self-contained classrooms taught only by special education teachers, even within mainstream schools, limits opportunities for academic and social interaction. This separation can reinforce stigma and contribute to exclusion. Facilitating inclusive extracurricular activities, such as mixed-ability clubs or student mentoring schemes, can help foster positive peer relationships. These

practical steps contribute to a whole-school approach that promotes a culture of belonging, equity, and participation for all students, including those with disabilities.

Teacher training programmes/Special Education programmes

In Saudi Arabia, teacher training programmes, especially special education programmes, should place greater emphasis on the social model of disability and its connection to inclusive education principles. For example, teacher education and in-service training should focus on promoting inclusive education, social justice, and human rights during the initial preparation for professional work, while continuing to include elements of special education, there is scope to expand emphasis on inclusive approaches.

Although special education teachers receive broad theoretical training, their practicum placements typically reflect the current structure of the education system. Most trainee teachers work in settings where students with disabilities are taught separately from non-disabled students. For example, students with learning disabilities are often included in mainstream classes but attend resource rooms for part of the day, while students with other types of disabilities may be placed in entirely separate classrooms, even within mainstream schools. These arrangements often reflect current practice but could be complemented by more inclusive approaches that promote integration.

As inclusive education in Saudi Arabia makes progress, training programmes should adapt to support this shift. This includes incorporating examples of inclusive practices from both local and international contexts, and encouraging critical reflection on the impact of educational segregation. Expanding practicum experiences to include inclusive classroom settings, where trainees can collaborate with general education teachers, would also help develop practical skills and shared professional values that support inclusion in everyday school life.

AT designers

As discussed earlier, the limited availability of AT in schools creates significant barriers to effective teaching and learning for students with disabilities. AT designers can help address these challenges by developing affordable, easy-to-use tools suited to real classroom conditions, particularly in under-resourced schools. Working closely with teachers can ensure these tools respond to actual needs and are more likely to be adopted and sustained in practice.

Designers should also consider involving teachers, students with disabilities, and parents throughout the design process. This participatory approach helps ensure that AT tools are both functional and culturally appropriate. In the context of Saudi Arabia, where inclusive education is still evolving, advanced technologies such as computers, interactive whiteboards, and digital projectors can play a key role in supporting inclusive pedagogy and differentiated instruction.

Furthermore, AT designers can support advocacy by gathering and sharing evidence from pilot projects or user feedback on the positive impact of these tools on student engagement, teacher practice, and learning outcomes. This can help strengthen the case for wider investment in AT and encourage integration of these tools into inclusive classroom practice.

9.4 Limitations and Suggestions for further research

As Wellington (2015) points out, limitations are an unavoidable part of all research projects. As a result, the following points will address some limitations of this research as well as make some suggestions for future research. First, although this research generated in-depth data using three online workshops as the qualitative research method (due to COVID-19), other valuable qualitative methods such as observations would be beneficial to capture and explore the actual real-time classroom interactions in the environment where teachers use the AT. This would help gain a more in-depth understanding, so the main limitation concerns the use of only one research method.

Second, in terms of the research sample, this research involved only female special education teachers due to the consideration of cultural rules and norms as discussed in the methodology and methods chapter. However, this could lead to a gender-biased understanding of this topic and limit the diversity of perspectives and experiences. Therefore, future research involving both male and female teachers would generate a more in-depth understanding, provide more balanced views and experiences, and enable a comprehensive analysis to obtain different insights, perspectives, and experiences.

The final notable limitation is that this research involved only special education teachers. This is a result of the current education system for disabled students using only special education teachers for disabled students due to their specialized expertise. As there has been a growing shift and movement toward inclusive education in Saudi Arabia, including both general and special education teachers in future research could potentially enrich the analysis with additional perspectives and valuable insights, and lead to a more comprehensive understanding regarding the AT topic being explored.

9.5 Chapter Summary

This chapter started with a summary of the key research findings and the contributions to knowledge. In particular, this chapter summarises the responses that arose from the five research questions and highlights the main findings that contribute to a deeper understanding of the attitudes, beliefs, and knowledge of female special education teachers towards the use of AT in teaching disabled students in mainstream primary education in Saudi Arabia. Next was a section on reflexivity and my reflection on my PhD research journey, followed by the recommendations for the Saudi Ministry of Education that emerged from the research. Finally, the chapter ended with an account of the main limitations and suggestions for further research.

References

- Abed, M.G. (2018) 'Teachers' perspectives surrounding ICT use amongst SEN students in the mainstream educational setting', *World Journal of Education*, 8(1), pp. 6–16.
- Abelson, R. (1979) 'Differences between belief systems and knowledge systems', *Cognitive Science*, 3, pp. 355–366.
- Abu-Alghayth, K.M. (2019) *The use of assistive technology with students with severe intellectual and developmental disabilities in Saudi Arabia: teachers' perspectives*. Doctoral dissertation, University of South Florida. Available at: <https://www.proquest.com/dissertations-theses/use-assistive-technology-with-students-severe/docview/2280578960/se-2?accountid=13828> (Accessed: 4 September 2023)
- Abu-Alghayth, K. (2020) 'Assistive technology in the Kingdom of Saudi Arabia', in Abu-Alghayth, K. (ed.) *Assistive technology to support inclusive education*. Leeds: Emerald Publishing, pp. 217–234.
- Abutabenjeh, S. and Jaradat, R. (2018) 'Clarification of research design, research methods, and research methodology: a guide for public administration researchers and practitioners', *Teaching Public Administration*, 36(3), pp. 237–258.
- Adebisi, R.O. Liman, N.A. and Longpoe, P.K. (2015) 'Using assistive technology in teaching children with learning disabilities in the 21st century', *Journal of Education and Practice*, 6(24), pp. 14–20.
- Aesaert, K. et al. (2013) 'The content of educational technology curricula: a cross-curricular state of the art', *Education Technology Research and Development*, 61(1), pp. 131–151.
- Ahmad, F.K. (2015) 'Use of assistive technology in inclusive education: making room for diverse learning needs', *Transcience*, 6(2), pp. 62–77.
- Ahmed, A. (2018) 'Perceptions of using assistive technology for students with disabilities in the classroom', *International Journal of Special Education*, 33(1), pp. 129–139.
- Ahmed, S. and Asraf, R.M. (2018) 'The workshop as a qualitative research approach: lessons learnt from a "critical thinking through writing" workshop', *The Turkish Online Journal of Design, Art and Communication*, 8, pp. 1504–1510. Available at: http://www.tojdac.org/tojdac/VOLUME8-SPTMSPCL_files/tojdac_v080SSE201.pdf. (Accessed: 4 July 2023).
- Ainscow, M. Booth, T. and Dyson, A. (2004) 'Understanding and developing inclusive practices in schools: a collaborative action research network', *International Journal of Inclusive Education*, 8(2), pp. 125–139.
- Ainscow, M. Booth, T. and Dyson, A. (2006) *Improving schools, developing inclusion*. London: Routledge.
- Ajuwon, P.M. (2008) 'Inclusive education for students with disabilities in Nigeria: benefits, challenges and policy implications', *International Journal of Special Education*, 23(3), pp. 11–16.
- Ajuwon, P.M. and Chitiyo, G. (2016) 'Survey of the use of assistive technology in schools in Nigeria', *Journal of the International Association of Special Education*, 16(1), pp. 4–13.
- Akanegbu, A. (2013) 'Vision of learning: a history of classroom projectors', EdTeach. Available at: <https://edtechmagazine.com/k12/article/2013/02/vision-learning-history-classroom-projectors>. (Accessed: 8 September 2023).

- Akbaba, B. (2013) 'The attitudes of pre-service history teachers towards teaching profession and technology and their self-efficacy about usage teaching materials', *International Journal of Academic Research*, 5(5), pp. 94–101.
- Alahmari, A. (2017) 'The state of distance education in Saudi Arabia', *Quarterly Review of Distance Education*, 18(2), pp.91–98.
- Al-Alwan, A.F. and Mahasneh, A.M. (2014) 'Teachers' self-efficacy as determinant of students' attitudes toward school: a study at the school level', *Review of European Studies*, 6(1), pp. 171–179.
- Al-Amri, H.A.S. (2022) 'Teachers' experiences of remote teaching in the COVID-19 pandemic for students with intellectual disabilities in the Kingdom of Saudi Arabia', *International Journal of Developmental Disabilities*, 69 (6), pp.1–15.
- Alasmari, M.A. (2022) 'The attitudes of public-school teachers towards e-learning in Saudi Arabia', *Arab World English Journal*, 2nd special issue on Covid-19. Pp.245-257
- Albarracin, D. and Shavitt, S. (2018) 'Attitudes and attitude change', *Annual Review of Psychology*, 69(1), pp. 299–327. doi: <https://doi.org/10.1146/annurev-psych-122216-011911>
- Albirini, A. (2006) 'Teachers' attitudes toward information and communication technologies: the case of Syrian EFL teachers', *Computers & Education*, 47(4), pp. 373–398. doi: <https://doi.org/10.1016/j.compedu.2004.10.013>
- Al-Dababneh, K.A. and Al-Zboon, E.K. (2022) 'Using assistive technologies in the curriculum of children with specific learning disabilities served in inclusion settings: teachers' beliefs and professionalism', *Disability and Rehabilitation: Assistive Technology*, 17(1), pp. 23–33.
- Aldabas, R.A. (2015) 'Special education in Saudi Arabia: history and areas for reform', *Creative Education*, 6(11), pp. 1158-1167.
- Aldakhil, A. (2017) *Exploring inclusion, disability and the label of intellectual disability: Saudi teachers' experiences and perspectives*. Doctoral dissertation, University of Sheffield.
- Aldehami, S. (2022) 'Assistive technology in special education students and its impact on engagement into education', *Information Sciences Letters*, 11(6), pp. 2325–2321.
- Aldossry, B. (2021) 'Evaluating the Madrasati platform for the virtual classroom in Saudi Arabian education during the time of COVID-19 pandemic', *European Journal of Open Education and E-learning Studies*, 6(1)
- Aldossry, B. (2021) 'Evaluating the Madrasati platform for the virtual classroom in Saudi Arabian education during the time of COVID-19 pandemic', *European Journal of Open Education and E-learning Studies*, 6(1), pp. 89–99. Available at: https://www.academia.edu/111097475/Evaluating_the_Madrasati_Platform_for_the_Virtual_Classroom_in_Saudi_Arabian_Education_During_the_Time_of_COVID_19_Pandemic (Accessed: 4 July 2023).
- Alexander, P.A. and Dochy, F.J.R.C. (1995) 'Conceptions of knowledge and beliefs: a comparison across varying cultural and educational communities', *American Educational Research Journal*, 32, pp. 413–442.
- Alexander, P.A. Schallert, D.L. and Hare, V.C. (1991) 'Coming to terms: how researchers in learning and literacy talk about knowledge', *Review of Educational Research*, 61(3), pp. 315–343.
- Al-Faiz, H. (2006) 'Attitudes of elementary school teachers in Riyadh, Saudi Arabia toward the inclusion of children with autism in public education. Doctoral dissertation, University of Arkansas, Fayetteville.

- Alfaraj, A. and Kuyini, A.B. (2014) 'The use of technology to support the learning of children with Down syndrome in Saudi Arabia', *World Journal of Education*, 4(6), pp. 42–53.
- Al-Hamli, A. (2008) 'Investigation of special education teachers' attitudes towards education of pupils with special needs in Riyadh city in the Kingdom of Saudi Arabia. Doctoral dissertation, Masaryk University.
- Alharahsheh, H.H. and Pius, A., 2020. *A review of key paradigms: Positivism vs interpretivism*. *Global Academic Journal of Humanities and Social Sciences*, 2(3), pp.39–43.
- Alharbi, K.A. et al. (2019) 'School's teachers knowledge about autism in Al-Badaya city, Al-Qassim region, Kingdom of Saudi Arabia. *Materia Sociomedica*, 31(1), pp. 4–9. doi: <https://doi.org/10.5455/msm.2019.31.4-9>
- Alharbi, S.A. (2018) *Special education teachers' knowledge and use of assistive technology for inclusive classrooms in Saudi Arabia*. Doctoral dissertation, Saint Louis University.
- Alhudaithi, G.S.S. (2015) *Saudi Arabian female teachers' attitudes towards the inclusion of children with autism into mainstream classrooms*. Doctoral dissertation, University of Leeds.
- Alhusain, A.M. (2010) 'Al-Imam Muhammad Ibn Saud Islamic University students attitudes towards the teaching profession' (in Arabic), *Journal of Education and Psychology*, 35, pp. 35–84.
- Al-Jadid, M.S. (2013) 'Disability in Saudi Arabia', *Saudi Medical Journal*, 34(5), pp. 453–460.
- Alkahtani, K.D. (2013) 'Teachers' knowledge and use of assistive technology for students with special needs', *Journal of Studies in Education*, 3(2), pp. 65–86. doi: <https://doi.org/10.5296/jse.V3i2.3424>
- Alkahtani, M.A. (2016) 'Review of the literature on children with special educational needs', *Journal of Education and Practice*, 7(35), pp. 70–83.
- Alkahtani, M.A. and Kheirallah, S.A. (2016) 'Background of individual education plans (IEPs) policy in some countries: a review', *Journal of Education and Practice*, 7(24), pp.15–26.
- Allport, G.W. (1954) 'The historical background of modern social psychology', in Lindzey, G. (ed.), *Handbook of social psychology*, Vol. 1. Cambridge, MA: Addison-Wesley, pp. 3–56.
- Allsopp, D.H. et al. (2012) 'Interactive whiteboard technology for students with disabilities: a year-long exploratory study', *Journal of Special Education Technology*, 27(4), pp. 1–15.
- Al-Mayman, H. (2020) 'Saudi e-learning portal ushers in 'new normal' with virtual classrooms', *Arab News*, 6 September. Available at: <https://www.arabnews.com/node/1730541/saudi-arabia> (Accessed: 20 Aug 2023).
- Almekhlafi, A.G., Almeqdadi, F.A. and Al Musawi, A.S., 2017. Teachers' perceptions of technology integration in teaching and learning at a university in the UAE. *International Journal of Technology and Educational Marketing*, 7(1), pp.1–20.
- Almethen, M.A. (2017) 'Saudi special education teachers' knowledge, skills, and professional development needs of assistive technology in the classroom',
- Almethen, M.A. (2017) *Saudi special education teachers' knowledge, skills, and professional development needs of assistive technology in the classroom*. Doctoral dissertation. Available at: <https://scholarworks.lib.csusb.edu/cgi/viewcontent.cgi?article=1506&context=etd> (Accessed: 4 June 2023).
- Al-Moghyrah, H. (2017) 'Assistive technology use for students with Down syndrome at mainstream schools in Riyadh, Saudi Arabia: teachers' perspectives', *Journal of Education and Practice*, 8(33), pp. 119-130.

- Almoghyrah, H. (2021) 'The challenges of implementing individualised education plans with children with Down syndrome at mainstream schools in Riyadh, Saudi Arabia: teachers' perspectives', *International Journal of Disability, Development and Education*, 70 (3), pp. 292-313.
- Al-Mousa, N. (2005) *Ministry of Education: the experience of the Kingdom of Saudi Arabia in the domain of including children with special educational needs in ordinary schools* (in Arabic) Riyadh: Directorate General of Special Education.
- Al-Mousa, N. (2010) *The experience of the Kingdom of Saudi Arabia in mainstreaming students with special educational needs in public schools*. Riyadh: The Arab Bureau of Education for the Gulf States. Available at: <http://unesdoc.unesco.org/images/0019/001916/191663e.pdf>. (Accessed: 4 June 2023).
- Almutairy, S. Davies, T. and Dimitriadi, Y. (2015) 'The readiness of applying m-learning among Saudi Arabian students at higher education', *International Journal of Interactive Mobile Technologies*, 9(3), pp.33–36.
- Al-Nahdi, G.H. (2007) *The application of the procedures and standards of assessment and diagnosis in mental education institutes and programs as regards regulatory principles of special education institutes and programs in Saudi Arabia*. Master's thesis, King Saud University.
- Alnahdi, G. (2014) 'Assistive technology in special education and the universal design for learning', *Turkish Online Journal of Educational Technology*, 13(2), pp.1–23.
- Alolaywi, Y. (2021) 'Teaching online during the COVID-19 pandemic: teachers' perspectives', *Journal of Language and Linguistic Studies*, 17(4), pp. 2022–2045.
- Alotaibi, F. and Almalki, N. (2016) 'Saudi teachers' perceptions of ICT implementation for students with autism spectrum disorder at mainstream schools', *Journal of Education and Practice*, 7(5), pp. 116–124.
- Al-Otaibi, R. (2020) 'The challenges facing Saudi families in educating their children in the light of the novel coronavirus pandemic (COVID-19)', *Arab Journal for Scientific Publishing*, 22, pp.152–175.
- Alpert, M. and Goggin, G. (2017) 'Digital technology and rights in the lives of children with disabilities', *New Media & Society*, 19(5), pp. 726–740.
- Al-Qarini, T. and Al-Harithi, H. (2020) 'The nature of the challenges facing universities in Saudi universities to benefit from education', *Journal of Educational Sciences*, 6(1), pp. 19–52.
- Alquraini, T. (2011) *Special education in Saudi Arabia: challenges, perspectives, future possibilities*. International Journal of Special Education. 26(2),149–159.
- Alquraini, T. (2013) 'Legislative rules for students with disabilities in the United States and Saudi Arabia: a comparative study', *International Interdisciplinary Journal of Education*, 2(6), pp. 601–614.
- Alrashidi, O. and Phan, H. (2015) 'Education context and English teaching and learning in the Kingdom of Saudi Arabia: an overview', *English Language Teaching*, 8(5), pp. 33–44.
- Al-Rubiyeh, A. (2010) *Students with special needs in the Kingdom of Saudi Arabia: their needs and rights*. Doctoral dissertation, University of Leicester.
- Al-Shammari, B.M. and Al-Jaber, N.N. (2017) 'Special education in Saudi Arabia: a review of the current state of the field', *International Journal of Special Education*, 31(2), pp. 13–24.
- Al-Shammari, Z. and Hornby, G. (2020) 'Special education teachers' knowledge and experience of IEPs in the education of students with special educational needs', *International Journal of Disability, Development and Education*, 67(2), pp. 167–181. doi: <https://doi.org/10.1080/1034912X.2019.1620182>

