

TEACHERS' PERCEPTIONS OF USING INFORMATION AND COMMUNICATION TECHNOLOGIES WITH STUDENTS WITH INTELLECTUAL DISABILITIES IN BOYS' PRIMARY MAINSTREAM SCHOOLS IN THE KINGDOM OF SAUDI ARABIA

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ABSTRACT

The study's objective was to obtain awareness of the present situation in the Kingdom of Saudi Arabia (KSA) concerning the use of Information and Communications Technology (ICT) in the education of students with intellectual disabilities through the insights of special education teachers working in mainstream boys' primary schools in Jeddah, Saudi Arabia. Insights were obtained from the teachers utilising an exploratory sequential mixed-methods research design comprising of semi-structured interviews (fifteen teachers) and a custom questionnaire (100 teachers). Methods of data analysis utilised by the study were thematic (interview data) and statistical (quantitative data).

The study found that special education teachers were constrained by a lack of continuous training and the non-availability of suitable ICT resources, such as up-to-date resources and educational tools in Arabic. Moreover, ICT tools in the KSA are high-priced and funding provision lacks adequate planning and utilisation.

The study's findings contribute to awareness of the current status of ICT use with students with intellectual disabilities in the KSA. Recommendations are offered to the Saudi Ministry of Education and to teachers working with students with intellectual disabilities. Suggestions for future research are also discussed.

Keywords: Inclusion, ICT use, students with intellectual disabilities, special education teachers, mainstream school environments, Saudi Arabia

DEDICATION

I dedicate this work to

My father Ali and My mother Fatimah

My beloved wife Rawabi

My sons Ali and Mohammed

For their unfailing love, prayers, and support throughout the entire doctorate program

May God bless you all

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I begin with the name of Allah, who is the most merciful and the most beneficent.

The almighty God (Allah) has been kind enough in guiding me to accomplish the present study. I express my heartfelt gratitude to all those people who have helped in the attainment of my study objectives. I wish to thank my first supervisor Professor Julie Allan and my second supervisor Neil Hall for their persistent guidance and encouragement in my research. I was able to complete my thesis since my supervisors spent valuable time in advising me on the basis of their vast experience. I also take this opportunity to thank my dear parents, who always prayed for my well-being and supported me in all of my endeavours. I would appreciate the unconditional support rendered by my wife, who had the patience to inspire and encourage me, especially during intriguing periods. I would also like to express my sincere gratitude to my friends who helped me in different ways.

TABLE OF CONTENTS

ABSTRACT ii
DEDICATION iii
ACKNOWLEDGMENTS iv
CHAPTER 1: INTRODUCTION 1
1.1 Setting the research context 1
1.1.1 Researcher's Position Statement 1
1.1.2 Background of the study 3
1.2 Overview of the Kingdom of Saudi Arabia 6
1.2.1 Culture and religion of Saudi Arabia 7
1.2.2 The Saudi view of disability 8
1.2.3 Disability policy in the KSA 9
1.3 Research problem statement 16
1.4 Research significance 17
1.5 Research aims 18
1.6 Research objectives 19
1.7 Research questions 19
1.8 Research structure 20
1.9 Summary 21
CHAPTER 2: LITERATURE REVIEW 22
2.1 Introduction 22
2.2 Search strategy 23
2.3 The concept of inclusive education 24
2.3.1 Inclusion, integration and mainstreaming 26
2.3.2 The Concept of Special Educational Needs (SEN) 31
2.4 Understanding Disability 32
2.4.1 Definitions of disability 34
2.4.2 Models of disability 36
2.4.3 The Saudi view of disability 46
2.5 Disability Labels 48
2.6 Attitudes Towards Persons With Disabilities 53
2.6.1 Teachers' Attitudes to the Inclusion of Students with SEN 56

2.6.2 Teachers' Attitudes to Including Children with Intellectual Disabilities 60
2.6.3 Attitudes of Teachers to inclusion in Saudi Arabia 61
2.6.4 Factors Affecting Teachers' Attitudes to Inclusion 65
2.7 Defining intellectual disability 66
2.8 Characteristics of intellectual disability 71
2.9 Information and Communications Technologies (ICT) 72
2.9.1 Evolution of the use of computer-based technologies in education 74
2.9.2 Use of ICTs with students with special needs 78
2.9.2.1 Use of ICTs with persons with intellectual disabilities 83
2.9.2.2 Studies related to the use of ICTs with persons with intellectual disabilities 84
2.9.3 ICT as a curriculum resource 87
2.9.3.1 Learning outcomes 88
2.9.3.2 Teaching outcomes 94
2.9.4 ICT tools 96
2.10 ICT in the Saudi educational system 100
2.10.1 The educational system in the KSA 102
2.10.2 Special education in the KSA 103
2.10.2.1 Historical background 103
2.10.2.2 Mainstreaming in the KSA 110
2.10.3 The objectives of introducing ICT into the educational system in the KSA 114
2.10.4 Studies related to ICT in the Saudi educational system 117
2.11 Teachers' use of ICT in teaching students with special needs 119
2.11.1 Qualifications of teachers in the KSA 122
2.11.2 Teachers' perceptions towards ICT usage in teaching 123
2.11.3 Advantages and disadvantages of the use of ICT in teaching students with special needs 129
2.11.4 Barriers to ICT usage in teaching students with special needs 132
2.11.5 Supporting factors, incentives, and motivators for ICT usage in teaching students with special needs 141
2.12 Research gap (theoretical rationale for the study) 148
2.13 Summary 152
CHAPTER 3: RESEARCH METHODOLOGY 154
3.1 Research philosophy for the study: pragmatic paradigm 154
3.2 Research design – A mixed-methods sequential exploratory study 157
3.3 Mixed methods implementation in the study 162
3.3.1 Phase 1: Qualitative study 163

3.3.1.1 Interviews 164
3.3.1.2 Pilot interviews 168
3.3.1.3 Interview sampling 169
3.3.1.4 Analysis of qualitative data - thematic analysis 172
3.3.2 Phase 2: Quantitative study 176
3.3.2.1 Purpose and rationale 176
3.3.2.2 Instrument Design 178
3.3.2.3 Questionnaire Content 179
3.3.2.4 Piloting the Questionnaire 181
3.3.2.5 Sampling for the Questionnaire 182
3.3.2.6 Analysis of quantitative data - statistical analysis 182
3.4 Ethical issues 184
3.5 Validity and reliability 186
3.6 Summary 188
CHAPTER 4: PRESENTATION OF FINDINGS 189
4.1 Introduction 189
Part 1: Qualitative Findings 189
Research Q1: What are the perceptions of Saudi teachers with regard to the use of ICT for students with intellectual disabilities? 193
Research Q2: What are the perceptions of Saudi teachers with regard to the main barriers encountered by special education teachers in using ICT for students with intellectual disabilities? 201
Research Q3: What are perceptions of Saudi teachers with regard to the main factors that contribute to the utilisation of ICT for students with intellectual disabilities in the KSA? 218
Reliability and Validity of the qualitative findings 232
Summary of the Qualitative Findings 233
Part 2: Quantitative findings 236
Demographic information of respondents 236
Respondents' perceptions of using ICT for students with Intellectual Disabilities 245
Barriers in implementing ICT tools and devices for students with Intellectual Disabilities 259
Development of ICT utilisation in schools 288
Reliability Analysis 303
Correlation between determinants of ICT utilisation 306
Summary of Quantitative Results 310
CHAPTER 5: DISCUSSION 312

5.1 Phase 1 – Discussion of Qualitative Results 312
5.1.1 Teachers' perceptions in using ICT for students with Intellectual Disabilities 312
5.1.1.1 Theme 1: Perceptions of ICT Concept 313
5.1.1.2 Theme 2: Advantages of using ICT 314
5.1.1.3 Theme 3: Disadvantages of using ICT 315
5.1.2 Main barriers facing teachers in using ICT for students with Intellectual Disabilities 318
5.1.2.1 Theme 1: Work environment 319
5.1.2.2 Theme 2: Teacher-related issues 323
5.1.2.3 Theme 3: Financial Issues 326
5.1.3 Main factors contributing to developing the usage of ICT for students with Intellectual Disabilities 328
5.1.3.1 Theme 1: Facilitating ICT use by teachers 328
5.1.3.2 Theme 2: Facilitating ICT use in schools 330
5.2 Phase 2 – Discussion of Quantitative Results 332
5.2.1 Teachers' Background Data 333
5.2.1.1 Respondents' Age 333
5.2.1.2 Respondents' Educational Qualification 334
5.2.1.3 Respondents' Work Experience with students with intellectual disabilities 334
5.2.1.4 Experience with ICT utilisation 334
5.2.1.5 Training courses for effective integration of ICT in teaching 334
5.2.1.6 Recognition of the importance of ICT by the IEP teams in schools 335
5.2.1.7 Use of ICT tools with students with intellectual disabilities 335
5.2.1.8 Access to ICT tools for students with intellectual disabilities 336
5.2.2 Teacher's perceptions of using ICT for students with Intellectual Disabilities 336
5.2.3 Barriers in implementing ICT tools and devices for students with Intellectual Disabilities 340
5.2.3.1 Barriers in the work environment 340
5.2.3.2 Teacher-related barriers 342
5.2.3.3 Financial barriers 344
5.2.4 Development of ICT utilisation in schools 344
5.2.4.1 Teacher Perspective 345
5.2.4.2 School Perspective 346
5.2.5 Correlation studies 347
5.3 Summary 348
CHAPTER 6: SUMMARY AND CONCLUSIONS 350

6.1 Summary of the Research 350
6.2 Researcher's Personal Reflections on the study 351
6.3 Contributions of the study 353
6.4 Recommendations 354
6.4.1 Recommendations directed to the Ministry of Education (policy) 355
6.4.2 Recommendations for teachers 357
6.5 Strengths of the study 358
6.6 Limitations of the study 359
6.7 Suggestions for Further Research 361
6.8 Concluding remarks 361
APPENDIX A 363
APPENDIX B 367
APPENDIX C 408
APPENDIX D 415
APPENDIX E 416
APPENDIX F 418
APPENDIX G 419
APPENDIX H 420
BIBLIOGRAPHY 441

LIST OF FIGURES

Figure 2.1:Factors affecting the ICT use of students and their school performance (Source: Biagi & Loi (2013)) 93
Figure 3.1: Mixed-methods sequential exploratory model (Adapted from Creswell & Plano Clark, 2007)..... 162
Figure 4.1: Age of the respondents 238
Figure 4.2: Educational qualification of the respondents..... 239
Figure 4.3: Years of experience with students with intellectual disabilities..... 240
Figure 4.4: Years of experience with ICT utilisation..... 241
Figure 4.5: Availability of training courses for effective integration of ICT in teaching..... 242
Figure 4.6: Importance of ICT recognised by the IEP team in school..... 243
Figure 4.7: Use of ICT tools with students with intellectual disabilities 244
Figure 4.8: Access to ICT tools for students with intellectual disabilities..... 244

LIST OF TABLES

Table 2.1: Arguments and Counter-Arguments for the use of labels in special education..... 52

Table 2.2: Summary of research findings on the advantages of using ICT in education (Source: Ministry of Education, Saudi Arabia, 2013)..... 94

Table 2.3: Distribution of male and female students in special education and mainstreaming in the school years 1991, 2013 (Source: MoE, Saudi Arabia, 2013)..... 108

Table 2.4: Special education, mainstreaming and students in different categories 2014/15 (Source: Battal, 2016)..... 113

Table 3.1: Interviewee details..... 171

Table 4.1: Teachers' Profiles..... 190

Table 4.2: Themes and Sub-themes..... 192

Table 4.3: Age of the respondents..... 237

Table 4.4: Educational qualification of the respondents..... 238

Table 4.5: Years of experience with students with intellectual disabilities..... 239

Table 4.6: Years of experience with ICT utilisation..... 241

Table 4.7: Perceptions of the concept of ICT..... 245

Table 4.8: Cross-tabulation between experience of teachers with ICT utilisation and perceived concept of ICT..... 248

Table 4.9: Perceptions of the advantages of using ICT..... 250

Table 4.10: Cross-tabulation between experience of teachers with ICT utilisation and perceived advantages of ICT..... 254

Table 4.11: Perceptions of the disadvantages of using ICT..... 255

Table 4.12: Cross-tabulation between experience of teachers with ICT utilisation and perceived disadvantages of ICT..... 258

Table 4.13: Barriers encountered in the work environment..... 260

Table 4.14: Cross-tabulation between barriers encountered in the work environment by teachers and their work experience..... 262

Table 4.15: Barriers related to ICT equipment..... 263

Table 4.16: Cross-tabulation between unavailability of ICT equipment in schools and work experience of teachers..... 265

Table 4.17: Lack of technical support for the ICT equipment..... 267

Table 4.18: Cross-tabulation between work experience of teachers and technical support offered to them..... 269

Table 4.19: Barriers related to training needs of teachers..... 270

Table 4.20: Cross-tabulation between work experience of teachers and their training needs 272

Table 4.21: Unwillingness of teachers to adopt ICT techniques..... 274

Table 4.22: Cross-tabulation between work experience of teachers and their unwillingness to adopt ICT techniques..... 277

Table 4.23: Non-availability of educational software in Arabic 278
Table 4.24: Cross-tabulation between software unavailability and teachers' work experience 280
Table 4.25: Insufficient external funds for ICT implementation in schools 282
Table 4.26: Cross-tabulation between insufficient external funds and work experience of teachers 283
Table 4.27: Insufficient school budget as a barrier for ICT implementation 285
Table 4.28: Cross-tabulation between insufficient school budget and work experience of teachers 287
Table 4.29: Perspective of teachers on ICT practices 288
Table 4.30: Providing continuous training for teachers 290
Table 4.31: Providing ICT devices for each teacher 292
Table 4.32: Need for including ICT in preparation programmes for teachers 294
Table 4.33: Need for educational resources 296
Table 4.34: Need for Internet access 297
Table 4.35: Financial support to schools for ICT integration 299
Table 4.36: Incorporation of ICT in the school curriculum 300
Table 4.37: Reliability test for teachers' perceptions of using ICT for students with Intellectual Disabilities 304
Table 4.38: Reliability test for barriers encountered by teachers in using ICT 304
Table 4.39: Reliability test for factors contributing to the development of ICT utilisation 305
Table 4.40: Pearson's correlation of barriers encountered by teachers in using ICT 307
Table 4.41: Pearson's correlation of factors contributing to the development of ICT integration 309
Table 6.1: Findings and Corresponding Recommendations 357

CHAPTER 1: INTRODUCTION

The aim of the present study is to scrutinise the utilisation of ICT in the field of special education and to examine the perceptions of teachers towards the use of ICT in the education of students with intellectual disabilities in mainstream boys' primary schools in the KSA. The purpose is to facilitate awareness about the present use of ICT in the education of students with intellectual disabilities in the KSA.

The purpose of this chapter is to present background information concerning the current study, the setting of the study, problem statement, significance, aims and objectives of the study, and the associated research questions.

I first set the context of the research.

1.1 Setting the research context

This section sets the research context by first describing the researcher's positionality and motivation for the study and then describing the background of the study.

1.1.1 Researcher's Position Statement

I briefly describe my personal background in this section, before proceeding to explain how I envisage the use of ICT for students with intellectual disabilities in inclusive settings in a Saudi context. Certainly, it is necessary for me to reveal my notions, opinions, prejudices, and beliefs in as transparent as manner as possible to enable readers to obtain an understanding of my personal position in this study. Moreover, this section acts as a point of departure for reflexivity in examining how my own opinions, standards, and viewpoints might direct the overall process of research (Mauthner & Doucet, 2003).

My PhD journey began in 2005 when I was in the second semester of my Bachelor of Arts (BA) programme in the KSA. I was required to perform practicum teaching for a semester prior to my graduation and was directed to teach in a private institute which provides special education for children with intellectual disabilities.

During this time, and later, I began to wonder why students with intellectual disabilities were relegated or separated to special education institutions and why conventional approaches to teaching were used with them when several of them, specifically the ones with mild intellectual disabilities, could be in more inclusive settings, benefiting from the various interventions and educational advancements available in the present day. Also, I was seeing the increased use of ICT tools and resources in Saudi society and among the children in my own family circles and realised that schools were now using these in an educational capacity. My exposure to students with intellectual disabilities led me to speculate on how ICT was used with these students and I began to explore this notion, scrutinising accounts of teachers' outlooks and perspectives regarding the use of ICT with students with intellectual disabilities in mainstream schools.

Due to my exposure to the educational environment in my country, I was aware that the number of private institutions and government-funded centres for students with SEN, in general, and with intellectual disabilities, in particular, has dramatically grown over the past decade and are widespread in the main cities in the KSA. Consequently, I started deliberating: Why is the full extent of educational services not available to students with intellectual disabilities? What if the government enforced the use of ICT in the education of children with intellectual disabilities in mainstream schools? What would be the resulting attitudes of teachers towards such an action? Are the teachers adequately equipped and trained to use ICT

resources with students with intellectual disabilities? Are the schools adequately equipped with sufficient ICT infrastructure and maintenance support? Has the Ministry of Education made sufficient provision to support ICT use in mainstream schools with students with intellectual disabilities?

I realised that I was in the fortunate position of not being separated from the societal processes of the study. Having subsequently worked as a special education teacher in Jeddah, Saudi Arabia which was the site of the study I had close encounters with students with intellectual disabilities in my country. Also, my positive experiences with inclusion, in addition to my experience in special education, increased my desire to engage in research on the matter under consideration, that is, the use of ICT in the context of students with intellectual disabilities in the KSA. Therefore, my positionality shaped this study and the research questions.

1.1.2 Background of the study

From being a method that merely facilitated long-distance communication, information and communication technology (ICT) may nowadays be regarded to be an indispensable element of society. ICT has progressively infiltrated aspects of everyday existence and this can only be assumed to continue as technology flourishes and innovative applications make their appearance. Therefore, it is not surprising that the use of ICT for and in education is a matter of significant concern for education authorities and considerable efforts are taken to ensure the presence of the requisite knowledge and skills to adapt to emergent developments in ICT (Noor-Ul-Amin, 2013; Tatto, 2006). ICTs for education signify "the development of information and communications technology specifically for teaching/learning purposes,"

whereas ICTs in education entail "the adoption of general components of information and communication technologies in the teaching learning process" (Noor-Ul-Amin, 2013, p. 39).

Nowadays, ICT is expected to be included in education strategies to equip persons to pursue jobs in the workforce and contribute to the global economy after leaving school. Accordingly, the curricula should include ICT applications, such as computer-based programs, to benefit from this technology (Semenov, 2005). In the KSA, ICT use in education is facilitated by the Ministry of Education who endeavour to "develop the infrastructure of information and communication technology and its employment in education and learning" (Ministry of Education, 2005, p. 16).

According to Cox et al. (Cox, Webb, Abbott, Blakeley, Beauchamp & Rhodes, 2003), the openness of teachers to the usage of computers in the preparation and delivery of teaching can range from using them in small ways, to more elemental changes. The potential of adopting information and communications technology (ICT) in school education may not be realised by teachers who are either slow or reluctant to adapt to changing circumstances. The reluctance in adopting changes in the education system can be attributed to the uncertain and obscure administrative guidelines and procedures on ICT, formulated by the government. Lack of adequate training, reliable support and supervision in the attainment of the targeted outcomes render the objectives and policies to be inefficient, as depicted in the UK's ICT programmes. According to Blamire and Balanskat (2005), computers are generally regarded as learning tools with no emphasis being placed on their utilisation for the attainment of the required objectives. The advantages of using ICT must be appreciated by teachers, who may otherwise express their dissent in the utilisation of computers in education (Al-Obaid, 2002). Additionally, adequate training will help teachers in overcoming their unwillingness to use computers in a classroom environment (Jones, 2004).

The use of ICT for and in education has been extended in recent times to include students with special educational needs (SEN). Several studies over the past three decades have demonstrated that a significant part can be played by ICT in any endeavour with certain groups with special needs, such as the visually impaired and those with motor disabilities. ICT can help not only by being a medium to assist interaction and learning, but also in other knowledge (Poon & Head, 1985). Scholars have also examined the manner in which ICT can impact the education of individuals with learning disabilities and have indicated that ICT can perform a significant and effective role in this regard (Pillay, Brownlee & Wilss, 1999; Quinn, 1996). More details about the use of ICT with students with SEN can be found in Chapter 2 (Literature Review).

Nevertheless, the use of ICT for and in the education of students with SEN, in general, and with intellectual disabilities, in particular, has not been the matter of much scrutiny. Further, the Kingdom of Saudi Arabia (KSA) is lacking in the application of technology in the field of education, and students with intellectual disabilities are deprived of the consequent benefits. Several methods, such as play-based education, simulation and repetition, are utilised to impart knowledge to students with intellectual disabilities. However, while these methods may be useful for some students, they may not be useful for others. Hence, modern technological advances have enabled teachers to utilise several techniques, allowing them to choose from various options and tools in the classroom. It must be noted that teachers and schools have their own requirements and the demand for such technology varies accordingly.

It has been observed from preceding studies, that the application of ICT in teaching is either decisively obstructed or promoted by teachers. Furthermore, teachers' perceptions and beliefs on technology can significantly impact students' outlooks. Therefore, in order to ensure that students gain an advantageous position on the acquisition of required skills during their

learning, it is imperative to comprehend the teachers' stance and opinions on the implementation of ICT in the field of education (Shapka & Ferrari, 2003). Accordingly, the following questions arose for the present study: What are the perceptions of Saudi teachers with regard to the use of ICT for students with intellectual disabilities?, What are the perceptions of Saudi teachers with regard to the main barriers encountered by special education teachers in using ICT for students with intellectual disabilities?, and What are perceptions of Saudi teachers with regard to the main factors that contribute to the utilisation of ICT for students with intellectual disabilities in the KSA?