- Alsolami, A. (2024) 'The educational journey of students with disabilities in Saudi Arabia: from isolation to inclusive education', *Remedial and Special Education*, pp.2-10
- Al-Zahrani, J.M. and Al-Jaber, N.N. (2019) 'Inclusive education in Saudi Arabia: perceptions of teachers and parents', *Journal of Inclusive Education*, 13(2), pp. 155–170.
- Al-Zaidiyeen, N.J. Mei, L.L. and Fook, F.S. (2010) 'Teachers' attitudes and levels of technology use in classrooms: the case of Jordan schools', *International Education Studies*, 3(2), pp. 211–218.
- Alzrayer, N.M. and Banda, D.R. (2017) 'Implementing tablet-based devices to improve communication skills of students with autism', *Intervention in School and Clinic*, 53(1), pp. 50–57.
- Aminrad, Z. *et al.* (2013) 'Relationship between awareness, knowledge and attitudes towards environmental education among secondary school students in Malaysia', *World Applied Sciences Journal*, 22(9), pp.1326–1333.
- An, Y. *et al.* (2021) 'Examining K–12 teachers' feelings, experiences, and perspectives regarding online teaching during the early stage of the COVID-19 pandemic', *Educational Technology Research and Development*, 69, pp. 2589–2613.
- Anderson, N. (2021) 'Accessibility challenges of video conferencing technology', in: *Proceedings of the 2nd international conference on design, operation and evaluation of mobile communications*. Springer International Publishing, pp. 185–194.
- Andrews, E.E. Powell, R.M. and Ayers, K. (2022) 'The evolution of disability language: choosing terms to describe disability', *Disability and Health Journal*, 15(3), pp. 101328. Available at: <https://www.sciencedirect.com/science/article/pii/S1936657422000681> (Accessed: 9 September 2023). DOI: 10.1016/j.dhjo.2022.101328.
- Angrosino, M.V. (2005) 'Recontextualizing observation: ethnography pedagogy and the prospects for a progressive political agenda', in Denzin, N.K. and Lincoln, Y.S. (eds.) *The Sage handbook of qualitative research*. 3rd edn. Sage, pp. 729–745.
- Annamma, S.A., Connor, D.J. & Ferri, B.A., 2013. Dis/ability critical race studies (DisCrit): Theorizing at the intersections of race and dis/ability. *Race, Ethnicity and Education*, 16(1), pp.1–31.
- Armstrong, D. and Squires, G. (2012) *Contemporary issues in special educational needs: considering the whole child*. Maidenhead: Open University Press.
- Armstrong, M. *et al.* (2016) 'Children's contact with people with disabilities and their attitudes towards disability: a cross-sectional study', *Disability and Rehabilitation*, 38, pp. 879–888. doi: <https://doi.org/10.3109/09638288.2015.1074727>
- Ary, D. *et al.* (2018) *Introduction to research in education*. 10th edn. Boston: Cengage Learning.
- Assistive Technology Industry Association. (2019) *What is assistive technology?* Available at: <https://www.atia.org/at-resources/what-is-at/> (Accessed 1 May 2024)
- Atanga, C. *et al.* (2019) 'Teachers of students with learning disabilities: assistive technology knowledge, perceptions, interests, and barriers', *Journal of Special Education Technology*, 35(4), pp. 236–248.
- Ault, M.J. Bausch, M.E. and McLaren, E.M. (2013) 'Assistive technology service delivery in rural school districts', *Rural Special Education Quarterly*. 32(2), pp. 15–22.
- Ayçiçek, B. and Karafil, B. (2021) 'Exploring perspectives of secondary school teachers on technology integration in education during pandemic', *Journal of Social Sciences of Muş Alparslan University*, 9(1), pp.157–168.

- Back, L.T. *et al.* (2016) 'How we label students with disabilities: a framework of language use in an urban school district in the United States', *Disability Studies Quarterly*, 36(4) doi: <http://dx.doi.org/10.18061/dsq.v36i4.4387>
- Baglama, B. Yikmis, A. and Demirok, M.S. (2017) 'Special education teachers' views on using technology in teaching', *European Journal of Special Education Research*, 2(5), pp. 120–134.
- Baglieri, S. and Shapiro, A. (2012) *Disability studies and the inclusive classroom: critical practices for creating least restrictive attitudes*. New York: Routledge.
- Bailey Jr, D.B. *et al.* (1998) 'Inclusion in the context of competing values in early childhood education', *Early Childhood Research Quarterly*, 13(1), pp. 27–47.
- Bandura, A. (1997) *Self-efficacy: the exercise of control*. New York: W.H. Freeman.
- Banks, S. *et al.* (2019) 'Introduction to co-producing research: a community development approach', in Banks, S. *et al.* (eds.) *Co-producing research: a community development approach*. Bristol: Policy Press, pp. 1–18.
- Baran, B. (2010) 'Experiences from the process of designing lessons with interactive whiteboard: ASSURE as a road map', *Contemporary Educational Technology*, 1(4), pp. 367–380.
- Barko, H. and Putnam, R.T. (1995) 'Expanding a teacher's knowledge base: a cognitive psychological perspective on professional development', in Guskey, T.R. and Huberman, M. (eds.), *Professional development in education: new paradigms and practices*. New York: Teachers College Press, pp. 35–66.
- Barnes, C. (2012) 'Re-thinking disability, work and welfare', *Sociology Compass*, 6(6), pp. 472–484.
- Barnes, C. and Mercer, G. (eds.) (2005) *The social model of disability: Europe and the majority world*. 1st edn. Leeds: The Disability Press.
- Barney, K. (2012) 'Disability simulations: using the social model of disability to update an experiential educational practice imprint', *SCHOLE: A Journal of Leisure Studies and Recreation Education*, 27(1), pp. 1–11.
- Baron, R.A. and Byrne, D. (2000) *Social Psychology*. 9th edn. Boston: Allyn and Bacon.
- Barton, L. (1986) 'The politics of special educational needs', *Disability, Handicap & Society*, 1(3), pp. 273–290.
- Barton, L. (1997) 'Inclusive education: romantic, subversive or realistic?', *International Journal of Inclusive Education*, 1(3), pp. 231–242.
- Barton, L. (2003) *Inclusive education and teacher education: a basis for hope or a discourse of delusion?* London: Institute of Education.
- Barton, L. (2009) 'Disability, physical education and sport: some critical observations and questions', in Fitzgerald, H. (ed.) *Disability and youth sport*. New York: Routledge, pp. 39–50.
- Bassarear, T.J. (1989) 'The interactive nature of cognition and affect in the learning of mathematics: two case studies', in: *Proceedings of the 11th Annual Meeting of the PME-NA*, 7(2), pp. 43–53.
- Battal, Z.M.B. (2016) 'Special education in Saudi Arabia', *International Journal of Technology and Inclusive Education*, 5(2), pp. 880–886.
- Bazeley, P. and Jackson, K. (2013) 'Perspectives: qualitative computing and NVivo', in *Qualitative Data Analysis with NVivo*. 2nd edn. London: Routledge, pp. 1–46.

- Beckett, A.E. (2009) 'Challenging disabling attitudes, building an inclusive society: considering the role of education in encouraging non-disabled children to develop positive attitudes towards disabled people', *British Journal of Sociology of Education*, 30(3), pp. 317–329.
- Bem, D.J. (1970) *Beliefs, attitudes, and human affairs*. Belmont, CA: Brooks/Cole.
- Bennett, S. (2007) *That workshop book: new systems and structures for classrooms that read, write, and think*. Portsmouth, NH: Heinemann.
- Bennett, S., Maton, K. and Kervin, L., 2008. The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39(5), pp. 775–786.
- Bhuana, G.P. and Apriliyanti, D.L. (2021) 'Teachers' encounter of online learning: challenges and support system', *Journal of English Education and Teaching*, 5(1), pp.110–122.
- Bickenbach, J. *et al.* (1999) 'Models of disablement, universalism and the international classification of impairments, disabilities and handicaps', *Social Science and Medicine*, 48(9), pp. 1173–1187.
- Bingham, J., Brandon, D. and Pritchard, M., 2013. *Disability discourse: Overview and critiques of the medical and social models*. *Disability Studies Quarterly*, 33(4). Available at: <https://dsq-sds.org/article/view/3512/3165> [Accessed 17 April 2025].
- Bird, C.M. (2005) 'How I stopped dreading and learned to love transcription', *Qualitative Inquiry*, 11, pp. 226–248.
- Blackwell, C.K. Lauricella, A.R. and Wartella, E. (2014) 'Factors influencing digital technology use in early childhood education', *Computers & Education*, 77, pp. 82–90.
- Blustein, J. (2012) 'Philosophical and ethical issues in disability', *Journal of Moral Philosophy*, 9, pp. 573–587. doi: <https://doi.org/10.1163/17455243-00904002>
- Boddy, C.R. (2016) 'Sample size for qualitative research', *Qualitative Market Research: An International Journal*, 19(4), pp. 426–432.
- Boer, A. Pijl, S.J. and Minnaert, A. (2011) 'Regular primary schoolteachers' attitudes towards inclusive education: a review of the literature', *International Journal of Inclusive Education*, 15(3), pp. 331–353. doi.org/10.1080/13603110903030089.
- Boer, A. Pijl, S.J. and Minnaert, A. (2012) 'Students' attitudes towards peers with disabilities: a review of the literature', *International Journal of Disability, Development and Education*, 59(4), pp. 379–392.
- Bohner, G. and Dickel, N. (2011) 'Attitudes and attitude change', *Annual Review of Psychology*, 62(1), pp. 391–417.
- Booth, T. and Ainscow, M. (2002) *Index for inclusion: developing learning and participation in schools*. Bristol: Centre for Studies on Inclusive Education (CSIE)
- Boyle, C. (2014) 'Labelling in special education. Where do the benefits lie?', in Holliman, A. (ed.) *The Routledge International Companion to Educational Psychology*. London: Routledge, pp. 213–221.
- Brady, K. and Woolfson, L. (2008) 'What teacher factors influence their attributions for children's difficulties in learning?', *British Journal of Educational Psychology*, 78(4), pp. 527–544.
- Braun, V. and Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, 3(2), pp. 77–101. doi: <https://doi.org/10.1191/1478088706qp063oa>
- British Educational Research Association (2018) *Ethical guidelines for educational research*. 4th edn. London: British Educational Research Association.

- Brittain, I. (2004) 'Perceptions of disability and their impact upon involvement in sport for people with disabilities at all levels', *Journal of Sport & Social Issues*, 28, pp. 429–452. doi: <https://doi.org/10.1177/0193723504268729>
- Broomhead, K.E. (2019) 'Acceptance or rejection? The social experiences of children with special educational needs and disabilities within a mainstream primary school', *Education 3–13*, 47(8), pp. 877–888. doi: <https://doi.org/10.1080/03004279.2018.1535610>
- Bruggink, M. Goei, S.L. and Koot, H.M. (2013) 'Characteristics of teacher-identified students with special educational needs in Dutch mainstream primary education', *Educational Research*, 55(4), pp. 361–375.
- Bryman, A. (2012) *Social research methods*. 4th edn. Oxford: Oxford University Press.
- Bunbury, S. (2019) 'Unconscious bias and the medical model: how the social model may hold the key to transformative thinking about disability discrimination', *International Journal of Discrimination and the Law*, 19(1), pp. 26–47.
- Burke, P.J. and Ruedel, K. (2008) 'Disability classification, categorisation in education: a US perspective', in: Florian, L. and McLaughlin, M.J. (eds.) *Disability classification in education*. Thousand Oaks, California: Corwin Press, pp. 68–76.
- Butler, A. *et al.* (2021) 'The use of mobile learning technologies for corporate training and development: a contextual framework', in: Camilleri, M.A. (ed.): *Strategic corporate communication in the digital age*. Leeds: Emerald Publishing, pp. 115–130.
- Butler, R. and Bowiby, S. (1997) 'Bodies and spaces: an exploration of disabled people's experiences of public space', *Environment and Planning D: Society and Space*, 15, pp. 411–433.
- Can-Yasar, M. *et al.* (2012) 'Using technology in pre-school education', *US–China Education Review A*, 4, pp. 375–383.
- Caplan, B. (1995) 'Choose your words! Division 22 presidential address', *Rehabilitation Psychology*, 40, pp. 233–240. doi: <http://dx.doi.org/10.1037/h0092829>
- Capper, C.A. and Pickett, R.S. (1994) 'The relationship between school structure and culture and students' views of diversity and inclusive education', *The Special Education Leadership Review*, 2, pp. 102–122.
- Carter, S.M. and Little, M. (2007) 'Justifying knowledge, justifying method, taking action: epistemologies, methodologies, and methods in qualitative research', *Qualitative Health Research*, 17(10), pp. 1316–1328.
- Casebolt, K.M. and Hodge, S.R. (2010) 'High school physical education teachers' beliefs about teaching students with mild to severe disabilities', *The Physical Educator*, 67(3), pp. 140–155.
- Caughey, J. McLean, K. and Edwards, S. (2023) 'Imagination and sociodramatic play using Minecraft and FaceTime as a digitally-mediated environment', *E-Learning and Digital Media*, 21(3), pp. 292–309. doi: <https://doi.org/10.1177/20427530231156183>
- Cennamo, K. Ross, J. and Ertmer, P.A. (2013) *Technology integration for meaningful classroom use: a standards-based approach*. Belmont, CA: Wadsworth, Cengage Learning.
- Chan, T.F.I. *et al.* (2016) 'Predicting the probability for faculty adopting an audience response system in higher education', *Journal of Information Technology Education*, 15, pp. 395–407. doi: <https://doi.org/10.28945/3548>
- Charlton, J. (1998) *Nothing about us without us*. Berkeley: University of California Press.

- Chen, P. and Hinton, S.M. (1999) 'Realtime interviewing using the world wide web', *Sociological Research Online*, 4(3), pp. 63–81.
- Chenail, R.J. (2012) 'Conducting qualitative data analysis: qualitative data analysis as a metaphoric process', *Qualitative Report*, 17(1), pp. 248–253.
- Chiu, T.K. and Churchill, D. (2015) 'Adoption of mobile devices in teaching: changes in teacher beliefs, attitudes and anxiety', *Interactive Learning Environments*, 24(2), pp.317–327.
- Chukwuemeka, E.J. and Samaila, D. (2020) 'Teachers' perception and factors limiting the use of high-tech assistive technology in special education schools in North-West Nigeria', *Contemporary Educational Technology*, 11(1), pp. 99–109.
- Cline, T. and Frederickson, N. (2009) *Special educational needs, inclusion and diversity*. McGraw-Hill Education (UK)
- Cohen, L. Manion, L. and Morrison, K. (2018) *Research methods in education*. 8th edn. London: Routledge.
- Cole, C.M. Waldron, N. and Majd, M. (2004) 'Academic progress of students across inclusive and traditional settings', *Mental Retardation*, 42(2), pp. 136–144.
- Collins, A. and Halverson, R. (2009) *Rethinking education in the age of technology: the digital revolution and the schools*. New York: Teachers College Press. Available at: http://ocw.mit.edu/courses/media-arts-and-sciences/mas-714j-technologies-for-creative-learning-fall-2009/readings/MITMAS_714JF09_read03_coll.pdf. (Accessed: 9 January 2023)
- Cone, J.D. and Foster, S.L. (2006) *Dissertations and theses from start to finish*. Washington, DC: American Psychological Association.
- Connor, D.J. and Valle, J.W. (2015) 'A socio-cultural reframing of science and dis/ability in education: past problems, current concerns and future possibilities', *Cultural Studies of Science Education*, 10(4), pp. 1103–1120.
- Cook, A.M. and Polgar, J.M, (2013) *Cook and Hussey's assistive technologies: principles and practice*. Elsevier Health Sciences.
- Cook, A.M. and Polgar, J.M. (2014) *Assistive technologies: principles and practice* (e-book). 4th edn.Elsevier Health Sciences. Available at: <https://www.sciencedirect.com/book/9780323096317/assistive-technologies> (Accessed: 4 July 2023).
- Cooper, P. (1996) 'Giving it a name: the value of descriptive categories in educational approaches to emotional and behavioural difficulties', *Support for Learning*, 11(4), pp. 146–150.
- Coppola, E.M. (2004) *Powering up: learning to teach well with technology*. New York: Teachers College Press.
- Corker, M., 1999. Disability discourse. Open University Press, Buckingham.
- Corbett, J. (1996) *Bad-mouthing: the language of special needs*. London: Falmer Press.
- Corbett, J. and Slee, R. (2000) 'An international conversation on inclusive education', in: Armstrong, F. Armstrong, D. and Barton, L. (eds.) *Inclusive education: policy, contexts and comparative perspectives*. London: David Fulton, pp. 133–146.
- Creswell, J.W. and Creswell, J.D. (2017) *Research design: qualitative, quantitative, and mixed methods approaches*. 5th edn. Los Angeles: Sage.

- Creswell, J.W. and Poth, C.N. (2017) *Qualitative inquiry and research design: choosing among five approaches*. 4th edn. London: Sage.
- Crow, L. (1996) 'Including all of our lives: renewing the social model of disability', in: Barnes, C. and Mercer, G. (eds.) *Disability and illness: exploring the divide*. Leeds: The Disability Press, pp. 55–27.
- Crystal, D. (1991) *The Cambridge encyclopaedia of language*. Cambridge: University Press.
- Cumming, T. and Draper Rodriguez, C. (2013) 'Integrating the iPad into language arts instruction for students with disabilities: engagement and perspectives', *Journal of Special Education Technology*, 28(4), pp. 43–53.
- Cumming, T.M. Strnadová, I. and Singh, S. (2014) 'iPads as instructional tools to enhance learning opportunities for students with developmental disabilities: an action research project', *Action Research*, 12(2), pp. 151–176.
- Daniel, T. and Tivener, K. (2016) 'Effects of sharing clickers in an active learning environment', *Journal of Educational Technology & Society*, 19(3), pp. 260–268.
- Darcy, S. and Buhalis, D. (2011) 'Conceptualising disability: medical, social, WHO ICF, dimensions and levels of support needs', in: Buhalis, D. and Darcy, S. (eds.) *Accessible tourism: concepts and issues*. Bristol, UK: Channel View Publications, pp. 21–44.
- Darrow, A.A. (2013) 'What we say matters: referring to students with disabilities', *General Music Today*, 27, pp. 40–42. doi: <https://doi.org/10.1177/1048371313508776>
- Davis, L.J. (1995) *Enforcing normalcy: disability, deafness and the body*. London: Verso.
- Davis, L.J. (2013) *The disability studies reader*. 4th edn. New York: Routledge.
- Debbag, M. (2017) 'Opinions of prospective classroom teachers about their competence for individualised education program (IEP)', *Universal Journal of Educational Research*, 5(2), pp. 181–185.
- Demetriou, K. (2022) 'Special educational needs categorisation systems: to be labelled or not?', *International Journal of Disability, Development and Education*, 69(5), pp. 1772–1794.
- Demir, E.B.K. Özbek, A.B. and Demir, K. (2022) 'Exploring Turkish special education teachers' experiences of emergency remote teaching during the COVID-19 pandemic', *Journal of Educational Technology and Online Learning*, 5(2), pp. 316–335.
- Deng, F. *et al.* (2014) 'The relationships among Chinese practicing teachers' epistemic beliefs, pedagogical beliefs and their beliefs about the use of ICT', *Journal of Educational Technology & Society*, 17(2), pp. 245–256.
- Denscombe, M., 2007. *The good research guide: for small-scale social research projects*. 3rd ed. Maidenhead: Open University Press.
- Denzin, N.K. and Lincoln, Y.S., 2011. *The SAGE Handbook of Qualitative Research*. 4th ed. Thousand Oaks, CA: SAGE Publications.
- Denzin, N. Norman, K. and Yvonna, S. (2005) 'Introduction, the discipline and practice of qualitative research', in: *The Sage handbook of qualitative research*. Thousand Oaks, CA: Sage, pp. 1–32.
- Deraney, P.M. and Abdelsalam, H.M. (2012) 'Private vs. public school education as a predictor for success for female students at a private university in Saudi Arabia', *Journal of Arts, Science & Commerce*. 3(3), pp. 4–5.
- Dewsbury, G. *et al.* (2004) 'The anti-social model of disability', *Disability & Society*, 19(2), pp. 145–158.