1.2 Overview of the Kingdom of Saudi Arabia

The Kingdom of Saudi Arabia (KSA) is located in the far south-west of the Asian continent and comprises approximately four-fifths of the Arabian Peninsula, occupying an area of 2,150,000 square kilometres. The KSA's neighbours in the north are Jordan, Iraq and Kuwait, while its neighbours in the east are Bahrain, Qatar, United Arab Emirates and the Arabian Gulf. The KSA's southern neighbours are Oman and Yemen and it is bounded by the Red Sea in the west. According to a recent census, over 27 million people reside in the KSA, of which about 54% of are male and the remainder (46%) are female. Approximately half of the KSA's population is estimated to be less than 20 years of age. Oil and gas are among the several natural resources found in the KSA. The chief cities in the KSA are Mecca and Medina, the holy cities of Islam, and Riyadh, its capital. Other significant cities include Jeddah, Qassim and Taif. According to the Ministry of Culture and Information (2006), the rituals of Hajj (pilgrimage) and Umrah (lesser pilgrimage) are performed by a large number of Muslims on their visit to the KSA. The culture and religion of Saudi Arabia are briefly described in the next section.

1.2.1 Culture and religion of Saudi Arabia

The KSA is a constitutional monarchy where the King heads the executive and administrative bodies, that is, the government and the Council of Ministers respectively. The constitution of the country is based on Sharia Law, with inputs derived chiefly from the Holy Quran and the Sunnah of the Prophet Mohammed (Al-Ghamdi & Abd-Jawad, 2008). Furthermore, the culture of Saudi Arabia is principally related to Islam. All facets of social and cultural existence, across the country, are concentrated on Islamic principles and the manner in which Muslims should act. Thus, for persons in Saudi society, religious values take precedence and their influence ranges from individual associations, to family, tribal and social beliefs. In fact, all of these are interconnected in an intricate network of responsibilities, as recorded in the Quran. Islamic principles, therefore, underlie all facets of peoples' existence and specific emphasis is placed upon education, which is considered to be a religious duty for both men and women. Thus, while the Saudi education system appears to be founded on gender segregation, with distinct schools for boys and girls, this is not viewed as a matter of inequality under Sharia law.

In this context, Al-Salloom (1989) states that,

> Islam dictates that learning is an obligation for every Muslim, man or woman. This obligation, which gives education the status of a religious duty, is the cornerstone of education in the KSA. It is the foundation upon which the state builds its educational responsibilities, and in light of which, the citizen performs duties towards himself, his community, and his religion. The roots of education in the KSA therefore, go deep into the Islamic education which started in the mosque and led to the establishment of schools and universities around their pillars. (p.37)

The interpretability of educational issues takes a backseat in the KSA due to the dominance of the Islamic religious attitudes and beliefs. However, it must be observed that Islamic teachings have emphasised the value of education and knowledge, irrespective of the learners' gender, and that Islam is compatible with education. The education system of the KSA discourages the concept of co-education and the faculty and school buildings are distinctively separate for males and females. This consideration is on the basis of the provisions of the Islamic Sharia. The next section briefly describes the Saudi view of disability.

1.2.2 The Saudi view of disability

The Muslim perspective with regard to disability can be explained by their faith and confidence in Allah. In the context of Saudi Arabia, disability can be stated to have moral or religious consequence and may be regarded sympathetically or with hostility. For example, disability could be regarded as a paradigm of the passive acquiescence to the challenges of existence. As a result, a child with disabilities might be considered to be a trial of faith. Conversely, social views might blend with religious doctrines and can frequently cause several different strategies, which may be erroneously attributed to religious principles, such as attempts to account for the disability or the pursuit of solutions. Miles (2002) suggested that some parents of children with disabilities may regard the disability as a burden sent by God or reason for ruin, while others may assign blame to themselves viewing disability as chastisement or a trial from Allah (Hasnain, Shaikh, & Shanawani, 2008).

Al-Gain and Al-Abdulwahab (2002) described the outlook of Saudi society towards persons with disability as built on a notion of disability that perceives such persons to be helpless, restricted to the home, with poor quality of existence, and non-productive members of society. Moreover, while Muslims may have several attitudes and beliefs in common, the intensity of

spirituality, social and economic status, level of educational, and familiarity with a specific child with disability and his/her faculties, could determine parental strategies, understanding of theories, and overall response to disability. Furthermore, the attitudes and behaviour of parents to the disability of their child may be affected by environmental facets, such as place of origin or residence, or the amenities obtainable in their locality (Al-aoufi, 2011).

1.2.3 Disability policy in the KSA

1.2.3.1 Special Education in Saudi Arabia

The past three decades have seen a progressive increase in commitment to inclusive education around the world (Ainscow, 2007). Inclusive education can be perceived as a medium through which social exclusion can be eliminated by demonstrating and inspiring social approval and inclusive actions in schools (Dare, Nowicki, & Felimban, 2017). Inclusive educational settings imply that children with difficulties associated with learning receive education in regular classrooms. Support for inclusive education was declared by the United Nations (UN) when the UN Convention on the Rights of Persons with Disabilities was adopted (United Nations [UN], 1989). This treaty endorses human rights and basic liberties for persons with disabilities, together with the right, without prejudice, to education. Similar to other countries, Saudi Arabia has also followed the global movement towards inclusive education by ratifying the UN convention in 2008 (Al-Mousa, 2010).

The practice of inclusive education has been recognised to vary between countries (Ainscow, 2007) as the "notions of how inclusive education should look are not the same from one country to the next" (Schneider & Harkins, 2009, p. 278). In the KSA, the responsibility for offering free education (primary to post-secondary) education to all citizens and for supervising quality benchmarks in private education falls under the purview of the Ministry of

Education ([MoE], Dare et al., 2017). The MoE supports the placement of students with learning difficulties in gender-segregated inclusive settings (Alanazi, 2012; Al-Mousa, 2010).

Mainstreaming has been implemented in the KSA since the 1980s. In the context of the country, the following definition of mainstreaming has been adopted by the MoE (2002, as cited in Al-Mousa, 2010)

> "Mainstreaming, operationally, means educating children with special educational needs in regular education schools, and providing them with special education services." (Al-Mousa, 2010, p. 17).

Thus, in the KSA, the use of the term mainstreaming indicates special education programmes in regular education schools, such as resource room programs, self-contained classroom programs, teacher-consultant programs, itinerant teacher programs, and follow-up programs (Al-Mousa, 2010).

Two groups are the target of mainstreaming in the KSA. The first, which includes gifted and talented students, students with learning disabilities, physical disabilities, behavioural and emotional disabilities, visual impairments, and communication disorders, have already been included in regular schools and are profiting from existing educational programmes. The second group comprises of students who have traditionally received education in segregated special education schools or self-sufficient classrooms, such as the blind, deaf or hard of hearing, mentally retarded, students with autism, and with multiple disabilities. Nevertheless, the greater inclusion of these students is advocated (Al-Mousa, 2010).

More detail about special education in the KSA can be found in Section 2.10.2.

1.2.3.2 Background to policies and legislation

Conforming to Shariah beliefs, the government of the KSA cares for its citizens, provides social security to the people and motivates them to be charitable. The government also assists people in cases of emergencies, disabilities and old age (MoE, 2008). Furthermore, in accordance with the Islamic law, all people are treated equally and are not discriminated, irrespective of their gender, race or abilities (Al-Jadid, 2013). Thus, the Saudi people are assured of government assistance in the case of disabilities and discrimination is forbidden. Persons with disabilities people are given equal rights of participation in local community works and are allowed to be in responsible positions.

According to Article 26 of the disability legislation of 1987, persons with disabilities people need to be protected and must be cared and supported by the government. The legislation resulted in several public organisations conducting evaluation programmes to verify the eligibility of persons with disabilities people requiring SEN services, and providing assistance according to their requirements. For example, the classifications of rehabilitation, specific educational programmes and disability are tackled under Article 1 (Prince Salman Centre for Disability Research, 2004).

At the same time, the method of students' classroom learning improved with significant amendments in the KSA legislation on special educational needs (Ministry of Labour and Social Affairs, n.d.). The intent of the Regulations of Special Education Institutes and Programmes (RSEIP) policy document (MoE, 2002) issued in 2002, was to improve the standards of education provision for students with SEN. More details about the RSEIP policy document are provided in the following subsection.

1.2.3.3 The RSEIP policy document

The RSEIP policy document was published by the Directorate General of Special Education (DGSE) through the National Committee for Special Education (NCSE) for the development of policies for students with SEN. Mainstreaming schools, as well as special education schools, were mandated to implement the regulations stipulated in the manual of the RSEIP policy (MoE, 2002).

The US Individuals with Disabilites Education Act (IDEA) was used to formulate the RSEIP (Aldabas, 2015; Alquraini, 2010). Such policies – designed and employed in foreign countries – can be used for formulating and implementing the policies in other countries, where the cultures may or may not differ from one another. These policies are defined by Tanaka (2005) as 'authoritarian importing or exporting' and can be implemented in countries, irrespective of the cultural contexts and the people's perceptions about their acceptance. In order to suit the local culture, the special education policies borrowed by the KSA were later amended (Alqraiti, 2005). The imported policies implemented in the local cultural circumstance need a thorough evaluation for amendment and transformation. Developments occuring in the local scenario may not be considered in the formulation of policies in foreign countries. Furthermore, the policies are static in nature and may not incorporate recent changes. Therefore, the transformation stage is necessary for enhancing the suitability of policies in the local context (Tanaka, 2005; Cowen, 2006).

The eligibility for special education services is determined by following certain procedures, whose information is given in the RSEIP policy document. These procedures are given for both male and female persons with disabilities (Al-Mousa, 2005). The government's perceptions for the implementation of special education policies are explicated in the RSEIP

policy document. The primary objectives of RSEIP were to enhance the standard of special education services, systematise the process of education, and expand the role of individual educational plan (IEP) team members, resulting in a positive impact on the education of students with SEN. RSEIP stipulates that the education system must encompass mainstream education and consider the education of students with SEN as its inherent component. The extent of the requirement of special education services was considered by the MoE, and the relevant information was used to formulate the strategy accordingly. Further, the Saudi educationists conceived that special education services would benefit students with intellectual disabilities and would result in persistent qualitative enhancements in the education of students with SEN (Al-Mousa, 2005).

Several principles related to special education were reflected by the education policy of the KSA. Additionally, several underlying factors need to be merged with these principles to conform to the international norms of providing care to students with SEN, and satisfying their educational needs. The fundamental principles of the special education policy in the KSA are as follows:

1. Islam recommends that every Muslim must compulsorily be knowledgeable. Thus, the government must encourage Islam and enable students to gain knowledge and acquire skills, according to their abilities (Article 10).

2. The state must evaluate the different requirements of students with SEN and accordingly establish short-term and long-term special education programmes. Furthermore, the root causes of educational disabilities must be identified and eliminated by the government (Article 55).

3. The overall purpose of special education is to inculcate Islamic and general values, care for the differently abled, identify the abilities of students with SEN, and train them with suitable life skills, according to their abilities (Article 189).

4. In order to attain the objectives of special education and to spread awareness about it, a robust strategy is required to be implemented and the regulations must be adhered for managing the operations (Article 191).

5. Students with SEN possess a positive psychology if they study in mainstream schools, as the learning environment would be a general one and not specific to differently abled students (MoE, 2002).

According to Ibrahim (2003), constructive cooperation, proper usage of available human and physical resources, time management and subsequent efforts are required for the successful implementation of the aforementioned principles that must be suitable for the requirements of various stakeholders in SEN programmes.

An inherent part of the Saudi education system is to provide education to individuals with disabilities and talented students. Therefore, an educational scheme with an objective of delivering adequate support to all students with SEN was formulated by the DGSE (2000). Ten themes were incorporated in this scheme, which are as follows:

1. To activate the role of public schools in the field of special education meant for differently abled students.

2. To expand the role of special education schools.

3. To increase the ambit of human resources with mainstream and special education schools.

4. To formulate curricula, textbooks and study plans within the special education schools and institutions.

5. To serve special categories by introducing and adopting modern technology.

6. To develop the organisational structure of the DGSE.

7. To review and amend the existing regulations and formulate novel rules for future mainstreaming programmes.

8. To revive the departmental role of special education in Local Education Authorities (LEAs) of Saudi Arabia.

9. To employ scientific research in the field of special education.

10. To co-operate and co-ordinate the policies of various bodies involved in and out of Saudi Arabia.

Considering the fundamental changes that had taken place in the field of special education in the KSA, the RSEIP document was written, which also satisfied the aforementioned seventh theme (Hussein & Salem, 2000). Accordingly, the RSEIP document allows, on one hand, the planning and development of regulations for future mainstreaming programmes in the KSA schools, and on the other, affirms to provide quality education services to students with SEN (MoE, 2002).

Deciding the assignment of tasks and responsibilities to employees, upgrading the level of services provided and organising the education process affects the significance of the regulations. Additionally, regulations are vital for encouraging team spirit and teamwork among multidisciplinary employees, and for making the workplace flexible.

Article 101 stipulates that the standards set by the DGSE must be followed by the administration of special education institutes under an LEA's supervision, in the formation of a multidisciplinary team.

The objective of the RSEIP document is to examine the perceptions of the Saudi IEP team members on the implementation of IEPs in accordance with RSEIP, as it is the key policy framework for IEP practice in the KSA.

The next section articulates the problem statement of the study.

1.3 Research problem statement

In general, the emphasis of special education teachers is to recognise and utilise the most appropriate resources and tools for the students with SEN in their care. ICT tools and resources have gained recognition across the globe for the benefits they provide students with SEN. Accordingly, it could be inferred that using the latest technological tools and solutions would be beneficial for educating such students, in general, and for students with intellectual disabilities, in particular, not only to assist such students in developing their skills, but also to enhance the educational system. However, the implementation of programmes which use such tools and solutions requires the participation of teachers to act as facilitators within classrooms. Hence, awareness of the use of ICT for students with intellectual disabilities has to be spread among teachers whose perceptions and opinions on the topic need to be considered for the present study.

It is difficult to think that teachers would adopt ICT in their classes unless and until they possess a positive sensitivity towards ICT. This statement holds true in not only in the case of Saudi Arabia, but all over the globe (Woodrow, 1992; Watson, 1998).

In addition to knowing the teachers' perceptions on the utilisation of ICT for students with SEN, the identification of the factors that affect their perceptions either positively or negatively is also crucial for the present study. Limited and inadequate studies have been found on the utilisation of ICT in the field of imparting education to students with intellectual disabilities in the KSA, and the association between teachers' perceptions and the various factors influencing them. The study of the current situation with regards to the teachers' perceptions towards the utilisation of ICT for students with intellectual disabilities has become necessary due to the lack of adequate studies in the KSA (Please see Chapter 2 for a detailed review of literature). Therefore, the present study intends to scrutinise the utilisation of ICT in the special education field, and to examine the teachers' perceptions towards the implementation of ICT in educating students with intellectual disabilities. Furthermore, teachers' perceptions on the current issues and potential techniques for improving the processes of teaching and learning of students with intellectual disabilities in the KSA are examined in the present study.

The next section describes the significance of the present study.

1.4 Research significance

The significance of the present study is primarily its contribution to knowledge, specifically the knowledge produced with regard to the use of ICT in the education of students with intellectual disabilities in inclusive education settings in the KSA. It is anticipated that the findings of the study will:

1. Offer insights for special education teachers in the KSA concerning the use of ICT in the education of students with intellectual disabilities and the accompanying advantages and

disadvantages. Moreover, factors supporting the development of the use of ICT, and barriers which hinder the same, in the education of such students will be identified;

2. Offer new information to policy makers in the MoE regarding the factors and challenges which need to be taken into account when creating future educational policies for the use of ICT in inclusive educational settings;

3. Initiate further and extensive research on the use of ICT in the context of inclusive education;

4. Provide insights into the experience of special education teachers in the KSA with regard to ICT use with students with intellectual disabilities; and

5. Generate interest for more research on education in the context of Saudi Arabia.

The next section describes the aims of the present study.

1.5 Research aims

The aims of the present study are the following:

1. To identify the current scenario with regard to the utilisation of ICT in classrooms for students with intellectual disabilities students in the KSA, and the teachers' perceptions on the topic.

2. To recognise the teachers' perceptions on the factors that impede the utilisation of ICT in the education of students with intellectual disabilities in the KSA.

3. To recognise the potential factors considered by teachers in the viable implementation of ICT for educating students with intellectual disabilities.

The next section describes the objectives of the present study.

1.6 Research objectives

The objectives of the current study are the following:

- To investigate the current use of ICT by Saudi special education teachers who work with students with intellectual disabilities in their teaching practice;
- To recognise the perceptions of Saudi special education teachers concerning the concept of ICT and its advantages and disadvantages;
- To recognise the reasons why (or why not) special education teachers in the KSA are using ICT in their teaching practice;
- To recognise the influences supporting the use of ICT with students with intellectual disabilities in the KSA;
- To recognise the motivators and incentives for using ICT in teaching students with intellectual disabilities in the KSA; and
- To identify the barriers hindering Saudi special education teachers' use of ICT with students with intellectual disabilities.

The next section lists the research questions of the current study.

1.7 Research questions

The present study aims to answer the following research questions:

Q1: What are the perceptions of Saudi teachers with regard to the use of ICT for students with intellectual disabilities?

Q2: What are the perceptions of Saudi teachers with regard to the main barriers encountered by special education teachers in using ICT for students with intellectual disabilities?

Q3: What are perceptions of Saudi teachers with regard to the main factors that contribute to the utilisation of ICT for students with intellectual disabilities in the KSA?

The next section describes the structure of the thesis.

1.8 Research structure

The present study consists of six chapters. This first or introductory chapter has introduced the key themes of this study. Accordingly, the background of the study was introduced. Additionally, since the study is set in the KSA, an overview was provided of the country, along with a brief account of the culture and religion. The approach to special education in the KSA was briefly described and included an overview of disability policy in the country. The problem being studied was stated. Also, the significance of the study and the aims and objectives to be achieved were described, followed by the research questions informing the study. The next chapter (Chapter 2) provides a review of extant literature and establishes the theoretical rationale for the study. Chapter 3 describes in detail the research methodology utilised by the study in gathering qualitative and quantitative data from special education teachers in Jeddah, who use ICT in the teaching of students with intellectual disabilities.

Chapter 4 presents the findings from the qualitative and quantitative phases of the study, while Chapter 5 provides the discussion of these findings based on extant literature. Chapter 6 provides the conclusion to the thesis by summarising the research, setting out its contributions, and providing recommendations for teachers and policy makers based on the study's findings.

1.9 Summary

The introduction chapter contains the researcher's position statement and descriptions of the basic elements of the present study, Saudi Arabia and the research problem statement. Additionally, the chapter focuses on the study objectives and research questions and highlights the significance of the study and its contribution to the educational field. A brief overview of the use of ICT with students with special needs is provided and the structure of the present study is also mentioned. The following chapter contains the review of literature relevant to the disability, inclusive education, ICT and its use in the education of students with intellectual disabilities.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The aim of this chapter is to establish the present state of understanding with regard to the different areas pertinent to the current study, as found in extant literature. Doing so will assist the researcher by providing clarity in connection with existing academic discourses concerning the use of ICT in the education of students with intellectual disabilities. Since there are two specific areas that need to be considered namely, inclusive education and the use of ICT in this context, the chapter can be regarded as being composed of two broad sections. The first deals with inclusive education and disability while the latter part of the chapter deals with ICT, in general, and its use in the inclusive educational context, in particular.

This chapter commences with an overview of inclusive education followed by a discussion to facilitate understanding of disability and the use of disability labels. The attitudes of persons, in general, and teachers, in particular, towards persons with disabilities are also examined. Next, insights into, and the characteristics of, intellectual disability are provided. Additionally, the concept of Information and Communication Technology (ICT) is introduced from the specific perspective of its use in education. Moreover, an overview is provided of the progress of ICT in the Saudi educational system. Subsequent sections describe teachers' use of ICT in the education of students with intellectual disabilities. These will be explored from the perspectives of teachers' perceptions, advantages and disadvantages, barriers and supporting factors. The final section will pesent the ensuing research gap or theoretical rationale for the study. The search strategy used by the study will first be described.

2.2 Search strategy

Access to journal articles was obtained using online databases such as ERIC and PsycINFO. Search engines (Google and Google Scholar) were also employed to search for general and open-source resources on the Internet. Research publications of public organisations, such as the United Nations (UNESCO, UNICEF), American Association of Intellectual and Developmental Disabilities (AAIDD), American Psychiatric Association (APA), British Educational Communications and Technology Agency [BECTA], British Educational Research Association [BERA], European Commission, World Health Organization, and World Bank, were also utilised. Other significant sources of information were the websites and publications of various governments (e.g., the Saudi Ministries of Education, Culture and Information, Economy and Planning, Labour and Social Affairs, the Saudi Communication and Information Technology Commission, the Departments of Constitutional Affairs and for Education and Skills (DfES) of the United Kingdom, etc.).

The record titles and abstracts (where available) were screened to make sure that the search results were relevant for the context of the current study. Moreover, hand searches were performed to identify studies that had been cited by other authors in the relevant literature.

The following search terms/phrases were used in the searches: intellectual disability; disability labels; special educational needs; students with intellectual disabilities; needs of students with SEN; inclusion; inclusive education; special education; barriers to inclusion; attitudes to inclusion; ICT use in education; ICT use with persons with disabilities; ICT use with persons with intellectual disabilities; and ICT use with persons with mental retardation. These search phrases were first used separately and then with the addition of the term "Saudi Arabia" to recognise literature associated with the study setting.

Articles were obtained from the electronic databases that offered full-text and the researcher's student grant was used to purchase some articles.

2.3 The concept of inclusive education

Inclusive education has been described by the UNESCO (2003) as a method which seeks to address the learning needs of all children, youth and adults, with a specific focus on those who are vulnerable to marginalisation and exclusion" (p. 4). In contrast, Rafferty, Boettcher, and Griffin (2001) describe it as indicating "the process of educating children with disabilities in the regular education classrooms of their neighbourhood schools – the schools they would attend if they did not have a disability – and providing them with the necessary services and support" (p. 266). Inclusive education has its origins alongside the rights of human beings to education as per the Universal Declaration of Human Rights (UDHR) in 1949. However, formal recognition came later with the adoption of the principle of inclusive education at the World Conference on Special Needs Education (UNESCO, 1994) at Salamanca and its subsequent reaffirmation at the World Education Forum (2000) in Dakar (UNESCO, 2003).