- Dhawan, S. (2020) 'Online learning: a panacea in the time of COVID-19 crisis', *Journal of Educational Technology Systems*, 49, pp. 5–22.
- Disability Rights UK. (2024) 'UK government faces UN violation of disability rights', *Disability Rights UK*, 5 March. Available at: <https://www.disabilityrightsuk.org/news/uk-government-faces-un-violation-disability-rights> (Accessed: 12 August 2024).
- Dodds, S. and Hess, A.V.C. (2020) 'Adapting research methodology during COVID-19: lessons for transformative service research', *Journal of Service Management*, 32(2), pp. 203–217.
- Doush, I.A. et al. 2023. 'Learning features and accessibility limitations of video conferencing applications: are people with visual impairment left behind?', *Universal Access in the Information Society*, 22(4), pp.1353–1368.
- Draper, E.A. (2018) 'Navigating the labels: appropriate terminology for students with disabilities', *General Music Today*, 32(1), pp. 30–32.
- Dray, B.J., 2008. Social construction of disability. In: E.F. Provenzo Jr., ed. *Encyclopedia of the Social and Cultural Foundations of Education*. Thousand Oaks, CA: SAGE Publications, pp. 722–724.
- Dunn, D.S. and Andrews, E.E. (2015) 'Person-first and identity-first language: developing psychologists' cultural competence using disability language', *American Psychologist*, 70, pp. 255–264. doi: <https://doi.org/10.1037/a0038636>
- Dyal, A. Carpenter, L.B. and Wright, J.V. (2009) 'Assistive technology: what every school leader should know', *Education*, 129(3), pp. 556–560.
- Eagly, A.H. and Chaiken, S. (1993) *The psychology of attitudes*. London: Harcourt Brace Jovanovich.
- Edyburn, D.L. (2013) 'Critical issues in advancing the special education technology evidence base', *Exceptional Children*, 80(1), pp. 7–24. doi: <https://doi.org/10.1177/001440291308000107>
- Ekeh, O.U. and Oladyo, O. (2013) 'Academic achievement of regular and special needs students in inclusive and non-inclusive classroom setting', *European Scientific Journal*, 9(8), pp. 1857–7431.
- Elshafie, M., 2013. Research paradigms: The novice researcher's nightmare. *Arab World English Journal*, 4(2), pp.4–13.
- Emiliani, P.L. Stephanidis, C. and Vanderheiden, G. (2011) 'Technology and inclusion: past, present and foreseeable future', *Technology and Disability*, 23(3), pp.101–114.
- Erdem, R. (2017) 'Students with special educational needs and assistive technologies: a literature review', *The Turkish Online Journal of Educational Technology*, 16(1), pp. 128–146.
- Erevelles, N. and Minear, A., 2010. Unspeakable offenses: Untangling race and disability in discourses of intersectionality. *Journal of Literary & Cultural Disability Studies*, 4(2), pp.127–145.
- Erkiliç, M. (2011) 'Conceptual challenges between universal design and disability in relation to the body, impairment, and the environment: where does the issue of disability stand in the philosophy of UD?', *METU JFA*, 20(2), pp. 181–203. doi: <https://doi.org/10.4305/METU.JFA.2011.2.9>
- Ertmer, P.A. et al. (1999) 'Examining teachers' beliefs about the role of technology in the elementary classroom', *Journal of Research on Computing in Education*, 32(1–2), pp. 54–72.
- Ertmer, P.A. et al. (2012) 'Teachers beliefs and technology integration practices: a critical relationship', *Computers & Education*, 59(2), pp. 423–435. Doi: <https://doi.org/10.1016/j.compedu.2012.02.001>

- Ertmer, P.A. and Ottenbreit-Leftwich, A.T. (2010) 'Teacher technology change: how knowledge, confidence, beliefs, and culture intersect', *Journal of Research on Technology in Education*, 42(3), pp. 255–284.
- Falkmer, M. *et al.* (2012) 'From my perspective: perceived participation in mainstream schools in students with autism spectrum conditions', *Developmental Neurorehabilitation*, 15(3), pp. 191–201.
- Famularsih, S. (2020) 'Students' experiences in using online learning applications due to COVID-19 in English classroom', *Studies in Learning and Teaching*, 1(2), pp.112–121.
- Fedynich, L.V. (2014) 'Teaching beyond the classroom walls: the pros and cons of cyber learning', *Journal of Instructional Pedagogies*, 13. Available at: <https://www.aabri.com/manuscripts/131701.pdf> (Accessed: 2 December 2023).
- Fekonja-Peklaj, U. and Marjanovič-Umek, L. (2015) 'Positive and negative aspects of the IWB and tablet computers in the first grade of primary school: a multiple-perspective approach', *Early Child Development and Care*, 185(6), pp. 996–1015.
- Fernández-Batanero, J.M. *et al.* (2022) 'Assistive technology for the inclusion of students with disabilities: a systematic review', *Educational Technology Research and Development*, 70(5), pp. 1911–1930.
- Fernández-Batanero, J.M. Cabero, J. and López, E. (2019) 'Knowledge and degree of training of primary education teachers in relation to ICT taught to students with disabilities', *British Journal of Educational Technology*, 50(4), pp. 1961–1978. doi: <https://doi.org/newdc.oum.edu.my/10.1111/bjet.12675>
- Ferri, F. Grifoni, P. and Guzzo, T. (2020) 'Online learning and emergency remote teaching: opportunities and challenges in emergency situations', *Societies*, 10(4), pp. 86.
- Fiala-Butora, J. and Stein, M.A. (2016) 'The law as a source of stigma or empowerment: legal capacity and persons with intellectual disabilities', in Scior, K. and Werner, S. (eds.) *Intellectual disability and stigma: stepping out from the margins*. London: Macmillan, pp. 195–208.
- Finkelstein, V. (2001) *The social model of disability repossessed*. Leeds: University of Leeds Centre for Disability Studies. Available at: <https://disability-studies.leeds.ac.uk/wp-content/uploads/sites/40/library/finkelstein-soc-mod-repossessed.pdf> (Accessed 5 May 2024).
- Fishbein, M. and Ajzen, I. (1997) *Belief, attitude, intention and behaviour: an introduction to theory and research*. Reading, MA: Addison-Wesley.
- Fitzgerald, H. (2006) 'Disability and physical education', in: Kirk, D. MacDonald, D. and O'Sullivan, M. (eds.) *The handbook of physical education*. London: Sage, pp. 752–766.
- Flanagan, S., Bouck, E. and Richardson, J. (2013) 'Middle school special education teachers' perceptions and use of assistive technology in literacy instruction', *Assistive Technology*. 25(3), pp. 24–30.
- Foreman, P. and Arthur-Kelly, M. (2017) Legislation and policies supporting inclusive practice. *Inclusion in action*, 5th edn. Australia: Cengage Learning AU.pp.50-85.
- Forhan, M. (2009) 'An analysis of disability models and the application of the ICF to obesity', *Disability and Rehabilitation*, 31, pp. 1382–1388. doi: <https://doi.org/10.1080/09638280802572981>
- Fougeyrollas, P. and Beauregard, L. (2001) 'The interactive person-environment in disability in creation', in: Albrecht, G.L., Seelman, K.D., and Bury, M. (eds.) *Handbook of Disability Studies*. Thousand Oaks, CA: Sage, pp. 171–194.
- Fox, N.J., 2008. Post-positivism. In: L.M. Given, ed. *The Sage Encyclopedia of Qualitative Research Methods*. Thousand Oaks, CA: Sage, pp.659–664.

- Friend, M.P. (2018) *Special education: contemporary perspectives for school professionals*. 5th edn. Boston: Pearson.
- Furinghetti, F. and Pehkonen, E. (2002) 'Rethinking characterizations of beliefs', in Leder, G. C., Pehkonen, E. and Törner, G. (eds.) *Beliefs: a hidden variable in mathematics education*. Dordrecht: Springer Netherlands, pp. 39–57.
- Gall, M.D., Borg, W.R. and Gall, J.P. (1996) 'Research methods', in: Gall, M.D., Borg, W.R. and Gall, J.P. (eds.) *Educational research: an introduction*. New York: Longman, pp. 165–370.
- Gall, M.D., Gall, J.P. and Borg, W.R., 2010. *Applying Educational Research: How to Read, Do, and Use Research to Solve Problems of Practice*. 6th ed. Boston.
- Ganz, J., Hong, E. and Goodwyn, F. (2013) 'Effectiveness of the PECS phase III app and choice between the app and traditional PECS among pre-schoolers with ASD', *Research in Autism Spectrum Disorders*, 7(8), pp. 973–983.
- Gatchalian, C. (2019) 'Assistive technologies in the 21st century', *Technology and the Curriculum*, Summer.
- Gautam, K.K. and Agrawal, P.C. (2012) 'Impact and utilization of projectors in higher education with low energy consumption and long-lasting batteries in a WSN environment', *International Journal of Computer Science & Engineering Technology*, 3(9), pp. 449–455.
- Gellman, W. (1960) 'Attitudes toward rehabilitation of the disabled', *Journal of Occupational Therapy*, 14, pp. 188–190.
- Gernsbacher, M.A. (2017) 'Editorial perspective: the use of person-first language in scholarly writing may accentuate stigma', *Journal of Child Psychology and Psychiatry*, 58(7), pp. 859–861. doi: <https://doi.org/10.1111/jcpp.12706>
- Ghai, A. (2015) *Rethinking disability in India*. London: Routledge.
- Giek, C.B. (2021) 'A systematic review of the influence of teachers' knowledge on the use of assistive technology', in: *Proceedings of the International Conference on Special Education: Volume 4*.
- Gillman, M., Heyman, B. and Swain, J. (2000) 'What's in a name? The implications of diagnosis for people with learning difficulties and their family carers', *Disability & Society*, 15(3), pp. 389–409.
- Goddard, M. (2004) 'Access through technology: Marti Goddard shows how to use technology to help meet the needs of people with disabilities', *Library Journal*, 129(7), S2.
- Goldstein, H. et al. (1975) 'Schools', in: Hobbs, N. (ed.) *Issues in the Classification of Children: Volume 2*. San Francisco: Jossey-Bass.
- Goffman, E., 1986. *Stigma: Notes on the Management of Spoiled Identity*. 1st Touchstone ed. New York: Simon & Schuster.
- Goodley, D. (1997) 'Locating self-advocacy in models of disability: understanding disability in the support of self-advocates with learning difficulties', *Disability & Society*, 12(3), pp. 367–379.
- Goodley, D. (2011) *Disability studies: an interdisciplinary introduction*. 1st edn. Los Angeles: Sage.
- Goodley, D. (2014) *Dis/ability studies: theorising disablism and ableism*. London: Routledge.
- Goodley, D. (2017) *Disability studies: an interdisciplinary introduction*. 2nd edn. London: Sage.

- Goodley, D. and Runswick-Cole, K. (2015) 'Thinking about schooling through dis/ability: a disHuman approach', in: Corcoran, T., White, J., Whitburn, B. (eds.) *Disability studies: educating for inclusion*. Rotterdam: Sense Publishers, pp. 241–253.
- Goodley, D. and Runswick-Cole, K. (2012) 'Reading Rosie: the postmodern disabled child', *Educational and Child Psychology* 29(2), pp. 53–66.
- Gray, D.E. (2014) *Doing research in the real world*. 3rd edn. London: Sage.
- Gray, L. M. et al. (2020) 'Expanding qualitative research interviewing strategies: Zoom video communications', *The Qualitative Report*, 25(5), pp. 1292–1301.
- Gray, L., Thomas, M. and Lewis, L. (2010) *Teachers' use of educational technology in US public schools: 2009*. Washington, DC: U.S. Department of Education National Center for Education Statistics, Institute for Education Sciences. Available at: <http://nces.ed.gov/pubs2010/2010040.pdf> (Accessed 3 May 2024).
- Grenier, M.A. (2011) 'Coteaching in physical education: a strategy for inclusive practice', *Adapted Physical Activity Quarterly*, 28(2), pp. 95–112.
- Groce, N. (2006) 'Cultural beliefs and practices that influence the type and nature of data collected on individuals with disability through national census', *Research in Social Science and Disability*, 4, pp. 41–54.
- Grönvik, L. (2007) 'The fuzzy buzz word: conceptualisations of disability in disability research classics', *Sociology of Health & Illness*, 29(5), pp. 750–766.
- Grönvik, L. (2009) 'Defining disability: effects of disability concepts on research outcomes', *International Journal of Social Research Methodology*, 12(1), pp. 1–18.
- Gross, J. (2002) *Special educational needs in the primary school a practical guide*. 4th edn. Buckingham: Open University Press.
- Grue, J. (2015) *Disability and discourse analysis*. Farnham, England: Ashgate Publishing.
- Guo, P. (2021) 'Integrated practice effect analysis of teaching design pattern on TPACK', *Computer Applications in Engineering Education*, 29(2), pp. 385–393.
- Hacker, J. et al. (2020) 'Virtually in this together: how web-conferencing systems enabled a new virtual togetherness during the COVID-19 crisis', *European Journal of Information Systems*, 29(5), pp. 563–584.
- Haegele, J.A. and Hodge, S. (2016) 'Disability discourse: overview and critiques of the medical and social models', *Quest*, 68(2), pp. 193–206.
- Hahn, H. (1986) 'Public support for rehabilitation programs: the analysis of US disability policy', *Disability, Handicap and Society*, 1(2), pp. 121–137.
- Halder, S. Assaf, L.C. and Keeffe, M. (2017) 'Disability and inclusion: current challenges', in: Halder S. and Assaf L.C. (eds.) *Inclusion, disability and culture: an ethnographic perspective traversing abilities and challenges*. Cham: Springer, pp. 1–14.
- Haleem, A. et al. (2022) 'Understanding the role of digital technologies in education: a review', *Sustainable Operations and Computers*, 3, pp. 275–285.
- Hallahan, D.P. and Kauffman, J.M. (2008) *Exceptional learners: introduction to special education*. 11th edn. Boston, MA: Allyn and Bacon.

- Hammond, M. and Wellington, J. (2012) *Research methods: the key concepts*. Routledge.
- Hampel, R. (2006) 'Rethinking task design for the digital age: a framework for language teaching and learning in a synchronous online environment', *ReCALL*, 18(1), pp.105–121.
- Hanks, J. (2021) 'Co-production and multimodality: learners as co-researchers exploring practice', *Educational Action Research*. 29(3), pp. 462–482.
- Hannam-Swain, S. and Bailey, C. (2021) 'Considering Covid-19: autoethnographic reflections on working practices in a time of crisis by two disabled UK academics', *Social Sciences & Humanities Open*, 4(1), 100145. doi: <https://doi.org/10.1016/j.ssaho.2021.100145>
- Hasler, F. (1993) 'Developments in the disabled people's movement', in: Swain, J *et al.* (eds.) *Disabling Barriers—Enabling Environments*. London: Sage, pp. 278–284.
- Hassanein, E.E.A. (2015) *Studies in inclusive education: inclusion, disability and culture*. Rotterdam: Sense Publishers.
- Hasselbring, T.S. and Glaser, C.H.W. (2000) 'Use of computer technology to help students with special needs', *The Future of Children*, 10(2), pp.102–122.
- Hayashi Jr, P., Abib, G. and Hoppen, N. (2019) 'Validity in qualitative research: a processual approach', *The Qualitative Report*, 24(1), pp. 98–112.
- Hayhoe, S. (2017) 'When Gucci make hearing aids, I'll be deaf: sensory impairment in later life and a need to define it according to identity', in: Halder, S. and Assaf, L.C. (eds.) *Inclusion, disability and culture: an ethnographic perspective traversing abilities and challenges*. Cham: Springer, pp. 77–88.
- Hegazy, I.A. and Muhammad, S.H.S. (2016) 'Blackboard collaborate quality standards for faculty members at King Saud University', in: *Proceedings of the Sixth International Arab Conference on Quality Assurance in Higher Education Quality Assurance (IACQA 2016)*. Khartoum: Sudan University of Science and Technology, pp. 351–364.
- Heiman, T. (2004) 'Teachers coping with changes: including students with disabilities in mainstream classes: an international view', *International Journal of Special Education*, 19(2), pp. 91–103.
- Hemmingson, H. and Borell, L. (2002) 'Environmental barriers in mainstream schools', *Child: Care, Health and Development*, 28(1), pp. 57–63.
- Hennink, M., Hutter, I. and Bailey, A. (2011) *Qualitative research methods*. Los Angeles: Sage.
- Henry, D. *et al.* (1996) 'Attitudes of community-living staff members toward persons with mental retardation, mental illness and dual diagnosis', *Mental Retardation*, 34, pp. 367–379.
- Hersh, M. Leporini, B. and Buzzi, M. (2020) 'Accessibility evaluation of video conferencing tools to support disabled people in distance teaching, meetings and other activities', in: *Future Perspectives of AT, eAccessibility and eInclusion*. ICCHP, pp. 133–139.
- Hersman, B.L. and Hodge, S.R. (2010) 'High school physical educators' beliefs about teaching differently abled students in an urban public school district', *Education and Urban Society*, 42(6), pp. 730–757.
- Hessels, M.G.P. (1997) 'Low IQ but high learning potential: why Zeyneb and Moussa do not belong in special education', *Educational and Child Psychology*, 14(4), pp. 121–136.
- Heumann J.E. (2016) *Our fight for disability rights—and why we're not done yet*. Available at: https://www.ted.com/talks/judith_heumann_our_fight_for_disability_rights_and_why_we_re_not_done_yet/ (Accessed 9 July 2024).