The broad concept of inclusive education indicates that

> … schools should accommodate all children regardless of their physical, intellectual, social, emotional, linguistic or other conditions. This should include disabled and gifted children, street and working children, children from remote or nomadic populations, children from linguistic, ethnic or cultural minorities and children from other disadvantaged or marginalised areas or groups (The Salamanca Statement and Framework for Action on Special Needs Education, para 3) (UNESCO, 1994, pg. 6).

The Salamanca Statement also called upon governments to

> adopt as a matter of law or policy, the principle of inclusive education, enrolling all children in regular schools, unless there are compelling reasons for doing otherwise (UNESCO, 1994, p. ix).

The right of children not to be prejudiced against (as stated in Article 2 of the United Nation's 1989 Convention on the Right of the Child) is another aspect that influenced the concept of inclusive education. As a result, all children have the right to an education that does not discriminate on the basis of gender, colour, race, language, religion, nationality, disability, etc. (UNESCO, 2003). Inclusion in education has been regarded as a process of managing and responding to the varied needs of all students by improving involvement in knowledge, society, and civilisation, and lessening rejection from and in education (Booth, 1996).

It can be seen from the perspective of students with special educational needs that inclusive education or "inclusion" is a topic of some significance. The general objective of inclusive education is to provide an appropriate and beneficial atmosphere of learning and educational measures for students with special educational needs in public schools (Smith, 2010).

Developed Western countries, such as the United States (US) and the United Kingdom (UK), have been the forerunners in the integration of students with special educational needs in schools. Special education in the US was supported as early as 1975 by the Education for all Handicapped Children Act. Subsequently, this act was revised and retitled the Individuals with Disabilities Education Act of 1990 (Hsu, 2007). The UK's Warnock Report (1978) took US legislation into account when it endeavoured to offer opportunities for education for all types of students. The US and the UK are early signatories of the Salamanca Statement (UNESCO, 1994). In the KSA, the definition of inclusive education is based on international references and modified to suit the Saudi environment (UNESCO, 2007a).

Some common terms associated with inclusive education will be introduced in the following sub-sections.

2.3.1 Inclusion, integration and mainstreaming

As seen in the preceding section, inclusive education, in general, implies "Education for All in a School for All (disabled and non-disabled children learning together in regular schools: learning to know, learning to do, learning to be and learning to live together)" (Puri & Abraham, 2004, p.25). That is, education is provided to students with disabilities in mainstream general schools in contrast to separated instruction in special schools.

Three terms, incorrectly assumed to be synonyms, are commonly encountered in any discussion of inclusive education namely, inclusion, integration, and mainstreaming , and have influenced the ways in which schools approach special education and students with disabilities. The notion of **integration** was the result of concern about the effects of providing education to students with disabilities in special schools. That is, isolating them from their peers in the mainstream system. Integration is defined as

> the process of educational decision-making and planning for students with a handicapping condition in the least restrictive environment. It is based on the philosophy of equal educational opportunity that is implemented through individual planning to promote appropriate learning, achievement, and social normalization (Stephens, Blackhurst, & Magliocca, 1988, p.12)

This definition indicates that a least restrictive environment, which takes the needs of students with disabilities into consideration, is required for the education of such students in mainstream schools. The term "least restrictive environment" is widely utilised to indicate students with disabilities learning alongside their peers to the extent possible, to prevent their

exclusion, except if they fall behind in the classes assigned for them in the school (Hodkinson & Devarakonda, 2009). Provision for least restrictive environments is clearly emphasised in the IDEA Act of the USA (Alquraini, 2013) whereas the Special Educational Needs and Disability Act 2001 (SENDA) of the UK contains provision that "that schools should not treat disabled students less favourably than others and should make 'reasonable adjustments' to ensure that they are not disadvantaged" (Wong, 2006, p. 33). In the context of Saudi Arabia, the RSEIP does not contain any guidance with regard to the complete inclusion of students with disabilities or least restrictive environment (Aldabas, 2015). However, while the 2000 Disability Law includes the concept of least restrictive environment, it is more from the perspective of general facilities available in the country (e.g., services provided by the government or public agencies) rather than a specific emphasis on education (Aldabas, 2015). Also, while the MoE provides policy and guidelines with regard to inclusion, the concept of the "least restrictive environment" is implemented through a combined system of segregated/integrated education (Alzaidi, 2017).

It can be seen that **integration** assumes the existence of segregated (i.e., separate) classrooms. Also, students with special needs spend some time with students without special needs. However, they may not be considered to truly belong to the class or to be involved in the same activities (Moore et al., 1998). Thus, integration is limited to the assignment of a student with special needs into an educational programme.

The term **Mainstreaming** also indicates the partial or full integration of students with disabilities into regular education classrooms depending on the student's characteristics and his/her capacity to deal with the academic requirements of the classroom (Fuchs & Fuchs, 1994; Murphy, 1996; Roberts & Mather, 1995). Moore and colleagues (1998) observed that in mainstreaming, students with special needs were not brought into the general education

setting if they required customised instruction and/or could not deal with the activities of a general classroom. The Warnock Report (1978) indicated that integration is a term utilised in the UK and mainstreaming is a term utilised in the United States, both representing the same notion, that is the "principle of educating handicapped and non-handicapped children together" (p. 99).

In contrast, **Inclusion**, in the school context, has been defined as follows:

> … all students are educated in general education programs. Inclusion is when a student with special learning and/or behavioural needs is educated full time in the general education program. Essentially, inclusion means that the student with special education needs is attending the general school program, enrolled in age-appropriate classes 100% of the school day (Idol, 2006, p. 77).

That is, classes in a general education school are designed to accommodate the needs of all students through the use of varied educational methods. Moreover, teachers collaborate to provide specifically created teaching and supplementary facilities and supports (Moore, Gilbreath, & Maiuri, 1998).

Inclusion, however, should be more than merely the nature of school attended by children. It should encompass the quality of their experience, the manner in which they are assisted to learn, to achieve, and to fully share in school life (House of Commons Education and Skills Committee, 2005). This is one aspect that the current study seeks to examine from the perspective of the use of ICT with students with intellectual disabilities. However, it is apparent that the approach in Saudi Arabia indicates a culture of integration, instead of complete inclusion (Alzaidi, 2017). (A more detailed discussion of special education in the KSA can be found in Section 2.10.2).

Mushoriwa (2001) summarised the differences between integration and inclusion when he observed that:

> In integration, the child must make adjustments to the requirements of the school but, in inclusion it is the school that must make adjustments to accommodate or include the child (Mushoriwa, 2001: p.142).

Prior research on special education has compared the concepts of integration and inclusion. For instance, it has been submitted (e.g., Jenkinson, 1997; Thomazet, 2009; etc.) that in integrated settings students with disabilities spend only a part of the day with their peers without disabilities in the regular classroom whereas in inclusive settings, such students spend the whole school day in the same classroom as their peers without disabilities. Other authors compare the inclusion and integration from the perspective of practice. For instance, Vislie (2003) observed that while the notion of integration signifies the rights of children with disabilities to study in a general school, the notion of inclusion is broader and signifies the different aspects that need to be considered to facilitate the education of such students, including allowing for the needs of different children and appropriately modifying the curricula. In other words, an inclusive school is intended to be useful and appropriate for all students without exception.

Another difference between integration and inclusion was provided by Loreman, Deppeler, and Harvey (2005) who submitted that in integrated schools, children with disabilities participate in all classes associated with the school and the schools provide assistance in coordinating with the school environment. On the other hand, in inclusive schools, students with disabilities are inherent components of the school system from the start. Phádraig (2007) highlighted that in an integrated school environment the students are required to try to adhere

to the school syllabus to the extent possible. In contrast, inclusive school environments endeavour to be of service to all students by providing flexibility in various aspects, including curricula, learning approaches, and the environment itself. In other words, integration signifies the student requiring to fit into the school environment whereas inclusion signifies the school making the necessary adaptations to accommodate all kinds of students. As Schneider and Harkins (2009) observe integration is "a matter of individual effort of parents, teachers, and children" (p. 278). Vislie (2003) tied it all together when she indicated that

> While integration was the main issue on the agenda when the international community and national governments discussed how to promote the right of disabled persons to an appropriate education until the end of the 1980s, inclusion has captured the field during the 1990s (p. 18)

Thus, it could be inferred that while both integration and inclusion deal with including students with disabilities in mainstream educational settings, integration was the first step in this direction and placed the onus on individuals to ensure that such students fitted in, whereas inclusion is the more progressive present day implementation of the concept of education that 'includes' all where the onus has been transferred to the educational system. Nevertheless, it must also be noted that while legislation across countries (e.g., IDEA, SENDA, RSEIP, etc.) stipulates that students with disabilities have the right to receive education along with students without disabilities, the nature or severity of disability can limit the extent of inclusion that can be implemented, that is, if education in regular classes cannot be satisfactorily delivered, integration may still be the most simplest mechanism to include students with disabilities in mainstream schools.

The next section discusses the concept of special educational needs.

2.3.2 The Concept of Special Educational Needs (SEN)

Students with "various (combinations of) impairments and/or difficulties in participating in education" are also termed students with special educational needs (SEN) (Pijl, Frostad, P., & Flem, 2008, p. 389). This term (SEN) is employed frequently in the UK to indicate differences in students that require provision for or for whom modifications are required to facilitate the participation in a mainstream school programme. These modifications might involve alterations to the curriculum, the learning plan, the supply of assistive technology and other specialist-provided services (DfE, 2011).

Quoting Florian and Hegarty (2004), Davis and Florian (2004) noted that

> the term 'special educational needs' covers an array of problems from those arising from particular impairments to those resulting from the complex interaction of pupil and school factors. Learning and behavioural difficulties may be experienced by any learner some of the time...Not all impairments or disabilities create barriers to learning…Many people are disabled by an impairment but they may or may not be *handicapped* by the condition...However, there are some conditions and impairments that are known to create barriers to learning unless accommodations are made. A person with a visual impairment, for example, may need some kind of support or accommodation to achieve the same functioning as the person without the visual impairment...The term special education is often used to refer to the process of making such accommodations (p. 34)

In the context of the current study, it must be noted that two groups of individuals have been recognised by the Ministry of Education in Saudi Arabia for integration into mainstream schools in the country. The integration of the first group into mainstream schools has already

been achieved and they participate in mainstream educational programmes. This group consists of students who fall into one of the following categories: the behaviourally and emotionally disturbed, with learning disability, gifted and talented, with physically disability, with low vision, and those with communication disorders. The second group consists of students who are usually educated in special schools. These include students who are blind, deaf or hard of hearing, mentally retarded, with multiple disabilities, and children with autism spectrum disorder (ASD). Nevertheless, there is a move to integrate these students in the mainstream (Al-Mousa, 2010) based on the extent of need and the use of suitable intervention programmes. It must be noted that there is a greater likelihood that students with more severe disabilities will continue to be excluded from mainstream schools. As an aside, it is interesting to note that even a study of fairly recent origin undertaken on behalf of the United Nations (Al-Mousa, 2010) continues to refer to persons with intellectual disabilities as 'mentally retarded' indicating the extent to which some labels continue to pervade society despite on-going disputes regarding labelling of disabilities (Please see Section 2.5 for a more detailed examination of Disability Labels).

The next section discusses the concept of disability.

2.4 Understanding Disability

Disability, according to the World Health Organisation (WHO, 2011), is "part of the human condition" (p. 7) and:

> almost everyone will be temporarily or permanently impaired at some point in life, and those who survive to old age will experience increasing difficulties in functioning. Disability is complex, and the interventions to overcome the disadvantages associated with disability are multiple and systemic – varying with the context (p. 7).

Across history, there is evidence that persons with disabilities have existed in all cultures. Disability, in Western society, occurs at the coming together of the claims of a specific impairment (e.g., mental, physical), its understanding by society, and the wider economic and political perspective of disability (Braddock & Parish, 2002). This outlook maintains that the larger societal environment provides meaning to disability. In contrast, impairment is of biological origin (Braddock & Parish, 2002; Brown & Radford, 2007). Therefore, disability is not limited to being affected by an impairment but is also a societal structure or classification that is impressed on persons with impairments. By itself, disability is not an unchanging concept (i.e., always considered in the same manner regardless of time and location), but one that transforms as the implications ascribed to the term originate from various societal and environmental aspects existent in any specific time and culture (Brown & Radford, 2007). This perspective is reflected by the critical theory and social model of disability which maintain that it is society's responsibility overall to safeguard the parity and welfare of all its members not excluding those with a disability (Bach, 2007). These perspectives do not reduce disability to a person's impairment but as resulting from the prejudice and drawbacks experienced by persons due to their attributes and contrasts.

Disability, for the individual, eventually signifies a constraint in their performance that denotes a considerable drawback to them in a specific societal setting (American Association on Mental Retardation [AAMR], 2002). Schalock, Luckasson, and Shogren (2007) suggested that disability and intellectual disability were two distinct but associated constructs. On the one hand, the disability construct is associated with health conditions that cause deficiencies in the functions and constitution of the human body and limit activities and restrict involvement from the perspective of individual and environmental aspects. On the other hand, the intellectual disability construct is perceived as developing from an environmental outlook

which places emphasis on the interaction between individual and environment and on the use of personalised supports to improve the functioning of a human.

The next sub-section briefly describes the lack of clarity with regard to definitions of disability.

2.4.1 Definitions of disability

Disability has been defined in many ways, each persuasive in its own right and with its own purpose. As a result, some definitions exact and purposeful while others are inexact and vague. For instance, the WHO (2011) provides a sweeping definition of the term referring to it as:

> the umbrella term for impairments, activity limitations and participation restrictions, referring to the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors) (WHO, 2011).

It can be inferred from this statement that the scope of the term disability is uncertain and complex as it indicates that a very broad range of individuals may be considered to be experiencing a disability. DePauw & Gavron (2005) suggest that this manner of definition could have been a factor in the greater visibility of persons with disabilities in the present day.

The definition of disability provided by the Americans with Disabilities Act (ADA, 1990) indicates that from the perspective of an individual, disability means "a mental or physical impairment that substantially limits one or more major life activities" (p. 330). Dattilo (1994) suggested that major life activities encompass not only the ability to see, speak, hear, dress, feed oneself, and walk, but also the ability to learn, work, and undertake other routine mental

or physical activities. The Disability Discrimination Act of the United Kingdom (Department of Constitutional Affairs, 1995) provides a similar definition of disability: a person has a disability for the purpose of this Act if he has a physical or mental impairment which has a substantial and long-term adverse effect on his ability to carry out normal day-to-day activities" (p. 1). The later Equality Act (2010) that superseded this act submitted that a person is disabled under this Act if he/she has "physical or mental impairment that has a 'substantial' and 'long-term' negative effect" on his/her "ability to do normal daily activities" (Gov.UK, 2010). The objective of this definition is to prevent prejudice against persons with disabilities and encompasses a broad extent of impairments, such as autism spectrum disorder and communication impediments.

Disability, in the KSA, has been described as "having a physical and /or psychological and developmental condition that affects an individual's appearance and behavior, such as blindness, deafness, and cognitive disabilities, Mental retardation" (Al-Ahmadi, 2009, p. 25). The country's Labour and Workman Law, in contrast, defines a person with disability as "any person whose capacity to achieve and continue a suitable job has diminished as a result of a physical or mental infirmity" (Al-Jadid, 2013, p. 453).

Overall, it could be seen that while there were similarities between definitions, researchers appear to be in agreement that defining disability is challenging as it "encompasses numerous conditions of mind and body and the boundary between ability and disability seems to be less clear" (Degener, 2004, p. 4).

The next sub-section introduces the notion of the models of disability.

2.4.2 Models of disability

In addition to the definitions discussed in the preceding section, disability can be understood through various models of disability. These models offer society a fundamental frame of reference with regard to the approaches to the devising of guidelines, regulations, and frameworks, along with their impact on the existence of persons with disabilities (Cole, 2008). The different models in existence include the individual medical model, moral model, functional model, rehabilitation model, socio-political model, environmental model, and transactional model. Although many models exist, it must be noted that the medical and social models incorporate, in some manner or the other, all the aspects of the other models (Kaplan, 2000; Nwanze, 2016).

Disability is regarded by the individual medical model to be a "defect or sickness which must be cured through medical intervention" (Kaplan, 2000, p. 352). In contrast, the moral disability model considers disability to be the effect of immorality (Kaplan, 2000). In the social model, disability is perceived as "a 'social oppression' similar to that encountered by women, ethnic minorities [and so on]" (Barnes, 2011, p. 60). Originating from the medical model, disability in the rehabilitation model is regarded as a defect that must be rectified with professional (e.g., rehabilitation professionals) help (Kaplan, 2000). The environmental and functional models are related models and can be explained together as both consider the functions of an individual (e.g., their skills, talents, and endeavours) and their environment (Smart & Smart, 2006). While the biological facets of disability as stipulated by the medical model are acknowledged by these two models, they also underscore the restrictive nature of the environment when unaltered for an individual with a disability.

Smart and Smart (2006), describing the socio-political model (also known as the Minority Model of Disability), observed that for "most people with disabilities, the prejudice and discrimination found in the broader society are more of an obstacle than are medical impairments or functional limitations" (p. 34). In other words, they contend that disability is the consequence of society's understanding of disability, for instance, the incompetence, shame, and bias, related to persons with disability. The social model is extended by the transactional model as it suggests that disability is the consequence of both disabling environments and disabling social relationships (Llewellyn & Hogan, 2000). Thus, the transactional model scrutinises the manner in which the societal associations of a person with a disability can have a disabling effect on the person.

Overall, it can be seen that there are different models of disability the chief of which are the medical and social models of disability. These models examine disability from various perspectives which serves to highlight the complexity of disability. The next sub-sections describe these two key models that have influenced contemporary beliefs concerning disability (Booth & Ainscow, 2002). As could be seen from the preceding discussions, these models offer conflicting stances with regard to persons with disabilities.

2.4.2.1 Medical Model of Disability

The medical or biomedical model of disability is the oldest, and most familiar, model of disability; and carries with it the authority and status of the esteemed medical profession (Smart & Smart, 2006). Moreover, due to its roots in science and long tradition, this model has dominated the manner in which disability is understood. This model uses medical language to define disability providing scientific authority to the notion that disabilities are entirely the experience of an individual. Consequently, matters of social equality are ignored

by this model. This model considers that disability (meaning, difficulty, and management) are inside the individual with the disability (Smart & Smart, 2006). The medical model thus emphasises that an individual with a disability is a 'victim.' Moreover, it believes that disability is a personal misfortune, not requiring the transformation of society (Barnes, 1999).

Fundamental to the medical model is the belief in the presence of pathology, and, also, "disabilities are objective conditions that exist in and of themselves" (Smart & Smart, 2006, p. 30). This process of objectification commences the prospect of debasing the individual since the alleged pathology is the emphasis (Albrecht, 1992; Longmore, 1995). This description of disability was labelled by Bickenbach (1993) as an aberration:

> The most commonly held belief about [this model of] disablement is that it involves a defect, deficiency, dysfunction, abnormality, failing, or medical "problem" that is located in an individual. We think it is so obvious as to be beyond serious dispute that disablement is a characteristic of a defective person, someone who is functionally limited or anatomically abnormal, diseased, or pathoanatomical, someone who is neither whole nor healthy, fit nor flourishing, someone who is biologically inferior or subnormal. The essence of disablement, in this view, is that there are things wrong with people with disabilities. (p. 61)

It is therefore evident that the medical model regards disability as biological inadequacy, failure, pathology, and abnormality, in contrast to persons without disabilities (McCarthy, 1993). Hence, despite personal talents and merits, the individual with a disability is aware that he/she is a member of a devalued group. Moreover, several persons with disabilities may not find any worth in attempting to fit into a society that instinctively overlooks them and regards them as psychologically abnormal. In other words, this model's perception of a perfect world

is one without disabilities, and the likelihood of providing the medical professional the authority with which to eradicate disabilities and the individuals who live through them is real (Singer, 2000).

Further, the medical model places emphasis on the circumstance that persons with disabilities need to rely on others, such as specialists and helpers. This leads to two principal outcomes. First, physical adjustment is necessitated; accomplished through different interventions for treatment or therapy, together with schemes for rehabilitation with the objective of increasing the prospect of restoring to a state of near-normalcy. Second, psychological changes are essential, and aid the individual in acknowledging and coping with his/her physical constraints (Oliver, 2009). Overall, the medical model proposes a supporting role for society while concentrating chiefly on the individual (Alabri, 2017).

This perspective describes the construct of disability from the perspective of inadequate inclusion in general society. In general, persons with disabilities are side-lined because of their lack of ability to undertake social activities, and their functional shortcomings. For this reason, a person with limited mobility can be categorised as disabled (Oliver, 2009).

While the medical model is significant, due to the authority of the medical field and technologies used in the field (Marks, 1999; Oliver, 2009), service providers have continued to perceive individuals with disabilities as an inconvenience, drawing attention to what cannot be done by such individuals and what is inhibited by their disability (Dowling & Dolan, 2001). Evidence of this model can be seen in the early notions regarding the provision of education of children with disabilities (Thompson, 1998).

The medical model of disability has been subject to considerable reproach since the 1970s, specifically by promoters of the social model of disability and by those embracing an outlook

to disability centred on rights. The medical model's definitional categories (WHO, 1980), in particular, have received much criticism (Barnes, 1999). Three definite and self-sufficient categories were provided by the WHO, each pertaining to a different level of experience following a disease.

a) Impairments (I code), concerned with abnormalities of body structure and appearance and with organ or system function) resulting from any cause; in principle, impairments represent disturbances at the organ level.

b) Disabilities (D code), reflecting the consequences of impairment in terms of functional performance and activity by the individual; disabilities thus represent disturbances at the level of the person.

c) Handicaps (H code), concerned with the disadvantages experienced by the individual as a result of impairments and disabilities; handicaps thus reflect interaction with and adaptation to the individual's surroundings. (WHO, 1980, p. 14)

It can be seen that the scope of the original definition of impairment was physical conditions. This was extended at a later stage to incorporate all impairments: intellectual and sensory. This was in acknowledgement of the fact that psychological effects are associated with all physical conditions and that physiological consequences accompany all intellectual impairments (Barnes, 1999). Moreover, by placing emphasis on physical function, non-medical causes of shortcomings are not included and this eventually fosters the notion of deformity. In addition, the medical model neglects to incorporate non-medical causes of weakness, together with the cultural perceptions of such disabilities. In addition, much of the rehabilitation required by those with disabilities cannot be offered merely by medical professions (Oliver, 2009). Instead, there is a need for societal rehabilitation.