- Hew, K.F. and Brush, T. (2007) 'Integrating technology into K–12 teaching and learning: current knowledge gaps and recommendations for future research', *Educational Technology Research and Development*, 55, pp. 223–252.
- Ho, A. (2004) 'To be labeled, or not to be labeled: that is the question', *British Journal of Learning Disabilities*, 32, pp. 86–92.
- Hodge, N. (2016) 'Schools without labels', in: Runswick-Cole, K., Mallett, R. and Timimi, S (eds.) *Rethinking autism: diagnosis, identity and equality*. London: Jessica Kingsley, pp. 185–203.
- Hodge, S.R. et al. (2009) 'A diversity of voices: physical education teachers' beliefs about inclusion and teaching students with disabilities', *International Journal of Disability, Development and Education*, 56(4), pp. 401–419.
- Hodkinson, A. (2012) 'Illusionary inclusion—what went wrong with New Labour's landmark education policy?', *British Journal of Special Educational Needs*, 39(1), pp. 4–8.
- Hoq, M.Z. (2020) 'E-learning during the period of pandemic (COVID-19) in the Kingdom of Saudi Arabia: an empirical study', *American Journal of Educational Research*, 8(7), pp. 457–464. doi: <https://doi.org/10.12691/education-8-7-2>
- Hung, S.T.A. (2016) 'Enhancing feedback provision through multimodal video technology', *Computers & Education*, 98, pp. 90–101.
- Hutchison, A., Beschoner, B. and Schmidt-Crawford, D. (2012) 'Exploring the use of the iPad for literacy learning', *The Reading Teacher*, 66, pp. 15–23. doi:10.1002/TRTR.01090.
- Inan, F.A. and Lowther, D.L. (2010) 'Factors affecting technology integration in K–12 classrooms: a path model', *Educational Technology Research and Development*, 58(2), pp. 137–154.
- Islahi, F., 2019. Exploring teacher attitude towards information technology with a gender perspective. *Contemporary Educational Technology*, 10(1), pp.37–54.
- Jacobsen, D.L. (2012) *Assistive technology for students with disabilities: resources and challenges encountered by teachers*. Doctoral Dissertation, University of Northern Iowa.
- James, P. and Thrope, N. (1994) *Ancient inventions*. New York: Ballantine.
- Javadi, M. and Zarea, K. (2016) 'Understanding thematic analysis and its pitfall', *Demo*, 1(1), pp. 33–39.
- Jeste, S. et al. (2020) 'Changes in access to educational and healthcare services for individuals with intellectual and developmental disabilities during COVID-19 restrictions', *Journal of Intellectual Disability Research*, 64, pp. 825–833.
- Jinnah-Ghelani, H.A. and Stoneman, Z. (2009) 'Elements of successful inclusion for school-age children with disabilities in childcare settings', *Child Care in Practice*, 15(3), pp. 175–191.
- Jodrell, D. (2010) 'Social-identity and self-efficacy concern for disability labels', *Psychology Teaching Review*, 16(2), pp. 111–121.
- Johnson, G. (2013) 'Using tablet computers with elementary school students with special needs: the practices and perceptions of special education teachers and teacher assistants', *Canadian Journal of Learning and Technology*, 39(4), pp. 2-12
- Kaban, A. (2021) 'Views on the usage of social media tools in school–family communication', *International Journal of Technology in Education*, 4(3), pp. 314–330.

- Karsenti, T. and Fievez, A. (2013) *The iPad in education: uses, benefits, and challenges. A survey of 6057 and 302 teachers in Quebec, Canada*. Montreal: CRIFPE.
- Karsenti, T. (2016) 'The interactive whiteboard: uses, benefits, and challenges. A survey of 11,683 students and 1,131 teachers', *Canadian Journal of Learning and Technology*, 42(5), pp. 2–22.
- Katsiyannis, A., Yell, M.L. and Bradley, R. (2001) 'Reflections on the 25th anniversary of the Individuals with Disabilities Education Act', *Remedial and Special Education*, 22(6), pp. 324–334.
- Kelemen, R.D. and Vanhala, L. (2010) 'The shift to the rights model of disability in the EU and Canada', *Regional and Federal Studies*, 20(1), pp. 1–18.
- Kessler, G. (2007) 'Formal and informal CALL preparation and teacher attitude toward technology', *Computer Assisted Language Learning*, 20(2), pp. 173–188. doi: <https://doi.org/10.1080/09588220701331394>
- Khaddage, F. (2013) 'The iPad global embrace! Are we branding mobile learning?', in: McBride, R and Searson, M. (eds.) *Proceedings of the Society for Information Technology & Teacher Education International Conference 2013*. Chesapeake, VA: AACE, pp. 3234–3240.
- Khan, S. and Emara, S.A. (2018) 'Effect of technology use in education', *International Journal of Pedagogical Innovation*, 6(2), pp. 142–149.
- Khan, Z.H. and Abid, M.I. (2021) 'Distance learning in engineering education: challenges and opportunities during COVID-19 pandemic crisis in Pakistan', *International Journal of Electrical Engineering Education*, 988493. doi: <https://doi.org/10.1177/0020720920988493>
- Khasnabis, C. et al. (2010) *Community-based rehabilitation: CBR guidelines*. Geneva: World Health Organisation.
- Kielhofner, G. 2005. Rethinking disability and what to do about it: Disability studies and its implications for occupational therapy. *The American Journal of Occupational Therapy*, 59(5), pp. 487–496.
- Kim, J. 2020. 'Learning and teaching online during Covid-19: experiences of student teachers in an early childhood education practicum', *International Journal of Early Childhood*, 52(2), pp. 145–158.
- King Salman Center for Disability Research. (2018) *Disability Codes*. Available at: <http://www.kscdr.org.sa/en/disability-code/> (Accessed 18 February 2023).
- Kirby, M. (2017) 'Implicit assumptions in special education policy: promoting full inclusion for students with learning disabilities', *Child & Youth Care Forum*, 46(2), pp. 175–191.
- Klassen, R.M. et al. (2011) 'Teacher efficacy research 1998–2009: signs of progress or unfulfilled promise?', *Educational Psychology Review*, 23, pp. 21–43.
- Kliwer, C. (1998) *Schooling children with Down syndrome: toward an understanding of possibility*. New York: Teachers College Press.
- Koehler, M.J. and Mishra, P. (2005) 'What happens when teachers design educational technology? The development of technological pedagogical content knowledge', *Journal of Educational Computing Research*, 32, pp. 131–152.
- Kollak, I. (2017) *Safe at home with assistive technology*. Cham, Switzerland: Springer Nature. doi: <https://doi.org/10.1007/978-3-319-42890-1>
- Kosaretskii, S.G. and Chernyshova, D.V. (2013) 'Electronic communication between the school and the home', *Russian Education & Society*, 55(10), pp. 81–89. doi: <https://doi.org/10.2753/RES1060-9393551006>

- Kouba, B.J. and Newberry, B. (2010) 'Assistive technology's past, present and future', in Seok, S., Meyen, E.L. and DaCosta, B. (eds.) *Handbook of research on human cognition and assistive technology: design, accessibility and transdisciplinary perspectives*. IGI Global, pp. 360–373.
- Kumashiro, K.K. (2000) 'Toward a theory of anti-oppressive education', *Review of Educational Research*, 70(1), pp. 25–53.
- Kuyumcu Vardar, A. & Acar, F. (2018) 'Quick assessment techniques used in learning teaching process', *Turkish Studies*, 13(11), pp. 879–898.
- Lalvani, P. 2015. 'Disability, stigma and otherness: perspectives of parents and teachers', *International Journal of Disability, Development and Education*, 62(4), pp. 379–393.
- Lauchlan, F. and Boyle, C. (2007) 'Is the use of labels in special education helpful?', *Support for Learning*, 22(1), pp. 36–42.
- Lautenbach, F. and Heyder, A. (2019) 'Changing attitudes to inclusion in preservice teacher education: a systematic review', *Educational Research*, 61(2), pp. 231–253.
- Lawless, K.A. and Pellegrino, J.W. (2007) 'Professional development in integrating technology into teaching and learning: knowns, unknowns, and ways to pursue better questions and answers', *Review of Educational Research*, 77, pp. 575–614.
- Lea, M. (2020) 'Judy Heumann and the disability rights movement', *UF Journal of Undergraduate Research*, 21(2), pp.2-10.
- Lemay, D.J. and Doleck, T. (2020) 'Online learning communities in the COVID-19 pandemic: social learning network analysis of Twitter during the shutdown', *International Journal of Learning Analytics and Artificial Intelligence for Education*, 2(1), p. 85-100. doi: <https://doi.org/10.3991/ijai.v2i1.15427>
- Leonardi, M. et al. (2006) 'The definition of disability: what is in a name?', *The Lancet*, 368(9543), pp. 1219–1221.
- Leporini, B., Buzzi, M. and Hersh, M. (2021) 'Distance meetings during the Covid-19 pandemic: are video conferencing tools accessible for blind people?', in: *Proceedings of the 18th International Web for All Conference*, pp. 1–10.
- Lester, F.K., Garofalo, J. and Kroll, D.L. (1989) 'Self-confidence, interest, beliefs, and metacognition: key influences on problem-solving behavior', In: R.E. Mayer (Ed.), *Affect and mathematical problem solving: a new perspective*. New York: Springer, pp. 75–88.
- Lewis, A. and Norwich, B. (2005) *Special teaching for special children? Pedagogies for inclusion*. Maidenhead: Open University Press.
- Lewis, I. (2009) *Education for disabled people in Ethiopia and Rwanda: background paper prepared for the UNESCO Education for All Global Monitoring Report 2010*. Available at: <http://unesdoc.unesco.org/images/0018/001865/186564e.pdf> (Accessed 17 November 2023).
- Liddiard, K. and Goodley, D. (2016) 'The mouth and dis/ability', *Community Dental Health*, 33, pp. 152–155.
- Lin, C.H. (2008) 'Preservice teachers' beliefs about using technology in the mathematics classroom', *Journal of Computers in Mathematics and Science Teaching*, 3(27), pp. 341–360.
- Lincoln, Y.S. and Guba, E.G. (1985) *Naturalistic inquiry*. London: Sage.
- Lindsay, S. and McPherson, A.C. (2012) 'Experiences of social exclusion and bullying at school among children and youth with cerebral palsy', *Disability and rehabilitation*, 34(2), pp. 101–109.

- Llewellyn, A. and Hogan, K. (2000) 'The use and abuse of models of disability', *Disability & Society*, 15(1), pp. 157–165.
- Lobe, B., Morgan, D. and Hoffman, K.A. (2020) 'Qualitative data collection in an era of social distancing', *International Journal of Qualitative Methods*, 19. doi:1609406920937875. <https://doi.org/10.1177/1609406920937875>.
- Long, E. *et al.* (2021) 'Rapid transitions: experiences with accessibility and special education during the COVID-19 crisis', *Frontiers in Computer Science*, 2. doi: <https://doi.org/10.3389/fcomp.2020.617006>.
- Louhiala, P. (2009) 'Ethics: philosophy meets disability', *Journal of Medical Ethics*, 35(9), pp. 570–572. doi: <https://doi.org/10.1136/jme.2009.030684>
- Lozano-Blasco, R. *et al.* (2021) 'YouTube's growth in use among children 0–5 during COVID19: the Occidental European case', *Technology in Society*, 66, 101648. doi: <https://doi.org/10.1016/j.techsoc.2021.101648>
- Lundberg, N.R. *et al.* (2011) 'Identity negotiating: redefining stigmatized identities through adaptive sports and recreation participation among individuals with a disability', *Journal of Leisure Research*, 43(2), pp. 205–225.
- Macdonald, S.J. and Clayton, J., 2012. Back to the future: Disability and the digital divide. In: A. Roulstone and C. Thomas, eds. *Disability and Technology*. Abingdon: Routledge, pp.128–144.
- MacKay, G. (2002) 'The disappearance of disability? Thoughts on a changing culture', *British Journal of Special Education*, 29(4), pp. 159–163.
- MacMillan, M. *et al.* (2014) 'The association between children's contact with people with disabilities and their attitudes towards disability: a systematic review. *Developmental Medicine & Child Neurology*, 56(6), pp. 529–546.
- Maio, G.R., 2003. *Ideologies, values, attitudes, and behavior*. In: J. Delamater (ed.), *Handbook of social psychology*. New York: Kluwer/Plenum Publishers, pp. 283–308.
- Malcolm, A.H., 1970. Polio victim, 22, is denied license to teach in city's schools. *The New York Times*, 1 April. Available at: <https://www.nytimes.com/1970/04/01/archives/polio-victim-22-is-dnied-license-to-teach-in-citys-schools.html>. (Accessed 5 May 2024).
- Mantey, E.E. (2017) 'Discrimination against children with disabilities in mainstream schools in Southern Ghana: challenges and perspectives from stakeholders', *International Journal of Educational Development*, 54, pp. 18–25. doi: <https://doi.org/10.1016/j.ijedudev.2017.02.001>
- Maor, D., Currie, J. and Drewry, R. (2011) 'The effectiveness of assistive technologies for children with special needs: a review of research-based studies', *European Journal of Special Needs Education*, 26(3), pp. 283–298.
- Marino, M.T., Marino, E.C. and Shaw, S.F. (2006) 'Making informed assistive technology decisions for students with high incidence disabilities', *Teaching Exceptional Children*, 38(6), pp. 18–25.
- Marks, D. (1997) 'Models of disability. *Disability and Rehabilitation*, 19(3), pp. 85–91.
- Markus, H.R. and Kitayama, S., 1991. Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98(2), pp.224–253.
- Marshall, C. (2008) 'School inspection: thirty-five years of school inspection: raising educational standards for children with additional needs?', *British Journal of Special Education*, 35(2), pp. 69–77.

- Martin, S.S. (2006) 'Special education, technology, and teacher education', *Special Education Technology Practice*, 2(1), pp. 21–36.
- Matsumoto, D., 2007. Culture, context, and behavior. *Journal of Personality*, 75(6), pp.1285-1320.
- Mason, A.J. and Kulinna, P.H. (2022) 'Digital projection for teaching and learning in physical education', *Journal of Physical Education, Recreation & Dance*, 93(8), pp. 22–27.
- Mason, J. (2002) *Qualitative researching*. 2nd edn. London: Sage.
- Mason, M. (1990) 'Disability equality in the classroom: a human rights issue', *Gender and Education*, 2(3), pp. 363–366.
- Matteson, M.L., Anderson, L. and Boyden, C. (2016) "Soft skills": a phrase in search of meaning', *Portal: Libraries and the Academy*, 16(1), pp. 71–88.
- Mayangsari, I.D. and Aprianti, A. (2017) 'Understanding communication among parents and teachers in WhatsApp: case study in Bandung, Indonesia', *Malaysian Journal of Social Sciences and Humanities*, 2(2), pp. 19–24
- McDowell, J. (1987) *Plato, Theaetetus*. Oxford: Clarendon.
- McFarlin, D.B. and Blascovich, J. (1981) 'Effects of self-esteem and performance feedback on future affective preferences and cognitive expectations', *Journal of Personality and Social Psychology*, 40(3), pp. 521–531.
- McGregor, S.L. and Murnane, J.A. (2010) 'Paradigm, methodology and method: intellectual integrity in consumer scholarship', *International Journal of Consumer Studies*, 34(4), pp. 419–427.
- McLeod, D.B. (1989) 'Beliefs, attitudes, and emotions: new views of affect in mathematics education', in: D.B. McLeod and V.M. Adams (eds.) *Affect and mathematical problem solving: a new perspective*. New York: Springer, pp. 245–258.
- McLeod, D.B. (1992) 'Research on affect in mathematics education: a reconceptualization', in: D.A. Grouws (ed.) *Handbook of research on mathematics teaching and learning*. New York: Macmillan, pp. 575–596.
- McLeod, J. (2001) *Qualitative research in counselling and psychotherapy*. London: Sage.
- Mei, B. and Brown, G.T.L. (2011) 'Planning the online survey', in: V.J. Smith and R.G. Brown, eds. *Conducting online surveys*. Thousand Oaks, CA: Sage, pp. 10–24.
- Meijer, C.J.W. (2003) *Special needs education across Europe*. Middelfart, Denmark: European Agency for Development in Special Needs Education.
- Melhuish, K. and Falloon, G. (2010) 'Looking to the future: m-learning with the iPad', *Computers in New Zealand Schools: Learning, Leading, Technology*. 22(3), pp. 1–16.
- Meliana, M., Junus, M. and Sulaeman, N.F. (2021) 'Learning science through online system: Whatsapp vs Google Meet platform', *ScienceEdu: Jurnal Pendidikan IPA*, 4(1), pp. 1–6.
- Menon, D. (2022) 'Uses and gratifications of educational apps: a study during COVID-19 pandemic', *Computers and Education Open*, 3, 100076. doi: <https://doi.org/10.1016/j.caeo.2022.100076>
- Merriam, S.B. (2009) *Qualitative research: a guide to design and implementation*. San Francisco: Jossey-Bass.

- Michaels, C. A. and McDermott, J. (2003) 'Assistive technology integration in special education teacher preparation: program coordinators' perceptions of current attainment and importance', *Journal of Special Education Technology*, 18(3), pp. 29–41.
- Middleton, L. (1999) 'The social exclusion of disabled children: the role of the voluntary sector in the contract culture', *Disability & Society*, 14(1), pp. 129–139.
- Mildenhall, P., Marshall, L. and Swan, P. (2010) 'Interactive whiteboards: interactive or just whiteboard?', *Australasian Journal of Educational Technology*, 26(4), pp. 494–510.
- Miles, M. (2000) 'Disability on a different model: glimpses of an Asian heritage', *Disability and Society*, 15(4), pp. 603–618.
- Miles, M.B. and Huberman, A.M. (1994) *Qualitative data analysis: an expanded sourcebook*. 2nd edn. Thousand Oaks: Sage.
- Miller, D. (2013.) Contextualizing instruction for English language learners with learning disabilities. *Teaching Exceptional Children*, 49(1), pp. 58–65.
- Ministry of Education, 2001. *Document of Rules and Regulations of Special Education Institutes and Programs* (in Arabic).
- Ministry of Education. (2020a) *The organisational guide for public education schools: a guide for goals and tasks*. Riyadh: Kingdom of Saudi Arabia. Available at: https://www.moe.gov.sa/الدليل_التنظيمي_للمدارس.pdf (Accessed 2 Aug 2024).
- Ministry of Education. (2020b). *The Saudi MOE: leading efforts to combat coronavirus pandemic*. Riyadh: Kingdom of Saudi Arabia. Available at: <https://iite.unesco.org/wp-content/uploads/2020/10/The-Saudi-MOE-Leading-Efforts-to-Combat-Coronavirus-Pandemic-COVID-19.pdf>. (Accessed 27 August 2023).
- Ministry of Education. (2021). التقرير التفصيلي. Available at: https://www.moe.gov.sa/ar/education/studies/Documents/التقرير_20%التفصيلي.pdf (Accessed 29 August 2023).
- Ministry of Education. (2023) *Statistics education for people with disabilities in Saudi Arabia*. Available at: <https://www.moe.gov.sa/> (Accessed 22 July 2024).
- Mitchell, D., Morton, M. and Hornby, G. (2010) *Review of literature on individual education plans: report to the New Zealand Ministry of Education*. New Zealand: University of Canterbury.
- Mitra, S. (2006) 'The capability approach and disability', *Journal of Disability Policy Studies*, 16, pp. 236–247. doi: <https://doi.org/10.1177/10442073060160040501>
- Mittler, J. (2007) 'Assistive technology and IDEA', in: Warger, C. (ed.) *Technology integration: providing access to the curriculum for students with disabilities*. Arlington, VA: Technology and Media Division, pp. 81– 85.
- Monsen, J.J. and Frederickson, N. (2004) 'Teachers' attitudes towards mainstreaming and their pupils' perceptions of their classroom learning environment', *Learning Environments Research*, 7, pp. 129–142.
- Morris, J. (1991) *Pride against prejudice: transforming attitudes to disability*. London: The Women's Press.
- Motshegwe, M.M. and Batane, T. (2015) 'Factors influencing instructors' attitudes toward technology integration', *Journal of Educational Technology Development and Exchange*, 8(1), pp. 1–15.

- Munyi, C.W. (2012) 'Past and present perceptions towards disability: a historical perspective', *Disability Quarterly Studies*, 32(2). Available at: <http://dsq-sds.org/article/view/3197/3068> (Accessed 10 March 2024).
- Nakken, H. and Pijl, S.J. (2002) 'Getting along with classmates in regular schools: a review of the effects of integration on the development of social relationships', *International Journal of Inclusive Education*, 6(1), pp. 47–61.
- Nepo, K. (2017) 'The use of technology to improve education', *Child & Youth Care Forum*, 46, pp. 207–221.
- Ngulube, P. (2015) 'Qualitative data analysis and interpretation: systematic search for meaning', in: E.R. Mathipa and M.T. Gumbo, eds. *Addressing research challenges: making headway for developing researchers*. Noordwyk: Mosala-MASEDI Publishers & Booksellers cc, pp.131–156.
- Nielsen, D.S. (2011) 'Overview of qualitative research methods', *Bone*, 48(S2), p. 51.
- Njiku, J., Maniraho, J. F. and Mutarutinya, V. (2019) 'Understanding teachers' attitude towards computer technology integration in education: a review of literature', *Education and Information Technologies*, 24(5), pp. 3041–3052.
- Norwich, B. (1999) 'The connotation of special education labels for professional in the field', *British Journal of Special Education*, 26(4), pp. 179–183.
- Norwich, B. (2001) 'Inclusion: evidence or value based policy and practice? Open dialogue', *The Psychology of Education Review*, 25(1), pp. 3-7
- Norwich, B. (2008a) *Dilemmas of difference, inclusion and disability. International perspectives and future directions*. London: Routledge.
- Norwich, B. (2008b) 'Perspectives and purposes of disability classification systems: implications for teachers and curriculum and pedagogy', in: Florian, L. and McClaughlin, M. (eds.) *Classification in special education*. Thousand Oaks, CA: Corwin Press, pp. 131–149.
- Norwich, B. (2014) 'Categories of special educational needs', in: Florian, L. (ed.) *Handbook of special education*. 2nd edn. London: Sage, pp.55–71.
- Novick, G. (2008) 'Is there a bias against telephone interviews in qualitative research', *Research in Nursing & Health*, 31(4), pp. 391–398.
- Nowell, L.S. et al. (2017) 'Thematic analysis: striving to meet the trustworthiness criteria', *International Journal of Qualitative Methods*, 16(1), pp. 1-13. doi: 10.1177/1609406917733847.
- Nsofor, C.C. and Bello, A. (2015) *Emerging trends in educational technology*. Ibadan: Emmi Press.
- Nurjannah, I. et al. (2014) 'Conducting grounded theory study in a language other than English: procedures for ensuring the integrity of translation', *Sage Open*, 4(1), pp. 1–10. doi: <https://doi.org/10.1177/21582440145289204>.
- Öberg, J. and Hernwall, P. (2016) 'Participatory design with teachers: designing the workshops', in: *Designs for Learning, Proceedings of the 5th International Conference on Designs for Learning*. Department of Computer and Systems Sciences (DSV), Stockholm University, Stockholm, Sweden. pp. 269–282.
- Odom, S.L. et al. (2006) 'Social acceptance and rejection of preschool children with disabilities: a mixed-method analysis', *Journal of Educational Psychology*, 98(4), pp. 807–823.

- Ok, M.W. (2018) 'Use of iPads as assistive technology for students with disabilities', *TechTrends*, 62(1), pp. 95–102.
- Okagaki, L. *et al.* (1998) 'Correlates of young children's interactions with classmates with disabilities', *Early Childhood Research Quarterly*, 13(1), pp. 67–86.
- Oliver, M. (1990) *The politics of disablement*. London: Macmillan.
- Oliver, M. (2004) 'The social model in action: if I had a hammer?', in: Barnes, C. and Mercer, G. (eds.) *Implementing the social model of disability: theory and research*. Leeds: The Disability Press, pp. 18–23.
- Oliver, M. and Barnes, C. (2012) *The new politics of disablement*. New York: Palgrave Macmillan.
- Olugbade, D. and Olurinola, O. (2021) 'Teachers' perception of the use of Microsoft Teams for remote learning in southwestern Nigerian schools', *African Journal of Teacher Education*, 10(1), pp. 265–281.
- Oppong, S.H. (2013) 'The problem of sampling in qualitative research', *Asian Journal of Management Sciences and Education*. 2(2), pp. 202–210.
- Ørngreen, R. and Levinsen, K. (2017) 'Workshops as a research methodology', *Electronic Journal of E-learning*, 15(1), pp. 70–81.
- Oskamp, S. and Schultz, P.W. (2005) *Attitudes and opinions*. 3rd edn. Mahwah, NJ: L. Erlbaum Associates.
- Ottenbreit-Leftwich, A.T. *et al.* (2010) 'Teacher value beliefs associated with using technology: addressing professional and student needs', *Computers & Education*, 55(3), pp.1321–1335.
- Paatsch, L., Toe, D. (2020) 'The impact of pragmatic delays for deaf and hard of hearing students in mainstream classrooms', *Pediatrics*, 146(3), pp. S292–S297.
- Palinkas, L.A. *et al.* (2015) 'Purposeful sampling for qualitative data collection and analysis in mixed method implementation research', *Administration and Policy in Mental Health and Mental Health Services Research*, 42(5), pp. 533–544.
- Pameijer, N. (2006) 'Towards needs-based assessment: bridging the gap between assessment and practice', *Educational and Child Psychology*, 23(3), pp. 13–24.
- Panhwar, A.H., Ansari, S. and Shah, A.A., 2017. Post-positivism: An effective paradigm for social and educational research. *International Research Journal of Arts & Humanities*, 45(45), pp.253–259.
- Parasuram, K. (2006) 'Variables that affect teachers' attitudes towards disability and inclusive education in Mumbai, India', *Disability & Society*, 21(3), pp. 231–242.
- Parette, H.P., Quesenberry, A.C. and Blum, C. (2010) 'Missing the boat with technology usage in early childhood settings: a 21st-century view of developmentally appropriate practice', *Early Childhood Education Journal*, 37(5), pp. 335–343. doi: <http://dx.doi.org/10.1007/s10643-009-0352-x>
- Parmenter, T.R. (2001) 'Intellectual disability—quo vadis?', in: Albrecht, G. L., Seelman, K. D., and Bury, M. (eds.) *Handbook of disability studies*. Thousand Oaks, CA: Sage, pp. 267–296.
- Parmigiani, D. *et al.* (2020) 'E-inclusion: online special education in Italy during the COVID-19 pandemic', *Technology, Pedagogy and Education*, 30(1), pp. 111–124.
- Paterson, K. and Hughes, B. (2000) 'Disabled bodies', in: Hancock, P. *et al.* (eds.) *The body, culture and society: an introduction*. Buckingham, England: Open University Press, pp. 29–44.

- Peers, D. Spencer-Cavaliere, N. and Eales, L. (2014) 'Say what you mean: rethinking disability language', *Adapted Physical Activity Quarterly*, 31, pp. 265–282.
- Petko, D., Prasse, D. and Cantieni, A. (2018) 'The interplay of school readiness and teacher readiness for educational technology integration: a structural equation model', *Computers in the Schools*, 35(1), p. 1–18. doi: <https://doi.org/10.1080/07380569.2018.1428007>.
- Pfeiffer, D. (2001) 'The conceptualization of disability', in: S.N. Barnartt and B.M. Altman, eds. *Exploring theories and expanding methodologies: where we are and where we need to go: Volume 2*. Leeds: Emerald Publishing, pp. 29–52.
- Pillow, W. (2003) Confession, catharsis, or cure? Rethinking the uses of reflexivity as methodological power in qualitative research. *International journal of qualitative studies in education*, 16(2), pp.175-196.
- Powell, S. (2014) 'Choosing iPad apps with a purpose', *Teaching Exceptional Children*, 47(1), pp. 20–26.
- Prensky, M. 2001. Digital natives, digital immigrants part 2: Do they really think differently? *On the Horizon*, 9(6), pp. 1-6.
- Priestly, M (2003) *Disability: a life course approach*. Oxford: Blackwell Publishing.
- Prior, M.T. (2018) 'Accomplishing "rapport" in qualitative research interviews: empathic moments in interaction', *Applied Linguistics Review*, 9(4), pp. 487–511.
- Rahamin, L. (2004) 'From integration to inclusion: using ICT to support learners with special educational needs in the ordinary classroom', in: Florian, L. and Hegarty, J. (eds.) *ICT and special educational needs: a tool for inclusion*. Maidenhead: Open University Press, pp. 35–45.
- Rahayu, R.P. and Wirza, Y. (2020) 'Teachers' perception of online learning during pandemic COVID-19' *Jurnal Penelitian Pendidikan*, 20(3), pp. 392–406.
- Raider-Roth, M. et al. (2021) 'Moving toward a utopian future one step at a time: taking our future creating workshop online', *Journal of Participatory Research Methods*, 2(1), pp.2-12. doi: [10.35844/001c.18689](https://doi.org/10.35844/001c.18689).
- Raja, R. and Nagasubramani, P.C. (2018) 'Impact of modern technology in education', *Journal of Applied and Advanced Research*, 3(1), pp. 33–35.
- Rajecki, D.W. (1982) *Attitudes, themes, and advances*. Sunderland, MA: Sinauer Associates Publishers.
- Ramdhani, T. and Nandiyanto, A.B.D. (2021) 'The use of WhatsApp social media as reinforcement online learning during the COVID-19 pandemic', *Indonesian Journal of Multidisciplinary Research*, 1(1), pp. 107–112.
- Ramdoss, S. et al. (2011) 'Use of computer-based interventions to teach communication skills to children with autism spectrum disorders: a systematic review', *Journal of Behavioral Education*, 20, pp. 55–76.
- Rashid, S. and Yadav, S.S. (2020) 'Impact of Covid-19 pandemic on higher education and research', *Indian Journal of Human Development*, 14(2), pp. 340–343.
- Retief, M. and Letšosa, R. (2018) 'Models of disability: a brief overview', *HTS Teologiese Studies/Theological Studies*, 74(1), pp. 1-8.
- Rezapour Nasrabad, R. (2018) 'Criteria of validity and reliability in qualitative research', *Journal of Qualitative Research in Health Sciences*, 6(4), pp. 493–499.
- Riandi, R., Apriliana, V. and Purwianingsih, W. (2018) 'The analysis of 21st century teachers' ability in technological pedagogical content knowledge', *Advances in Social Science, Education and Humanities Research*, 212, pp. 275–278.

- Rice, M.F. (2022) 'Special education teachers' use of technologies during the COVID-19 era (Spring 2020–Fall 2021)', *TechTrends*, 66(2), pp. 310–326.
- Richardson, V. (1996) 'The role of attitudes and beliefs in learning to teach', in: Sikula, J. (ed.) *Handbook of research on teacher education*. 2nd edn. New York: Macmillan, pp. 102–119.
- Riddick, B. (2000) 'An examination of the relationship between labelling and stigmatisation with special reference to dyslexia', *Disability & Society*, 15(4), pp. 653–667.
- Ritchie, J. and Spencer, L. (2002) 'Qualitative data analysis for applied policy research', in: Huberman, M. and Miles, M.B. (eds.) *The qualitative research companion*. London: Sage, pp. 305–330.
- Riyanti, D. (2021) 'The use of Google Meet for online microteaching', *Journal of English Education and Linguistics Studies*, 8(2), pp. 139–156.
- Robson, C. (2011) 'Approaches to social research', in: Robson, C. (ed.) *Real world research*. 3rd edn. Chichester: Wiley, pp.14–41.
- Roffey, S., Tarrant, T. and K. Majors. (1994) *Young friends: schools and friendship*. London: Cassell.
- Rokeach, M. (1968) *Beliefs, attitudes, and values: A theory of organization and change*. San Francisco, CA: Jossey-Bass.
- Rorty, R. (1989) *Contingency, irony, and solidarity*. Cambridge: Cambridge University Press.
- Rosenberg, M.J. and Hovland, C.I. (1960) 'Cognitive, affective and behavioral components of attitudes', in: Hovland, C.I. and Rosenberg, M.J. (eds.) *Attitude organization and change, an analysis of consistency among attitude components*. New Haven: Yale University Press, pp. 1–14.
- Rouse, M. (2008) 'Developing inclusive practice: a role for teachers and teacher education?', *Education in the North*, 16(1), pp. 1–20. Available at: <https://www.abdn.ac.uk/eitn/journal/46/> (Accessed 7 October 2023).
- Roush, S.E. and Sharby, N. (2011) 'Disability reconsidered: the paradox of physical therapy', *Physical Therapy*, 91, pp. 1715–1727. doi: <https://doi.org/10.2522/ptj.20100389>
- Rowlands, T. (2015) *The utilisation of assistive technology to enhance education support for all learners in a mainstream school*. Doctoral dissertation, University of South Africa.
- Royal Embassy of Saudi Arabia in the United States. (2015) *Education*. Available at: <http://embassies.mofa.gov.sa/sites/usa/en/aboutsaudiArabia/countryinformation/pages/education.aspx> (Accessed 19 June 2024).
- Rufus, A. et al. (2015) 'Using assistive technology in teaching children with learning disabilities in the 21st century' *Journal of Education and Practice*. 6(24), pp. 14–20.
- Rui Xia Ang, J. et al. (2022) 'In this online environment, we're limited: exploring inclusive video conferencing design for signers, in: *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems*, 29 April–5 May, New Orleans, LA, USA. New York, NY: Association for Computing Machinery, pp. 1–16. doi: 10.1145/3491102.3517488.
- Runswick-Cole, K. and Hodge, N. (2009) 'Needs or rights? A challenge to the discourse of special education', *British Journal of Special Education*, 36(4), pp. 198–203.
- Russo, C.J. and Osborne Jr, A.G. (2013) 'Assistive technology and students with disabilities', *School Business Affairs*, 79(4). pp. 34–36.

- Salisbury, C.L. *et al.* (1994) 'Promoting the inclusion of young children with disabilities in the primary grades: a curriculum adaptation process', *Journal of Early Intervention*, 18, pp. 311–322.
- Saltes, N. (2013) '“Abnormal” bodies on the borders of inclusion: biopolitics and the paradox of disability surveillance', *Surveillance & Society*, 11(1–2), pp. 55–73.
- Sanford, J.A. (2012) *Universal design as a rehabilitation strategy: design for the ages*. New York: Springer.
- Santos, J.M. and Castro, R.D. (2021) 'Technological pedagogical content knowledge (TPACK) in action: application of learning in the classroom by preservice teachers (PST)', *Social Sciences and Humanities Open*, 3(1), pp. 100–110.
- Saran, A. *et al.* (2023) 'Effectiveness of interventions for improving social inclusion outcomes for people with disabilities in low-and middle-income countries: a systematic review', *Campbell Systematic Reviews*, 19(1), pp. e1316. doi: 10.1002/cl2.1316.
- Sater, G.M. and French, D.C. (1989) 'A comparison of the social competencies of learning disabled and low achieving elementary-aged children', *The Journal of Special Education*, 23(1), pp. 29–40.
- Saudi Arabia. (2016) *Saudi Vision 2030*. Available at: <https://www.vision2030.gov.sa/download/file/fid/417> (Accessed 19 July 2024).
- Saudi Arabia. (2019) *Royal directive to adopt the term ‘people with disabilities’*. Available at: <https://apd.gov.sa/blog/news-2/news-56> (Accessed: 18 June 2024)
- Savolainen, H. *et al.* (2012) 'Understanding teachers' attitudes and self-efficacy in inclusive education: implications for pre-service and in-service teacher education', *European Journal of Special Needs Education*, 27(1), pp. 51–68. doi:10.1080/08856257.2011.613603.
- Savolainen, H., Malinen, O.-P. and Schwab, S. (2022) 'Teacher efficacy predicts teachers' attitudes towards inclusion: a longitudinal cross-lagged analysis', *International Journal of Inclusive Education*, 26(9), pp. 958–972. doi:10.1080/13603116.2020.1752826
- Schwarz, N. and Bohner, G. (2001) 'The construction of attitudes', in: Tesser, A. and Schwarz, N. (eds.) *Blackwell handbook of social psychology: intraindividual processes*, Oxford: Blackwell Publishers Ltd, pp. 436–457.
- Schwandt, T.A., 1998. Constructivist, interpretivist approaches to human inquiry. In: N.K. Denzin and Y.S. Lincoln, eds. *The landscape of qualitative research: Theories and issues*. Thousand Oaks, CA: Sage Publications, pp.221–259.
- Scotch, R.K. (2001) *From good will to civil rights: transforming federal disability policy*. 2nd edn. Philadelphia: Temple University Press.
- Shaheen, N.L. and Lohnes Watulak, S. (2019) 'Bringing disability into the discussion: examining technology accessibility as an equity concern in the field of instructional technology', *Journal of Research on Technology in Education*, 51(2), pp. 187–201.
- Shakespeare, T. (1994) 'Cultural representation of disabled people: dustbins for disavowal?', *Disability & Society*, 9(3), pp. 283–299.
- Shakespeare, T. (2006) *Disability rights and wrongs*. London: Routledge.
- Shakespeare, T. and Watson, N. (2001) 'The social model of disability: an outdated ideology?', *Research in Social Science and Disability*, 2, pp. 9–28.