Also, individuals with disabilities are categorised or classified by the medical model in categories, thus leading to them being viewed by the general public as their category, for example, "the blind" or "the mentally ill" (Nagi, 1969). Consequently, categorised individuals, notwithstanding category, are not regarded as individuals but rather as their category (Schur, 1971). This emphasis on the deficit or disability in a person, who also receives a label corresponding to his/her disability, indicates that the medical model inadequately acknowledges that disability is the response of society to impairment. These labels signify society's lack of responsibility. Nevertheless, labels cannot be altogether abandoned as this would increase the likelihood of limited service provision or resources and lesser awareness (Please see Section 2.5 for a detailed discussion on Disability Labels).

A further critique of the medical model is that it neglects to acknowledge that apart from the inherent restrictions caused by impairment, demeaning, offending and belittling social responses may also provoke secondary limitations. Hence, the response of society to persons with disabilities can be as incapacitating as the actual impairment. Furthermore, traditional attitudes to impairment were known to be pathological, signifying that the person was acknowledged either as an admirable hero or a pitiable helpless individual (Barnes, Mercer, & Shakespeare, 1999).

The preceding deliberations on the medical model clearly have significant implications for the educational system in Saudi Arabia specifically with regard to inclusion at the primary school level. Biased attitudes towards persons with disabilities are common, acquired through contact with other people's preconceptions and ignorance (Aboela, 2008).

The medical model is further limited by its notion of measuring the extent of disability, on scales ranging from mild to severe, subject to the degree to which a person departs from a

societal standard. These standards are perhaps man-made concepts developed to safeguard the person not having a disability (Slee, 1996). However, these standards also aid in preserving existing levels of social order (Slee & Allan, 2001). This shortcoming in the medical model is also evident in the Saudi setting as IQ tests are utilised deterministically to place children with learning difficulties on a scale ranging from mild to severe, concurring with the understood standards and to therefore finalise their educational environment (Alabri, 2017).

As seen in this sub-section, the medical model places emphasis on abnormality and inequality in the individual, a complementary model disputing this perspective exists, namely the social model of disability. This will be described in the following sub-section.

2.4.2.2 Social Model of Disability

The social model challenges the inclination of the medical model to connect disability and weakness, contending that persons with disabilities are not always weak, or requiring medical attention (Marks, 1999). This model was developed in response to the medical model of disability (Oliver, 1996), which, as seen, depends on a comparatively clear-cut difference between disability and impairment (Goering, 2015). Impairment, in the social model, is recognised as a bodily condition that is unusual, defined as "lacking part of or all of a limb, or having a defective limb, organ or mechanism of the body" (Oliver, 1996, p. 22). Fundamentally, the possessor of an impairment may or may not negatively assess it (Silvers, 2003). For instance, a person who was born blind may recognise his/her blindness as a manner of existence, rather than as a problem or insufficiency (Kent, 2000). Likewise, and even with respect to developed impairment, it was noted that "impairment is, in fact, nothing less than a description of the physical body" (Oliver, 1996, p. 35). In contrast, disability signifies the "disadvantage or restriction of activity caused by a contemporary social

organization which takes no or little account of people who have physical impairments and thus excludes them from participation in the mainstream of social activities" (Oliver, 1996, p. 22).

As a response to the medical model, the Union of the Physically Impaired Against Segregation (UPIAS) was established in 1976 by the initiators (Oliver, Abberley, Finkelstein and Hunt) of the social model (Chappell, Goodley, & Lawthom, 2001). The social model focuses on both formal and social constructs, and regards disability as the consequence of historic and social elements. Instead of classifying disability as having its place in a broken or weakened body, it differentiates between disability and impairment (Marks, 1999). Disability is recognised by the social model from the perspective of the factors to be blamed for limiting persons with disabilities, ranging all the way from established prejudice to personal bias, from impracticable systems of transport to public buildings which are inaccessible, and also with regard to education (schools, syllabus, and teachers) (Oliver, 2009).

This pioneering view of disability, disputes the medical treatise by diverting attention from the body (Shakespeare, 2006) and offering definitions from the perspective of the manner in which persons with disabilities live. It views the notion of 'disability' as existing away from the responsibility of an individual and offers a novel framework wherein the daily existence of persons with disabilities is considered through a societal lens. Thus, disability is not recognised by this model to be a direct consequence of the impairment of a person but instead as the result of different social hindrances (Boxall, 2002; Shakespeare, 2006). Therefore, the emphasis is on how the needs of persons with disabilities are met and fulfilled by the environment. This embraces a focus on specific components of the existence of children with disabilities that require and justify support. For example, wheelchair access is prohibited if a school lacks ramps. The physical environment is challenging for persons with visual

impairments if there are insufficient resources, such as Braille books or signs. This kind of approach draws attention away from the rehabilitation of persons with disabilities and instead diverts attention to society's need for transformation (Oliver, 2009).

Therefore, it is evident that the social model of disability posits that disability is the result of society's lack of success in offering adequate and appropriate services, and in regarding the requirements of persons with disabilities. Persons with disabilities encounter persecution and undesirable social activities that challenge their very person in different religious, political and economic contexts (Lang, 2000). In a similar manner, disability was viewed by Thomas and Corker (2002) as a kind of persecution involving the societal forcing of limitations for persons with impairments. Disability is viewed exclusively as a social construct by Oliver (2009) and Gallagher (2014) thus making it society's responsibility to adjust to persons with impairment, receiving them as they are.

As a result, attention is directed by the social model to policy and planning in an endeavour to meet the needs of persons with disabilities (Marks, 1999; Smith, Polloway, Patton, & Dowdy, 2014). Through advocacy and support for rights, the social model plays a key role in empowering persons with disabilities (Shakespeare, 2006). Consequently, the social model causes the creation of more socially inclusive policies along with the provision of better support for persons with disabilities to exist in the broader society, taking living autonomously into account (Oliver, 2009).

Nevertheless, the social model of disability has its own limitations. As Shakespeare (2006) observes, "the strength and simplicity of the social model of disability has created as many problems as it has solved" (p. 31). It was contended by Marks (1999), that the model does not sufficiently take the complex social aspects and extensive diversity influencing the production

of disability into consideration, including the diversities in experience caused by gender and ethnicity. Moreover, persons with learning difficulties are inadequately represented by the model (Chappell et al., 2001). This can be attributed to the model's emphasis on the physical sphere, concerning the effects of the physical environment, while this might not be a significant area of impact for persons with learning difficulties (Al-Khatteeb, 2008). In essence, the association between physical, emotional and social factors is not appropriately highlighted by the model (Marks, 1999). In addition, it does not succeed in fulfilling the needs of people when various impairments and/or disabilities are in question (Shakespeare, 2006).

It was argued by Shakespeare (2006) that perceiving disability merely as a problem necessitating the elimination or bypassing of social obstacles is rather obstructive. This will not result in getting rid of all impairments since the relevance or applicability of barriers differs across persons with disabilities. Further, while an individual or group might identify an obstacle, another may not. For example, while holding a telephone conversation is not a problematic experience for a person with a visual impairment, it is for a person with hearing difficulties. Other factors, including price and feasibility, also have to be considered in bidding to eliminate obstacles in the environment for persons with disabilities. Therefore, though access to facilities may be improved and, hence, inclusion of persons with disabilities, the elimination of obstacles is not the final answer. However, provision of segregated or differentiated services on a case-by-case basis could make certain that the quality of the services is high (Shakespeare, 2006).

The social model also does not regard the significance ascribed to impairment for different persons with disabilities (Shakespeare, 2006). Nevertheless, it continues to be an important theoretical system despite its limitations (Barnes, 1999; Shakespeare, 2006). The social model's significance lies in the suggestion that the remedy for impairment should not be

limited merely to medical interventions. Instead, the elimination of social barriers should also be given priority as these also generate problems for persons with disabilities, such as adverse outlooks, biased treatment, physical environments that are inaccessible, and insufficient welfare policies (Shakespeare, 2006; Smith et al., 2014).

From the perspective of education, the burden placed by the medical model on the individual is decreased by the social model (Rieser, 2006). Consequently, the rationale for excluding children with special needs is questioned as these children, similar to children without disabilities, have the right to be included (Middleton, 1999). Priestly (2003) argued that the move to the social model has aided the evolution of several critiques concerning the manner in which society perceives persons with disabilities.

The next section revisits the Saudi view of disability in the light of the preceding discussion on the models of disabilities.

2.4.3 The Saudi view of disability

I revisit the Saudi view of disability here to provide the reader with an understanding of the factors that underlie the viewpoints in the country. Overall, there is greater evidence that the Medical Model of Disability is the model that is prevalent in my country.

As mentioned earlier, the Muslim perspective with regard to disability can be explained by their faith and confidence in Allah. Thus, disability has been variously considered as retribution for wickedness (Afeafe, 2000), and as a test of patience (of an individual or his/her family) which if successfully faced facilitates entry into Paradise (Al-Mousa, 2008). It has also been perceived as a condition that encompasses vulnerability, lack of independence, limited mobility outside the home, poor quality of existence and non-productivity (Al-Gain & Al-Abdulwahab, 2002). Moreover, this viewpoint leads to poor quality of education which

can be attributed to the fact that autonomous living is not anticipated from persons with disabilities (Fandy, 2007). Consequently, opportunities for education are limited, especially for persons with significant learning difficulties (Fandy, 2007). Moreover, persons with disabilities in Saudi Arabia are often stigmatised and several derogatory terms may be employed to indicate them, such as feeble-minded, _idiotic, _imbecilic, and mentally or morally defective (Alabri, 2017). Therefore, it can be seen that social traditions and conformist religious beliefs have a considerable influence on education in the country.

Overall, it is evident that the medical model of disability is at present prevalent in the country as disability is associated with the individual and is responsible for persons with disabilities being viewed as pitiable or ridiculous, and hence being socially excluded (or stigmatised). However, the basis for disability is perceived to be the will of God (Allah). Nevertheless, Islamic teachings also submit that all things, good or bad, are as per the will of God (Allah) and that any problems that arise must be resolved. The existence of diverse understandings of Islamic doctrine has caused confusion with regard to the applicability of the social or medical model in the Saudi context. For instance, Alabri (2017) suggested that the social model was more helpful and would be a more appropriate in the particular context of Saudi cultural and religious beliefs. It can also be seen that the efforts of the Government of Saudi Arabia to promote the education of persons with disabilities in special and general education settings (see Section 2.10.2 for a review of special education in Saudi Arabia) is possibly an indication that the social model of disability is the way forward in the country. The next section provides an overview of the concept of labelling in the context of disability.