- Shamsuddin, A., Sheikh, A. and Keers, R.N. (2021) 'Conducting research using online workshops during COVID-19: lessons for and beyond the pandemic', *International Journal of Qualitative Methods*, 20, doi: 10.1177/16094069211043744.
- Sharma, A. and Dunay, A. (2016) 'Life proposes, disability disposes: an overview on the models of disability with special reference to WHO conceptual models', *Littera Scripta*, 9(3), pp. 66–83.
- Sheehan, R. and Ali, A. (2016) 'Self-stigma in people with intellectual disabilities', in: Scior, K. and Werner, S. (eds.) *Intellectual disability and stigma: stepping out from the margins*. London: Macmillan, pp. 91–110.
- Shishah, W (2021) 'Usability perceptions of the Madrasati platform by teachers in Saudi Arabian Schools', *International Journal of Advanced Computer Science and Applications*, 12(8). pp. 340-351.
- Shulman, L.S. (1986) 'Those who understand: knowledge growth in teaching', *Educational Researcher*, 15(2), pp. 4–14.
- Sider, S. and Maich, K. (2014) 'Assistive technology tools: supporting literacy learning for all learners in the inclusive classroom. What Works?', *Research into Practice*, 50(1), 1–12.
- Sidi, Y., Shamir-Inbal, T. and Eshet-Alkalai, Y. (2023) 'From face-to-face to online: teachers' perceived experiences in online distance teaching during the Covid-19 pandemic', *Computers and Education*, 201, pp. 104831–104831. doi: 10.1016/j.compedu.2023.104831
- Siebers, T. (2008) *Disability theory*. Ann Arbor: University of Michigan Press.
- Sikes, P. (2004) 'Methodology, procedures and ethical considerations', in Opie, C. (ed.) *Doing educational research: a guide to first-time researchers*. London: Sage, pp. 15–33.
- Slee, R. (2011) *The irregular school: exclusion, schooling and inclusive education*. London: Routledge.
- Slee, R. and Allan, J. (2001) 'Excluding the included: a reconsideration of inclusive education', *International Studies in Sociology of Education*, 11(2), pp. 173–192.
- Smart, J.F. (2009) 'The power of models of disability', *Journal of Rehabilitation*, 75(2), p.3-11.
- Smart J.F. and Smart D.W. (2006). 'Models of disability: implications for the counseling profession', *Journal of Counseling & Development*, 84(1), pp. 29-40.
- Smith, D. (2007) *Introduction to special education*. (6th edn.) London: Boston: Allyn & Bacon.
- Smith, H. (2005) 'Interactive whiteboards: boon or bandwagon? A critical review of the literature', *Journal of Computer Assisted Learning*, 21, pp. 91–10.
- Smith, J.A. and Osborn, M. (2003) 'Interpretative phenomenological analysis', in: Smith, J.A. (ed.) *Qualitative psychology: a practical guide to methods*. 2nd edn. London: Sage. pp. 193-211.
- Smith, J.A. Flowers, P. and Larkin, M., 2009. *Interpretative phenomenological analysis: Theory, method and research*. London: SAGE Publications.
- Smith, M.K. and Smith, K.E. (2000) "'I believe in inclusion, but...": regular education early childhood teachers' perceptions of successful inclusion', *Journal of Research in Childhood Education*, 14(2), pp. 161–180.
- Smith, P.B., Peterson, M.F. and Thomas, D.C. (2008) *The handbook of cross-cultural management research*. Thousand Oaks, CA: Sage.
- Snape, D. and Spencer, L., 2003. The foundations of qualitative research. *Qualitative research practice: a guide for social science students and researchers*. London: Sage, pp.1-23.

- Snoeyink, R. and Ertmer, P. (2001/2002) 'Thrust into technology: how veteran teachers respond', *Journal of Educational Technology Systems*, 30, pp. 85–111.
- Söder, M., 1989. Disability as a social construct: the labelling approach revisited. *European Journal of Special Needs Education*, 4(2), pp.117-129.
- Solity, J. E. (1991) 'Special needs: a discriminatory concept?', *Educational Psychology in Practice*, 7, pp. 112–119.
- Southerland, S.A., Sinatra, G.M. and Matthews, M.R. (2001) 'Belief, knowledge, and science education', *Educational Psychology Review*, 13, pp. 325–351.
- Spiteri, M. and Chang Rundgren, S.N. (2020) 'Literature review on the factors affecting primary teachers' use of digital technology', *Technology, Knowledge and Learning*, 25(1), pp. 115–128.
- Stein, M. and Wang, M.C. (1988) 'Teacher development and school improvement: the process of teacher change', *Teaching and Teacher Education*, 4, pp. 171–187.
- Stewart-Withers, R. et al. (2014) 'Qualitative research', in: Scheyvens, R. (ed.) *Development field work: a practical guide*. London: Sage, pp. 59–80.
- Stone-MacDonald, A. and Butera, G.D. (2012) 'Cultural beliefs and attitudes about disability in East Africa', *Review of Disability Studies: An International Journal*, 8(1), pp. 1-19.
- Stronge, J. (2002) *Qualities of effective teachers*. Alexandria, VA: ASCD.
- Suduc, A.M. and Bizoi, M. (2022) 'AI shapes the future of web conferencing platforms', *Procedia Computer Science*, 214, pp. 288–294.
- Suduc, A.M., Bizoi, M. and Filip, F.G. (2023) 'Status, challenges and trends in videoconferencing platforms', *International Journal of Computers Communications & Control*, 18(3), pp. 2-10. doi:10.15837/ijccc.2023.3.5465.
- Sulaimani, M.F. and Bagadood, N.H. (2023) 'Assistive technology for students with intellectual disability: examining special education teachers' perceptions in Saudi Arabia', *Assistive Technology*, 35(3), pp. 235–241. doi: <https://doi.org/10.1080/10400435.2022.2035017>
- Sullivan, G.M. and Sargeant, J. (2011) 'Qualities of qualitative research: part I', *Journal of Graduate Medical Education*, 3(4), pp. 449–452.
- Sundeen, T.H. and Sundeen, D.M. (2013) 'Instructional technology for rural schools: access and acquisition', *Rural Special Education Quarterly*, 32(2), pp. 8–14.
- Sutcliffe, J. and Simons, K. (1993) *Self advocacy and people with learning difficulties*. Leicester: NIACE.
- Sze, S. (2019) *An investigation of various types of assistive technology (AT)*. Available at: <https://files.eric.ed.gov/fulltext/ED490347.pdf> (Accessed 1 May 2024).
- Szumski, G., Smogorzewska, J. and Grygiel, P. (2020) 'Attitudes of students toward people with disabilities, moral identity and inclusive education: a two-level analysis', *Research in Developmental Disabilities*, 102, pp.2-12. doi:10.1016/j.ridd.2020.103685.
- Swain, J. and French, S., 2000. Towards an affirmation model of disability. *Disability & Society*, 15(4), pp.569-582.
- Tabata, L.N. and Johnsrud, L.K. (2008) 'The impact of faculty attitudes toward technology, distance education, and innovation', *Research in Higher Education*, 49, pp. 625–646.

- Tamah, S.M. *et al.* (2020) 'Secondary school language teachers' online learning engagement during the COVID-19 pandemic in Indonesia', *Journal of Information Technology Education: Research*, 19, pp. 803–832.
- Tarantino, G., Makopoulou, K. and Neville, R.D. (2022) 'Inclusion of children with special educational needs and disabilities in physical education: a systematic review and meta-analysis of teachers' attitudes', *Educational Research Review*, 36, pp. 2–14.
- Taylor, C. and Albasri, W. (2014) 'The impact of Saudi Arabia King Abdullah's scholarship program in the US', *Open Journal of Social Sciences*, 2(10), pp. 109–118.
- Taylor, G. (1999) 'Empowerment, identity and participatory research: using social action research to challenge isolation for deaf and hard of hearing people from minority ethnic communities', *Disability & Society*, 14(3), pp. 369–384.
- Terzi, L., 2004. The social model of disability: A philosophical critique. *Journal of Applied Philosophy*, 21(2), pp.141-157.
- Terzi, L. (2005) 'Beyond the dilemma of difference: the capability approach to disability and special educational needs', *Journal of Philosophy of Education*, 39(3), pp. 443–459.
- Thomas, C., (1999). *Female forms: Experiencing and understanding disability*. McGraw-Hill Education (UK).
- Thomas, C. (2004) 'Developing the social relational in the social model of disability: a theoretical agenda', in: Barnes, C. and Mercer, G. (eds.) *Implementing the social model of disability: theory and research*. 1st edn. Leeds: The Disability Press, pp. 32–47.
- Thomas, C. (2004) 'How is disability understood? An examination of sociological approaches', *Disability & Society*, 19(6), pp. 569–583.
- Thomas, G. and Loxley, A. (2001) *Deconstructing special education and constructing inclusion*. Maidenhead: Open University Press.
- Thompson, A.S. (2021) 'Attitudes and beliefs in psychology', in: Gregersen, T. and Mercer, S. (eds.) *The Routledge handbook of the psychology of language learning and teaching*. London: Routledge.
- Thormann, J. *et al.* (1987) 'Microcomputers in special education classrooms: themes from research and implications for practice', in: Johnson, D.L., Maddux, C.D. and Candler, A.C. (eds.), *Computers in the special education classroom*. New York: Hawthorne Press, pp. 97–109.
- Thousand, J. and Villa, R. (1992) *Restructuring for caring and effective education*. Baltimore: Brookes.
- Thurneck, D.A. (2008) *The impact of inclusive education on the development of disability attitudes*. Doctoral dissertation, James Madison University.
- Tlili, A. *et al.* 2021. 'Remote special education during crisis: COVID-19 as a case study', in: Burgos, D., Tlili, A. and Tabacco, A. (eds.) *Radical solutions for education in a crisis context*. Singapore: Springer, pp. 69–83.
- Tobbell, J. and Lawthom, R. (2005) 'Dispensing with labels: enabling children and professionals to share a community of practice', *Educational and Child Psychology*, 22(3), pp. 89–97.
- Tobin, C., Mavrommati, G. and Urban-Rich, J. (2020) 'Responding to social distancing in conducting stakeholder workshops in COVID-19 era', *Societies*, 10(4), p. 2-13.
- Todd, R.W. (2020) 'Teachers' perceptions of the shift from the classroom to online teaching', *International Journal of TESOL Studies*, 2(2), pp. 4–16.

- Tran, L.M., Patton, J.R. and Brohammer, M. (2018) 'Preparing educators for developing culturally and linguistically responsive IEPs', *Teacher Education and Special Education*, 41(3), pp. 229–242.
- Triviño-Amigo, N. *et al.* (2022) 'Inclusive education in primary and secondary school: perception of teacher training', *International Journal of Environmental Research and Public Health*, 19(23), pp. 2–12. doi: 0.3390/ijerph192315451.
- Tuckett, A.G. (2005) 'Applying thematic analysis theory to practice: a researcher's experience', *Contemporary Nurse*, 19, pp. 75–87.
- Tuffour, I. (2017) 'A critical overview of interpretative phenomenological analysis: a contemporary qualitative research approach', *Journal of Healthcare Communications*, 2(4), p. 52.
- Türel, Y.K. and Johnson, T.E. (2012) 'Teachers' belief and use of interactive whiteboards for teaching and learning', *Journal of Educational Technology and Society*, 15(1), pp. 381–394.
- Turner, D.W. (2010) 'Qualitative interview design: a practical guide for novice investigators', *Qualitative Report*, 15(3), pp. 754–760.
- Uerz, D. Volman, M. and Kral, M. (2018) 'Teacher educators' competences in fostering student teachers' proficiency in teaching and learning with technology: an overview of relevant research literature', *Teaching and Teacher Education*, 70, pp. 12–23.
- Ullah, A., Ashraf, M., Ashraf, S. and Ahmed, S. (2021) 'Challenges of online learning during the COVID-19 pandemic encountered by students in Pakistan', *Journal of Pedagogical Sociology and Psychology*, 3(1), pp. 36–44.
- Underhill, R. (1988) 'Focus on research into practice in diagnostic and prescriptive mathematics: mathematics learners' beliefs: a review', *Focus on Learning Problems in Mathematics*, 10(1), pp. 55–69.
- United Kingdom Department for Education. (2015) *Special educational needs and disability code of practice: 0 to 25 years*. London: UK Department for Education. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/398815/SEND_Code_of_Practice_January_2015.pdf (Accessed: 29 July 2023).
- United Nations. (2006) *Convention on the rights of persons with disabilities (CRPD)*. Available at: <https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-persons-disabilities> (Accessed 11 August 2024).
- United Nations. (2018) *Leaving no one behind: the imperative of inclusive development. Report on the world social situation 2016*. Available at: <https://social.desa.un.org/sites/default/files/publications/2023-03/World%20Social%20Report%202016.pdf> (Accessed 11 August 2024).
- United Nations Human Rights Office of the High Commissioner. (2014) *Convention on the rights of persons with disabilities. Training Guide No. 19*. Available at: https://www.ohchr.org/sites/default/files/Documents/Publications/CRPD_TrainingGuide_PTS19_EN_Accessible.pdf (Accessed 15 May 2024).
- United States. (1990a) *Americans with Disabilities Act*, Pub. L. No. 101–336, 42 U.S.C. § 12101 et seq. Available at: <https://www.ada.gov/pubs/adastatute08.htm>. (Accessed 13 May 2024).
- United States. (1990b) *Individuals with Disabilities Education Act (IDEA)* of 1990, Pub. L. No. 101-476, 20 U.S.C. § 1400 et seq. Available at: <https://sites.ed.gov/idea/> (Accessed 13 May 2024).
- United States. (2004) *Individuals with Disabilities Education Improvement Act (IDEIA)*. Public Law 108–446, 118 Stat. 2657 20 U.S.C. § 1400 et seq. Available at: <https://www.congress.gov/bill/108th-congress/house-bill/1350/text>. (Accessed 15 May 2024).

- Valentine, E.R. (1982) *Conceptual issues in Psychology*. 2nd edn. London: Allen & Unwin.
- Van Laarhoven, T. and Conderman, G. (2011) 'Integrating assistive technology into special education teacher preparation programs', *Journal of Technology and Teacher Education*, 19, pp. 473–497.
- Van Teijlingen, E. and Hundley, V. (2002) 'The importance of pilot studies', *Nursing Standard*, 16(40), pp. 33.
- Vaughn, S. and Fuchs, L. S. (2003) 'Redefining learning disabilities as inadequate response to instruction: the promise and potential problems', *Learning Disabilities Research and Practice*, 18(3), pp. 137–146.
- Villa, R. and Thousand, J. (2000) *Restructuring for caring and effective education*. 2nd edn. Portland, MA: Brookes.
- Villa, R. and Thousand, J.S. (2005) *Creating an inclusive school*. Alexandria, VA: ASCD.
- Villanueva, M.G. *et al.* (2012) 'Science education for students with special needs', *Studies in Science Education*, 48(2), pp. 187–215.
- Viner, M., Singh, A. and Shaughnessy, M.F. (2020) 'Assistive technology to help students with disabilities', in: Singh, A., Viner, M. and Yeh, C.J. (eds.) *Special education design and development tools for school rehabilitation professionals*, Hershey, PA: IGI Global, pp. 240–267.
- Voogt, J. *et al.* (2013) 'Technological pedagogical content knowledge: a review of the literature', *Journal of Computer Assisted Learning*, 29(2), pp. 109–121.
- Vreeman, R.C. and Carroll, A.E. (2007) 'A systematic review of school-based interventions to prevent bullying', *Archives of Pediatrics & Adolescent Medicine*, 161(1), pp. 78–88.
- Vygotsky, L.S. (1978) *Mind in society: the development of higher psychological processes*. Cambridge: Harvard University Press.
- Vygotsky, L.S. (1995) *Problemy defectologii [problems of defectology]*. Moscow: Prosvecshenie Press.
- Wachira, P. and Keengwe, J. (2010) 'Technology integration barriers: urban school mathematics teachers perspectives', *Journal of Science Education and Technology*, 20, pp. 17–25. doi: <http://dx.doi.org/10.1007/s10956-010-9230-y>
- Wajdi, M.B.N. *et al.* (2020) 'Education policy overcome coronavirus, a study of Indonesians', *Journal of Education and Technology*, 3(2), pp. 97–106.
- Wake, D. and Whittingham, J. (2013) 'Teacher candidates' perceptions of technology supported literacy practices', *Contemporary Issues in Technology and Teacher Education*, 13(3), pp. 175–206.
- Walker, S., Berthelsen, D. and Irving, K. (2001) 'Temperament and peer acceptance in early childhood: sex and social status differences', *Child Study Journal*, 31(3), pp. 177–192.
- Wan, Y.S. (2020) 'Education during Covid-19', *Ideas Institute for Democracy and Economics*, 19, pp. 1–10.
- Warnock, M. (1978) *Meeting special educational needs: a brief guide. A report of the Committee of Enquiry into the Education of Handicapped Children and Young People, for the Department of Education and Science and Scottish Education Department and Welsh Office*. London: HMSO.
- Wasserman, E. and Zwebner, Y. (2017) 'Communication between teachers and parents using the WhatsApp application', *International Journal of Learning, Teaching and Educational Research*, 16(12), pp. 1–12.

- Weber, D. and Demchak, M. (1996) 'Using assistive technology with individuals with severe disabilities', *Computers in the Schools*, 12(3), pp. 43–56.
- Wehmeyer, M. *et al.* (2004) 'Technology use by students with intellectual disabilities: an overview', *Journal of Special Education Technology*, 19(4), pp. 7–21.
- Wehmeyer, M. *et al.* (2008) 'The efficacy of technology use by people with intellectual disability: a single-subject design meta-analysis', *Journal of Special Education Technology*, 23(3), pp. 21–30.
- Wellington, J. (2015) *Educational research: contemporary issues and practical approaches*. 2nd edn. London: Bloomsbury.
- Wellington, J. *et al.* (2005) *Succeeding with your doctorate*. London: Sage.
- Wendell, S., 1996. *The Rejected Body: Feminist Philosophical Reflections on Disability*. Routledge.
- WhatsApp. (2017) *WhatsApp security*. Available at: <https://www.whatsapp.com/security> (Accessed 10 August 2023).
- Whitby, P.J., Leininger, M.L. and Grillo, K. (2012) 'Tips for using interactive whiteboards to increase participation of students with disabilities', *Teaching Exceptional Children*, 44(6), pp. 50–57.
- Wilczenski, L.F. (1991) *Use of the "attitudes towards mainstreaming scale" with undergraduate education students*. Presented at the annual meeting of the New England Educational Research Organization, Portsmouth, NH.
- Wilson, J. (2002) 'Defining 'special needs'', *European Journal of Special Needs Education*, 17(1), pp. 61–66.
- Wilson, M.C. and Scior, K. (2014) 'Attitudes towards individuals with disabilities as measured by the implicit association test: a literature review', *Research in Developmental Disabilities*, 25, pp. 294–321. doi: <https://doi.org/10.1016/j.ridd.2013.11.003>
- Wong, K.T., Teo, T. and Russo, S. (2013) 'Interactive whiteboard acceptance: applicability of the UTAUT model to student teachers', *The Asia-Pacific Education Researcher*, 22(1), pp. 1–10.
- Wood, S.G. *et al.* (2017) 'Does use of text-to-speech and related read-aloud tools improve reading comprehension for students with reading disabilities? A meta-analysis', *Journal of Learning Disabilities*, 51(1), pp. 73–84.
- Woodyatt, C.R., Finneran, C.A. and Stephenson, R. (2016) 'In-person versus online focus group discussions: a comparative analysis of data quality', *Qualitative Health Research*, 26(6), pp. 741–749.
- World Health Organization. (1980) *International classification of impairments, disabilities, and handicaps: a manual of classification relating to the consequences of disease, published in accordance with resolution WHA29.35 of the 29th World Health Assembly, May 1976*. Geneva: World Health Organization. Available at: [International Classification of Impairments, Disabilities, and Handicaps](#). (Accessed 6 May 2024).
- World Health Organisation. (2001) *International classification of functioning, disability and health (ICF)*. Geneva: World Health Organisation. Available at: International Classification of Functioning, Disability and Health (ICF) –WHO. (Accessed 6 May 2024).
- World Health Organization and United Nations Children's Fund. (2022) *Global report on assistive technology*. Geneva: World Health Organization. Available at: Global Report on Assistive Technology – WHO. (Accessed 6 July 2024).

- World Health Organization and World Bank. (2011) *World report on disability*. Available at: <https://www.who.int/teams/noncommunicable-diseases/sensory-functions-disability-and-rehabilitation/world-report-on-disability> (Accessed 11 August 2024).
- Wright, B.A. (1983) *Physical disability: a psychosocial approach*. 2nd edn. New York: Harper & Row.
- Xin, J.F. and Leonard, D.A. (2015) 'Using iPads to teach communication skills of students with autism', *Journal of Autism and Developmental Disorders*, 45, pp. 4154–4164.
- Yazıcı, T. (2015) 'Place of interpersonal communication in the instant messaging application: a study on college students relating to the WhatsApp applications', *International Journal of Social Sciences and Education Research*, 1(4), pp. 1102–1119. doi: <https://doi.org/10.24289/ijsser.279121>
- Yeboah, J. and Ewur, G.D. (2014) 'The impact of WhatsApp messenger usage on students performance in tertiary institutions in Ghana', *Journal of Education and Practice*, 5(6), pp. 157–164.
- Yi, Y. and Jang, J. (2020) 'Envisioning possibilities amid the COVID-19 pandemic: implications from English language teaching in South Korea', *TESOL Journal*, 11(3), pp.1-5. doi: <https://doi.org/10.1002/tesj.543>.
- Yilmaz, K. (2013) 'Comparison of quantitative and qualitative research traditions: epistemological, theoretical, and methodological differences', *European Journal of Education*, 48(2), pp. 311–325.
- Yuen, A.H. and Ma, W.W., 2002. Gender differences in teacher computer acceptance. *Journal of Technology and Teacher Education*, 10(3), pp.365–382.
- Yuker, H.E. (1988) 'The effects of contact on attitudes toward disabled persons: some empirical generalizations', in: Yuker, H.E. (ed.) *Attitudes toward persons with disabilities*. New York: Springer, pp. 262–274.
- Zee, M. and Koomen, H.M. (2016) 'Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: a synthesis of 40 years of research', *Review of Educational Research*, 86(4), pp. 981–1015.
- Zengin, B., Arian, A., and Dogan, D. (2011) 'Opinions of English major students about their departments' websites', *Contemporary Educational Technology*, 2(4), pp. 294–307.
- Zhao, Y. (2007) 'Social studies teachers' perspectives of technology integration', *Journal of Technology and Teacher Education*, 15(3), pp. 311–333.
- Zhao, Y. et al. (2002) 'Conditions for classroom technology innovation', *Teachers College Record*, 104(3), pp. 482–515.
- Zhou, L. et al. (2012) 'Assistive technology competencies for teachers of students with visual impairments: a national study', *Journal of Visual Impairment and Blindness*, 106(10), pp. 656–665.
- Zigmond, N.P. and Kloo, A. (2017) 'General and special education are (and should be) different', in: Hallahan, D. and Kauffman, J. (eds.) *Special Education*. New York and London: Routledge, pp. 249–261.
- Zimbardo, P.G. and Leippe, M.R. (1991) *The psychology of attitude change and social influence*. 3rd edn. New York: McGraw-Hill.

Appendices

Appendix 1: Ethics Approval Letter



Downloaded: 07/04/2022
Approved: 06/04/2022

Ezdehar Almwasheer
Registration number: 200263326
School of Education
Programme: Standard PhD in School of Education

Dear Ezdehar

PROJECT TITLE: The attitudes, beliefs, and knowledge of female special education teachers toward the use of assistive technology in teaching children with special educational needs and disabilities (SEND) in mainstream primary education in Saudi Arabia.

APPLICATION: Reference Number 044707

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 06/04/2022 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 044707 (form submission date: 31/03/2022); (expected project end date: 26/10/2024).
- Participant information sheet 1100722 version 4 (31/03/2022).
- Participant consent form 1100723 version 3 (28/02/2022).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

ED6ETH Edu
Ethics Administrator
School of Education

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy:
<https://www.sheffield.ac.uk/rs/ethicsandintegrity/ethicspolicy/approval-procedure>
- The project must abide by the University's Good Research & Innovation Practices Policy:
https://www.sheffield.ac.uk/polopoly_fs/1.6710661/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

Appendix 2: Approval Letter from the Saudi Ministry of Education (Arabic)

الرقم: ٢٦٧٤٤٢
التاريخ: ١٤٤٢/١٠/١٤
المرفقات:


وزارة التعليم
Ministry of Education

المملكة العربية السعودية
وزارة التعليم
الإدارة العامة للتعليم بمنطقة الجوف
إدارة التخطيط والتطوير

الموضوع: تسهيل مهمة الباحثة: ازدهار بنت سليمان المويشير

المكرمة / مديرة الابتدائية القائمة بسكاكا
وفقها الله
المكرمة / مديرة الابتدائية الرابعة والعشرون بسكاكا
وفقها الله
المكرمة / مديرة الابتدائية الثالثة بقارا
وفقها الله
المكرمة / مديرة معهد التربية الفكرية
وفقها الله
السلام عليكم ورحمة الله وبركاته

بناءً على الخطاب المقدم من الباحثة / ازدهار بنت سليمان المويشير رقم ٤٦٠٣٩٠٤٦/٢٠١٤
وتاريخ ١٤٤٢/١٠/٧ هـ المبتعثة من جامعة الجوف إلى بريطانيا في مدينة شفيلد لدراسة مرحلة
الدكتوراه، والتي تقوم بإعداد دراسة بعنوان "وجهة نظر معلمات التربية الخاصة في استخدام
التكنولوجيا المساعدة في تدريس الأطفال ذوي الاحتياجات الخاصة في المدارس الابتدائية في
المملكة العربية السعودية".
نأمل منكم تسهيل مهمة الباحثة في إقامة ثلاث ورش أون لاين مع معلمات التربية الخاصة
بالمرحلة الابتدائية.

شاكرين اهتمامكم وتعاونكم.

مساعدة مدير إدارة التخطيط والتطوير



سهام بنت دحام الحمدان

Appendix 3: Information Sheet (English Version)



Participant Information Sheet

Research Project Title:

The attitudes, experiences, and knowledge of female special education teachers toward the use of assistive technology (AT) in teaching children with special educational needs and disabilities (SEND) in mainstream primary education in Saudi Arabia.

Thank you for considering participating in this research project. Before you decide whether or not to take part, it is important that you understand the aim of this research and what it will include. Please take your time to read the following information carefully. You are welcome to contact me if you have any questions, need further explanation, or want to discuss the research.

Project's purpose

I am a lecturer in the Department of Education at Al Jouf University, and I am currently studying at the University of Sheffield (U.K.) for a PhD in Special Educational Needs and Disabilities. I am investigating the perspectives of special education teachers toward the use of assistive technology in their classrooms. I have chosen this focus because assistive technology is considered an exceptional support tool that can help children with SEND in their learning and significantly impact the educational sphere (Selwyn and Facer 2014).

Why have I been chosen?

I first contacted the head teacher of your school to share this study with any special education teachers who might be interested in participating. This study needs at least six participants to be valid. I contacted head teachers at several schools, and I am looking specifically for special education teachers in primary school.

Do I have to take part?

It is entirely your decision whether or not to participate, and you also have the right to withdraw from the study at any time before I start analysing the data of this research with no explanation or negative impact. Choosing to take part in this study will not have any impact on your job nor is it intended to build a relationship between you and the University of Sheffield. If you agree and would like to take part in the study, you will be asked to sign a consent form and keep this information sheet.

What will happen to me if I take part? What do I have to do?

If you agree to take part you will be asked to participate in three online workshops with me on Google Meet platform. The workshops consist of three themes about your use of assistive technology with children with SEND and will take approximately two hours including time breaks. The purpose of these workshops is to discuss this topic deeply to glean your perspectives, experiences, and knowledge on the topic. No sensitive or private issues will be discussed. The workshops will be audio recorded for analysis purpose and for illustration in the produced thesis. The workshops will be held in Arabic and later translated to English. The workshops will be done by myself and my supervisors to supporting me if possible. There are three total workshops for the same participants. No one other than the primary researcher (Ezdehar Almweisheer) and the supervisory team Dr. Katherine Easton, Dr. Kirsty Liddiard at Sheffield University will be allowed to access the information collected or the workshops recordings without your permission.

What are the possible disadvantages and risks of taking part?

Participation in this study will bring no serious risk or problems, but it can help to increase awareness of the teaching process and improve the academic environments for children with SEND to help them succeed.

What are the possible benefits of taking part?

Whilst there are no direct benefits or advantages of taking part in this study, your participation could help improve the learning environment of children with SEND, and, accordingly, their academic and social development.

Will my taking part in this project be kept confidential?

Your data will be kept anonymous and confidential. You will be referred to in reports using a pseudonym name. No one will be able to access your data except me and the members of my research team at University of Sheffield, Dr. Katherine Easton, Dr. Kirsty Liddiard. Any identifiable information such as your name or any characteristics will not be included in the workshops and my research data. No names or any other information that may identify you will be shared or used without your permission. The University of Sheffield and its Education Department oversee the ethics review process, and this project has been approved by them.

What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

Of course, no real names will be used. Any personal data or general information that collected for the research purpose is important and will be kept, stored, and processed by the researcher securely considering the three main factors 1) confidentiality which means ensuring that only me and my supervisory team Dr. Katherine Easton, Dr. Kirsty Liddiard will access the information; 2) integrity which also ensuring that information is accurate, trustworthy, relate for purpose and no sensitive questions will be included or asked, and 3) availability ensuring that information is available when is needed. Furthermore, using collaborative tools, such as Google Drive and University's network filestore system to manage and keep all information in safe place.

What will happen to the data collected, and the results of the research project?

After the workshops themes and activities are translated from English to Arabic, the participants will be able to join the workshops through Google meet platform, and the workshops will only be audio recorded for subsequent transcription and data analysis. All data collected will be accessible only to the researcher and the research team members as mentioned before. All data will be stored safely on University encrypted computer storage and using Google Drive and destroyed after the research has been completed and approved by the University of Sheffield. Data will be kept for a period of 5 years post the PhD for publication purpose. The results of this research will be used in my PhD thesis and could be published in academic journals. You will not be referred to by name in the reports. You will have a pseudonym assigned to your data. You can learn the results of this study at any time after completed and passed it by sending me an email.

Who is organising and funding the research?

The Saudi Arabian Cultural Bureau in the UK.

Who is the Data Controller?

The University of Sheffield is responsible for this research project and any issues that may be raised regarding this research. As the data controller for this study, the University of Sheffield is responsible for looking after your information and its proper use.

Who has ethically reviewed the project?

This project has been ethically approved by supervisors Dr.Katherine Easton, Dr. Kirsty Liddiard alongside the University of Sheffield Department of Education. The university's Research Ethics Committee oversees the application and implementation of the university's research ethics policy.

What if something goes wrong and I wish to complain about the research or report a concern or incident?

The University of Sheffield policy is intended to provide guidance to ensure the safeguarding and prevent any harm in research and innovation. Also, the university has a duty of care to manage any risks or problems so all participants who will be involved in this research have a right to be treated fairly with respect and report any concerns or issues about this research. If you are dissatisfied with any aspect of the research and wish to make a complaint, please contact Dr Kirsty Liddiard in the first instance. If you feel your complaint has not been handled in a satisfactory way you can contact the Head of the Department Professor Rebecca Lawthom by email: r.lawthom@sheffield.ac.uk and the phone number: +441142228172. If the complaint relates to how your personal data has been handled, you can find information about how to raise a complaint in the University's Privacy Notice: <https://www.sheffield.ac.uk/govern/data-protection/privacy/general>.

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

The three workshops will be only audio recorded. The recording will be transcribed and analysed. No one other than the primary researcher and my supervisory team as mentioned before will have access to the recordings. Your recording will not be used in any other way without your consent. Audio recordings will be securely deleted once transcription is complete.

Thank you for taking part in the project.

If you have any further questions, please feel free to contact me. Thank you very much.

Researcher's Details

Ezdehar Almwasheer

University of Sheffield

ESAImwasheer1@sheffield.ac.uk

Supervisor's Details

Dr. Kirsty Liddiard

K.liddiard@sheffield.ac.uk

Dr. Katherine Easton

K.a.easton@sheffield.ac.uk

University of Sheffield

Appendix 4: Information Sheet (Arabic Version)

اتجاهات ومعتقدات ومعرفة معلمات التربية الخاصة تجاه التكنولوجيا المساعدة في تدريس الطلاب ذوي الاحتياجات الخاصة في المدارس الابتدائية في المملكة العربية السعودية

يسعدني أن أدعوك للمشاركة في هذه الدراسة والتي أجريها كمطلب للحصول على درجة الدكتوراه من جامعة شيفلد بالمملكة المتحدة. قبل أن تقرر المشاركة في هذه الدراسة، من المهم أن تتعرف على فكره وأهداف وآليات هذا البحث. لذلك، فضلاً عن بعض الوقت لقراءة المعلومات التالية ولا تتردد في سؤالني عن أي شيء غير مفهوم أو غير واضح.

وفي الختام، تأكد أن مشاركتك مهمة ومفيدة للغاية لإثراء هذه الدراسة ومحل التقدير وتقبل شكري وتقديري مقدماً.

ما هو الغرض من الدراسة؟

الغرض من هذه الدراسة الووعية الحالية هو استكشاف مجموعة متنوعة من الاتجاهات والخبرات والمعرفة لمعلمات التربية الخاصة تجاه استخدام التكنولوجيا المساعدة في تدريس الأطفال ذوي الاحتياجات الخاصة في المدارس الابتدائية. بالإضافة إلى ذلك، تحاول هذه الدراسة التركيز على أفكار وخبرات المعلمين الشخصية من خلال دورهم في تدريس الأطفال ذوي الاحتياجات الخاصة. سوف تساعد نتائج هذه الدراسة على فهم واقع استخدام التكنولوجيا المساعدة في تدريس الطلاب ذوي الاحتياجات الخاصة وتقديم بعض الأفكار والاقتراحات لتحسين التدريس في المستقبل. ومن المأمول أيضاً أن تقدم هذه النتائج بعض التوصيات والمقترحات للمسؤولين في وزارة التعليم لتحقيق بيئة تعليمية ناجحة لكل من المعلمين والطلاب.

لماذا تم اختيارك؟

في البداية تم التواصل مع مديرات المدارس لتتم مشاركة هذه الدراسة مع معلمات التربية الخاصة خاصة حيث انه كمعلمة تربية خاصة أعتقد أن لديك رؤية وخبرة فريدة من نوعها لإثراء هذه الدراسة. بالإضافة إلى أن الدور الذي يقدمه المعلم هو المفتاح الأساسي لإنجاح أي برامج تعليمية بشكل عام ولبرامج التربية للطلاب ذوي الاحتياجات الخاصة بشكل خاص.

هل يجب على المشاركة؟

المشاركة في هذه الدراسة مشاركة اختيارية بشكل كامل. وبالتالي، لديك كامل الحرية في اختيار المشاركة في هذه الدراسة أو عدم المشاركة. إذا وافقت على المشاركة في هذه الدراسة، سوف يتم تقديم ورقة معلومات هذه وحفظها (الورقة الحالية) لك مع نموذج الموافقة للتوقيع عليه كجزء من لائحة الجامعة. نموذج الموافقة الموقعة هو إثبات مشاركتك التطوعية في هذه الدراسة. ومع ذلك، لك مطلق الحرية في الانسحاب في أي وقت ولأي سبب من هذه الدراسة دون تقديم أسباب أو مبررات وذلك قبل البدء في مرحلة تحليل البيانات. كما أن مشاركتك في هذه الدراسة لا يترتب عليه أي تأثير سلبي على وظيفتك كما انه لا يترتب عليه بدء أي علاقة مع جامعة شيفلد.

ماذا سيحدث لك إذا شاركت؟

بعد أن تمنح إذنك بالمشاركة، سوف نقوم بإجراء ثلاث ورش عمل والتي ستقام اونلاين عبر برنامج هوفل ميث للمناقشة عن استخدام التكنولوجيا المساعدة في تدريس الأطفال ذوي الاحتياجات الخاصة مع بعض الأنشطة التي تتعلق بموضوع الدراسة لمعرفة تصوراتك وخبراتك وأفكارك واحتياجاتك واقتراحاتك حول استخدام التكنولوجيا المساعدة في تدريس الطلاب ذوي الاحتياجات الخاصة في المملكة العربية السعودية. سوف يتم تركيز النقاش على موضوع الدراسة بما يقارب ساعتين لكل ورشة مع التسجيل الصوتي للورشة. ليس لحد الحق في الحصول على المعلومات ولا التسجيل باستثنائي إذا كباحثة وفريق الاشراف في جامعة شيفلد الدكتوراه كاترين والدكتوراه كريستي

ما هي الآثار والمخاطر المحتملة للمشاركة في هذه الدراسة؟

لا ينبغي أن يؤدي مشاركتك في هذه الدراسة إلى أي مخاطر أو آثار سلبية محتملة ولكنها فرصة لرفع الوعي وتطوير البيئة التعليمية للطلاب ذوي الاحتياجات الخاصة. ومع ذلك، إذا حدث شيء عن طريق الخطأ أثناء الدراسة، يرجى إبلاغي على الفور.

ما هو المقابل أو الفائدة المرجوة من المشاركة في هذه الدراسة؟

لا يوجد أي فوائد مادية أو مادية للمشاركة في هذه الدراسة ولكن كما ذكرنا سابقاً من المأمول أن توفر هذه الدراسة بعض الأفكار والاستراتيجيات المفيدة والتي قد تساعد علي تحسين وتطوير البيئة العملية التعليمية للطلاب ذوي الاحتياجات الخاصة ومعلميهم.

هل ستبقى مشاركتي في هذا المشروع سرية؟

المعلومات التي سوف يتم جمعها واسماء المشاركين في هذه الدراسة لن يتم الكشف عنها تحت أي ظرف من الظروف وسيتم استخدام أسماء مستعارة ولن يشار لأي بيانات أو أسماء من المحتمل ان تكشف عنك إضافة الى ذلك فان جميع البيانات والمعلومات سيتم حفظها في مكان آمن (حساب الباحث الإلكتروني بجامعة شيفيلد) وليس لأحد الاطلاع عليها سواي والمشرفين علي البحث كلا من الدكتور كاترين والدكتور كريستي.

ماذا سيحدث للبيانات التي تم جمعها وكذلك لنتائج هذا المشروع البحثي؟

جميع البيانات سيتم حفظها في مكان آمن في فويل درايف على حساب الجامعة ولن يتمكن أحد من الاطلاع عليها سوى الباحث والمشرفين كما ذكر سابقاً. سيتم استخدام نتائج هذه الدراسة في أطروحة الدكتوراه الخاصة بي، وستكون متاحة في مكتبة جامعة شيفيلد كرسالة إلكترونية عند اكتمالها. في المستقبل، يمكن استخدام بعض من أجزاء هذه الدراسة أو مشاركتها لغرض النشر العلمي في مراجعات أكاديمية أو منشورات بحثية أو مؤتمرات مهنية وعلمية من غير الإفصاح عن الاسماء أو المعلومات الخاصة بالمشاركين في هذه الدراسة.

من يقوم بتنظيم وتمويل هذه الدراسة؟

هذه الدراسة جزء من منحة الدكتوراه التي تمنحها جامعة الجوف بالملكة العربية السعودية للباحث.

من يقوم بالإشراف أخلاقياً على هذه الدراسة؟

تمت مراجعة هذه الدراسة من الناحية الأخلاقية وفقاً لأنظمة ولوائح أخلاقيات البحث العلمي بجامعة شيفيلد، المملكة المتحدة وتمت الموافقة عليها.

ماذا لو حدث خطأ ما وأرغب في الإبلاغ عن مشكلة؟

إذا لم تكن راضياً عن أي شيء متعلق بهذه الدراسة يمكن مناقشة تلك المشاكل مع المشراف الخاص بي الدكتور كريستي على البريد الإلكتروني: k.liddiard@sheffield.ac.uk

إذا لم يتم التجاوب معك وكنت لاتزال غير راضى، يمكنك التواصل مع الدكتور ريبكاكا على الإيميل: r.lawthorn@sheffield.ac.uk أو رقم الهاتف +441142228172

هل سيتم تسجيلي وكيف سيتم استخدام الوسائط المسجلة؟

جميع ورش العمل الثلاثة سيتم تسجيلها صوتياً لغرض الدراسة وسيتم طباعة نسخة التسجيل لاستخدامها لغرض التحليل للبيانات ولا يمكن لأحد الوصول الى التسجيل عبري وفريق الاشراف على الدكتوراه. لن يتم استخدام التسجيل لأي أغراض أخرى دون الحصول على موافقتك. سيتم حذفها لاحقاً بعد الانتهاء منها كلياً.

لمزيد من المعلومات

يرجى التواصل مع الباحث وكذلك المشرفات الأكاديميات الخاصة بي الدكتورة كاترين والدكتورة كريستي على البريد الإلكتروني

ESAlmwaisheer1@sheffield.ac.uk الباحثة ازدهار المويشير

k.a.easton@sheffield.ac.uk الدكتورة كاترين

K.liddiard@Sheffield.ac.uk الدكتورة كريستي

وتقبلوا فائق شكري وتقديري على مشاركتك في هذه الدراسة وأتمنى لكم التوفيق

Appendix 5: Consent form (English Version)



Participant Consent Form Special education teachers' perceptions toward the use of assistive technology with children with SEND

Consent Form

<i>Please tick the appropriate boxes</i>	Yes	No
Taking Part in the Project		
I have read and understood the project information sheet dated 28 / 02 /2022, the project has been fully explained to me. (If you will answer No to this question, please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.)	☐	☐
I have been given the opportunity to ask questions about the project.	☐	☐
I agree to take part in the project. I understand that taking part in the project will include being only audio recorded		
I agree to take part in the project. I understand that taking part in the project will include being participate in the online workshops.		
I understand that by choosing to participate as a volunteer in this research, this does not create a legally binding agreement nor is it intended to create an employment relationship with the University of Sheffield.	☐	☐
I understand that my taking part is voluntary and that I can withdraw from the study at any time/before the researcher start analyzing data/...../..... ; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.	☐	☐
How my information will be used during and after the project		
I understand my personal details such as name, phone number, address and email address etc. will not be revealed to people outside the project.	☐	☐
I understand and agree that my words may be quoted in publications, reports, web pages, and other research outputs. I understand that I will not be named in these outputs unless I specifically request this.	☐	☐
So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.	☐	☐

Name of participant [printed] Signature Date

Name of Researcher [printed] Signature Date

Project contact details for further information:

Researcher: Ezdehar Almwasheer. Email: ESAlmwasheer1@sheffield.ac.uk

Supervisors: Dr.Kirsty Liddiard. Email: K.liddiard@sheffield.ac.uk

Dr. Katherine Easton. Email: K.a.easton@sheffield.ac.uk

Save 2 copies of the consent form: 1 paper copy for the participant, 1 copy for the research data file

Appendix 6: Consent form (Arabic Version)

اتجاهات ومعتقدات وتجارب معلمات التربية الخاصة تجاه استخدام التكنولوجيا المساعدة في تدريس الطلاب ذوي الاحتياجات الخاصة في المدارس الابتدائية في المملكة العربية السعودية (نموذج موافقة مشارك)

لا	نعم	يرجى وضع علامة في الخانة المناسبة
		المشاركة في هذا البحث
		لقد قرأت وفهمت ورقة معلومات المشروع بتاريخ / / أو تم شرح المشروع بالكامل لي. إذا كانت إجابتك "لا" على هذا السؤال، فيرجى عدم المتابعة مع نموذج الموافقة هذا حتى تكون مدركاً تماماً لما تعنيه مشاركتك في المشروع
		لقد أُهِنحت الفرصة لطرح الاسئلة حول البحث.
		أوافق على المشاركة في المشروع، وأدرك ان صوتي والمعلومات التي سوف أورها سيتم تسجيلها بشكل صوتي.
		أدرك أن المشاركة في المشروع ستشمل على اجراء ثلاثة ورشة عمل وستقام اونلاين
		أفهم أن مشاركتي اختيارية وأن مشاركتي في هذا المشروع لا يعني انشاء علاقة عمل مع جامعة شيفلد.
		أفهم أن مشاركتي اختيارية وأني أستطيع الانسحاب من الدراسة في أي وقت قبل بدء الباحث بعملية تحليل البيانات وانه لا يتعين علي تقديم أي أسباب لعدم رغبتي في المشاركة ولن تكون هناك عواقب سلبية إذا اخترت الانسحاب.
		كيف سيتم استخدام معلوماتي أثناء وبعد المشروع
		أدرك أن بياناتي الشخصية مثل الاسم ورقم الهاتف والعنوان وعنوان البريد الإلكتروني وما إلى ذلك لن يتم الكشف عنها للأشخاص خارج المشروع.
		أفهم وأوافق على أنه قد يتم اقتباس كلماتي في المنشورات والتقارير وصفحات الويب وغيرها من مخرجات البحث. أدرك أنه لن يتم ذكر اسمي في هذه المخرجات ما لم أطلب ذلك على وجه التحديد.
		لكي يمكن استخدام المعلومات التي تقدمها بشكل قانوني من قبل الباحثين.
		أوافق على تعيين حقوق الطبع والنشر التي أمتلكها في أي مواد تم إنشاؤها كجزء من هذا المشروع إلى جامعة شيفلد.

التوقيع:

التوقيع:

المشارك:

التاريخ:

التوقيع:

الباحث: أزدهار سليمان المويشر

لمزيد من المعلومات أو الاستفسارات يمكنك الاتصال بي على: ESAlmwaisheer1@sheffield.ac.uk

كما يمكنك التواصل مع المشرقة الأكاديمية الخاصة بي على

Dr.Kirsty Liddiard K.liddiard@sheffield.ac.uk

Dr. Katherine Easton K.a.easton@sheffield.ac.uk

Appendix 7: Workshop Agenda

Workshop Agenda

Workshop (2)

Location: Google Meet

Workshop Time: 2 hours 8:30 – 10:30 pm

Date: 26 September 2022

Themes: The teachers' opinions and perspectives on the challenges and benefits that have arisen from the use of online AT during and after the pandemic.

Mon, Sep 26, 2022 – Google Meet

8:30 – 8:40pm The emotions wheel icebreaker activity by sharing the [\(Jamboard link\)](#)

8:40 – 9:15pm breakout rooms to discuss teachers' opinions and perspectives on the challenges and benefits of online AT during and after the pandemic.

9:15– 9:45pm Sharing together what have been discussed in the breakout rooms.

9:45– 10:00 pm Break

10:00 – 10:15pm A map in the day life activity.

10:15 – 10:30pm Sharing a day in the life activity and thanks everyone with ending the meeting.

Appendix 8: Character profile image worksheet

Hobbies/interests الهوايات/الاهتمامات	Things related to teaching أشياء تتعلق بالتدريس	 Name/Age الاسم/العمر
Years of teaching experience عدد سنوات الخبرة		
Character traits السمات الشخصية		

Appendix 9: challenges and benefits of AT (English Version)

Workshop Two

Some questions to guide the discussion in the Breakout rooms.

Breakout room (Challenges)

Please ask and answer the following:

1. Can you please tell me about the challenges you have encountered in your teaching and use of online AT during and after the pandemic with students with SEND?
- 2) What steps did you take to deal with these challenges?

Breakout room (benefits)

Please ask and answer the following:

1. Can you please tell me about the benefits you have found in your teaching and using online AT during and after the pandemic with students with SEND?
- 2) What are the most effective and helpful tools that you have used in teaching students with SEND?
- 3) How would you rate your success of using online AT?
- 4) Do you have any training hours provided regarding AT courses taken regarding AT?

Appendix 10: challenges and benefits of AT (Arabic Version)

(الصعوبات والتحديات) الغرفة الافتراضية

اسألني وأجيبني:

هل بإمكانك التحدث عن الصعوبات التي واجهتها في التدريس واستخدام التكنولوجيا عن بعد خلال وبعد الجائحة مع طلاب التربية الخاصة؟

ماهي الخطوات التي اتبعتها للتعامل مع هذه الصعوبات (خلال وبعد الجائحة؟

هل تم التعامل مع هذه الصعوبات بطرق مختلفة إدكري امثلة؟

(المميزات والفوائد) الغرفة الافتراضية

اسألني وأجيبني:

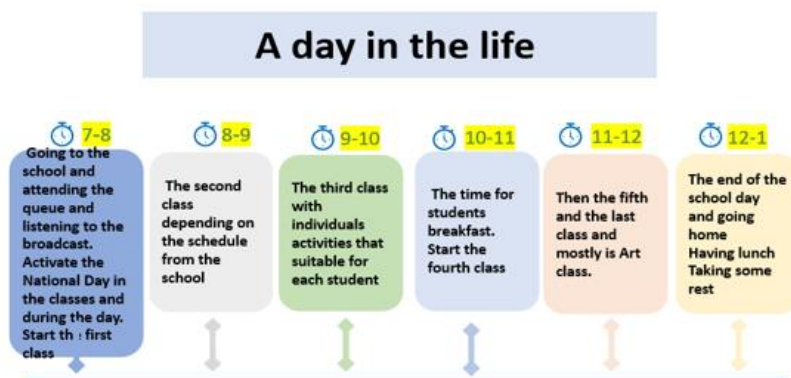
هل بإمكانك التحدث من فضلك عن الفوائد والمميزات التي وجدتها من التدريس واستخدام التكنولوجيا عن بعد خلال وبعد الجائحة مع طلاب التربية الخاصة؟

ماهي أغلب الأدوات والوسائل فاعلية وفائدة التي استخدمتها كمعلمة في تدريس طلاب التربية الخاصة؟

كيف تقيم أو تقدر نجاحك في استخدام التكنولوجيا المساعدة عن بعد؟

هل لديك أي تدريب أو كورسات سابقة تم الحصول عليها فيما يخص التكنولوجيا المساعدة؟

Appendix 11: A Day in the Life Worksheet (Arabic and English Version)



Appendix 12: A missing sentence Activity (Example)

أفكار المعلمين حول أفضل السبل لدعم الطلاب ذوي الاحتياجات الخاصة *

: للمضى قدما نحو الامام

أتمنى اننا نمتلك فصول مجهزة بأدوات حديثة كالسبورة الذكية والبروجكتر ، كذلك (ميزانية حقيقية) لتوفير الوسائل داخل الفصول الدراسية .

انا اكره الاتجاهات السلبية نحو طلاب التربية الخاصة سواء من مدراء المدارس او المعلمين او الطلاب .

تعديل المقاييس التابعة للخطط الفردية بما يتواءم مع كل مرحلة ودرجة إعاقة

اذا فقط بإمكانى ان اعمل شيئا فانا اتمنى أن يكون هناك (بيئة آمنة) مزودة بالألعاب للترفيه عن الطلاب وتفرغ طاقاتهم خاصة فتي الفكرى والنوحد

القضاء ملف التحضير الجماعى والاكفاء بالخطوة الفردية ، أو جعله اسبوعى كنظام وحدات من باب عدم هدر الوقت فى الكتابة والتركيز على العطاء للطلاب

Appendix 13: Coding Example

Coding and Themes of workshop

Title: The teachers' opinions and perspectives on the challenges and benefits that have arisen from the use of online AT during and after the pandemic.

Theme: Benefits of using online AT during and after the pandemic

Maha	Amal	Sarah	Wejdan	Afnan	Majd	
During the pandemic, our knowledge of how to use technology in teaching increased. This motivating both students and teachers to discover new things when using technology, even though this	Although there were some challenges during the pandemic, we were able to deal with them and continue the process of learning and teaching through the Madrasati platform and different programs. By using technology, we saved time and effort, found	During the pandemic, I was able to use technology in different ways, such as PowerPoint slides, videos, YouTube, and audio files. Technology facilitates new digital learning strategies, allows for different learning styles, and saves time and effort. After the pandemic,	During the pandemic, I could rely on technology to improve the learning process for students with SEND by using different programs, platforms, resources, and strategies. Using technology saved time and effort and enabled us to find information easily and	Technology eased the process of learning and teaching, and a variety of resources and strategies were accessible through technology. As it saves time and effort, the teaching becomes more enjoyable, accessible, and effective. Since the pandemic, I have realized that students	Using technology can save time and effort. Through technology, information and concepts can be delivered easily and quickly by using multiple resources and strategies. Technology helps teachers to display videos,	*Technology motivating both teachers and students to discover new things *Technology facilitates new learning strategies, multiple resources and new assessment *Technology saves time and effort and delivered information

was difficult in the beginning. It was a fun and enjoyable time of using technology. Now, teachers can use different resources and strategies in teaching. After the pandemic, my skills had developed and I could continue to use technology to teach students with SEND. I realized that using technology saves time and effort and allows	information fast and easily, and developed interaction and enthusiasm in the students due to the new things they discovered and learned. Especially after the pandemic, technology made communication and information sharing easier and helped demonstrate the students' learning improvement.	technology made teaching more enjoyable and accessible, and communication between teachers and students' families became easier. Also, as the lessons are once again face-to-face, I can better notice students' improvement.	quickly. Communication was made easier by using different apps and platforms. Even though it was all difficult at the beginning, overall technology has facilitated new digital learning strategies for students with SEND. Since the pandemic, technology has made teaching more enjoyable and accessible, especially for students with SEND, and helps students to improve and learn new skills.	can focus more and interact with me better when I use technology in the classroom. Technology offers different ways of communicating and can help students to improve and learn new skills.	PowerPoint slides, and other media. After the pandemic, I realized the necessity of continuing to use technology in the classrooms due to its effectiveness and benefits less consumption of paper, and a new approach to learning and assessment. Students learn and focus more if there is any type of technology that can be used during the lesson, so technology makes learning and teaching more enjoyable.	easily and quickly *Teaching with technology fun, useful and more accessible *Communication with technology become easier *Technology improved students' learning