2.5 Disability Labels

The origins of the concept of labelling of can be found in the 1960s in the work of Goffman (1963) where it was declared that difference is ascertained by the normative or ascendant in society, thus resulting in the stigmatisation of individuals for their deviance from the standard (Link & Phelan, 1999; Pescosolido, Martin, Lang, & Olafsdottir, 2008). According to the social construction of identity, persons who do not conform to standardising expectations are in danger of becoming marginalised from their social settings (Harvard Medical School, 2010). In other words, they are stigmatised. Insights into the outlooks of dominant members of a society of groups located outside the standard are offered by the grouping and labelling of stigmatised persons (Link & Phelan, 1999).

In the context of special education, several countries require a child to have a label of disability to be entitled for special education (Blackorby, Wagner, Cadwallader, Cameto, Levine, & Marder, 2002; Klingner, Blanchett, & Harry, 2007; Lauchlan & Boyle, 2007). Nevertheless, as noted several years ago by Goffman (1963) and as retold by Foreman (2005), disability labels and classifications turn out to be weighed down "with meaning" (Foreman, 2005, p. 57). The definition of the opportunities and boundaries of a person can be substantially influenced by disability labels. For instance, using a disability label to describe children can cause them to encounter stigma and reduced expectations from peers and teachers (Lauchlan & Boyle, 2007).

The use of labelling has been debated for several years in both psychology and education. This is not unexpected since the association of a label with a child governs the manner in which they are assessed, depicted, and aided. Practices associated with intervention,

certification, training, and funding are identified by the classification system in use (Auer, 2014).

Label usage has resulted in both favourable and detrimental impacts for both professionals and the persons being labelled. It is believed by many that individuals are benefited by diagnostic labels as they reveal the strengths, weaknesses, capabilities, and aptitude of a person while offering insight to suitable and successful treatments and interventions for the person, and also a method of professional communication. A contrasting view is provided by those who argue that incorrect impressions may be prompted by labels with regard to a person's capabilities and difficulties, and may work to bias professionals (e.g., teachers) against the person's actual capacity. Further, they argue that labels have limited to nil treatment validity. Additionally, harmful stereotypes and bias may be elicited by labels that would not otherwise be present (Auer, 2014).

A common outcome of assigning labels to children is labelling bias which is the expectations that may be developed by people towards an individual who has been assigned a certain label (Fox & Stinnett, 1996). Emotional, reasoning, and societal facets are encompassed by this phenomenon and evidence of this exists even among professionals of superior knowledge, education, and capability. Tesser (1995) observed that people use their own opinions and hearsay to influence their views about others. For instance, the labelling of children can cause distinct expectations for the labelled children (Brophy & Good, 1970; Cooper, Findley, & Good, 1982; Glock, 1972; Rosenthal & Jacobson, 1968). Moreover, it is possible for a label to become connected with a person and the associations can grow to become established (Palmer, 1983). Several times, a child is assessed, allotted a label, and then regarded, because of the label, in a different way (Carroll & Reppucci, 1978; Fogel & Nelson, 1983; Smith, Flexer, & Sigelman, 1980). Labelling bias may negatively affect children who are assigned

labels in school. After the categorisation of a child with a special education label a lessening in academic accomplishment is often evident (Rosenthal & Jacobson, 1968).

Allan and Youdell (2017) offer a different perspective on the use of labels in legislation related to special education. They mention that the use of the label 'children/young people with SEND' indicating persons with special educational needs and/or disabilities in the UK's Code of Practice for Special Educational Needs and Disability: 0 to 25 years effectively 'ghosts' the very persons the Code intends to aid by omitting "any specificity about the nature of these special educational needs or disabilities, and any diagnoses that might underpin them" (p. 6). It could be seen here that labels can serve to mask the individual needs of a person with a disability by considering them, to all intents and purposes, to be the same as every other person with the same disability.

Despite the controversy surrounding labelling, labels continue to exist. One reason is that most countries have a legal stipulation that a child must be diagnosed with a disorder to be considered for special education services. For instance, in the KSA, the RSEIP (MoE, 2002) offers information about categories of disability and the mandatory procedures that direct decision-making with regard to establishing eligibility for special education services in the country. Similar legislations or guidelines exist in the United States (Reger, 1982). These laws, since development, have been adapted to grouping systems that classify children with a range of behaviours, features, and disabilities. As a result of this classification, a child is assigned a label. The early use of labels was associated with favourable purposes in special education. At times, however, they have been recognised as hampering the successful provision of special education services to children within the context of schools (Field, Hoffman, St. Peter, & Sawilowsky, 1992; Foster & Ysseldyke, 1976; Rosenthal & Jacobson, 1968).

The labelling of children has created differences in the expectations of the child being labelled (Brophy & Good, 1970; Cooper et al., 1982; Rosenthal & Jacobson, 1968). For instance, Labelling bias can cause school personnel to form opinions or expectancies for a student with a disability even before they directly interact with or observe the student (Carroll & Reppucci, 1978; Fogel & Nelson, 1983; Fox & Stinnett, 1996). As mentioned earlier, while the early intent of labels was associated with favourable outcomes in special education, they have been revealed to obstruct the accomplishments of children in receipt of the services (Field et al., 1992; Foster & Ysseldyke, 1976). For instance, school personnel can adversely interpret a label such as 'emotional disturbance" to indicate that a student is not as capable of being successful unlabelled students (Field et al., 1992; Foster & Ysseldyke, 1976; Rosenthal & Jacobson, 1968). On the other hand, expectations may be biased in the opposite direction for more positive labels such as 'gifted' and 'talented' (Auer, 2014).

Lauchlan and Boyle (2007) provided arguments and counter-arguments for the use of labels in special education. I list these in Table 2.1.

Table 2.1: Arguments and Counter-Arguments for the use of labels in special education

Source: Lauchlan & Boyle, 2007

Sl #	**Argument**	**Counter-Argument**
1	"Diagnosis, or a label, leads to treatment: it opens doors for resources" (p. 36)	"A label is applied but there is a lack of consideration regarding the nature of intervention" (p. 36)
2	"Labeling leads to awareness raising and promotes understanding of particular difficulties" (p. 37)	"Labelling leads to stigmatisation" (p. 37)
3	"Labels reduce ambiguities and provide clear communication devices for professional exchanges of information" (p. 38)	"There is no clear agreement amongst professionals about how labels are decided. Moreover, labels lead to generalisation of children's difficulties, neglecting specific individualised issues." (p. 38)
4	"Labels provide comfort to children and families by 'explaining' their difficulties" (p. 40)	"Labelling leads to a focus on within-child deficits and possibly lowered expectations" (p. 40)
5	"Labels provide people with a social identity: a sense of belonging to a group" (p. 40)	"Labelling can lead to teasing, bullying, and low self-esteem." (p. 40)

Lauchlan and Boyle (2007) concluded by observing that "The preceding arguments would appear to suggest that labels are more unhelpful than helpful for the practice of those working in special education" (p. 41). However, it would seem to appear that the use of labels if used judiciously can be beneficial especially in the context of special edcuation as they can ensure

that a student with a specific type of disability obtains at least the core minimum of services and support he/she requires to be able to participate in an inclusive educational environment.

In this thesis, I have used the labels students with SEN and students with disabilities interchangeably, indicating that in my mind, at least, these labels are synonymous.

The next section examines the attitudes towards persons with disabilities.

2.6 Attitudes Towards Persons With Disabilities

The complex and multi-dimensional characteristics of attitudes is recognised by theorists (Vignes et al., 2009). Triandis, Adamopoulos, and Brinberg (1984) described attitudes as possessing emotional and cognitive elements that influence a person to behave in a certain manner subject to the social situation. In other words, attitudes comprise affective, cognitive, and behavioural elements (Cook & Selltiz, 1964; Triandis, 1971). An attitude's cognitive dimension encompasses the opinions, views, and principles of both the attitude holder and the attitude referent. On the other hand, an attitude's affect component involves emotional experiences related to the attitude referent. The third, or behavioural, component of attitudes involves both the predisposition and intent to behave in an expected manner along with the behavioural responses enacted by the attitude holder to the attitude referent (Antonak & Livneh, 1988; Triandis et al., 1984; Vilchinsky, Findler, & Werner, 2010).

Moreover, attitudes differ in their focus, varying between negative and positive or reaching a point where individuals are not interested or are not aware of their feelings. Attitudes also differ in their object (towards something or somebody), their strength (more or less strong), and their steadiness (the intensity of the feelings of an individual) (Anderson, 1997). Attitudes are influenced by various factors (Innes & Diamond, 1999; Scheepstra, Nakken, & Pijl,

1999). Moreover, early childhood years have a strong impact on them (Innes & Diamond, 1999).

In the context of disability, attitudes can encompass various spheres pertaining to the inclusion of persons with disabilities, discrimination against persons with disabilities, benefits (e.g., wisdom, perspective) related to the possessing of a disability, and the outlooks of persons with disabilities (Power, Green, & The WHOQOL-DIS Group, 2010). For instance, attitudes about the outlooks for a person with a disability will influence opinions regarding the practicality of what a person with a disability aspires to achieve in his/her existence (Fioramonti, Ebener, & Arrastia-Chisholm, 2018).

A regular finding by scholars (e.g., Barr & Bracchitta, 2012; Hergenrather & Rhodes, 2007; Power et al., 2010) studying attitudes towards disability is that adverse undercurrents may be carried by individual and social attitudes towards disability. Goddard and Jordan (1998), twenty years ago, commented that individuals with disabilities continued to be regarded as different, of lower social desirability, needy, cut off, and even emotionally unsound. In another early study from the last century, Altman (1981) observed that stereotyping lenses that emphasise differences and attach despondency and reliance have been conventionally used to view individuals with disabilities. Moreover, public perceptions (as directed by various forms of media and social fora) of individuals with disability either glorify (e.g., as selfless, brave) or disparage (e.g., as needy, wretched, thankless, or extraordinary) them (Daruwalla & Darcy, 2005). In some cases, persons *without* disabilities have been found to possess a "mixed stereotype" of persons *with* disabilities (Rohmer & Louvet, 2012, p. 732, emphasis mine). The findings of this study indicate that at an obvious level, persons with disabilities were associated with greater cordiality but less competence in contrast to persons without disabilities. In contrast, at the implied level, they were associated not only with lower

competence but also lower cordiality. The mixed pattern between cordiality and competence typically detected at an obvious level may be founded on social compulsions against bias and inequity (Rohmer & Louvet, 2012). Moreover, this manner of prejudiced stereotyping may cause lessened expectations, vocational stereotyping (role entrapment), avoidable dependence, and disparate societal status in associations (Smart, 2001).

Variables affecting the attitudes towards persons with disabilities has been scrutinised with particular emphasis on the features either of the attitude holder or the attitude referent (Weisel & Zaidan, 2003). Variables such as, type of disability and gender, have been examined with regard to the attitude referent and have been found to be related to distinct attitude valence (McCaughey & Strohmer, 2005; Ostapczuk & Musch, 2011; Smart, 2001; Weisel & Florian, 1990). On the other hand, variables such as, cultural background and standards, profession, and certain character features have been examined concerning attitude valence for attitude holders (Goreczny, Bender, Caruso, & Feinstein, 2011; Keller & Siegrist, 2010; Loo, 2001; Tervo, Palmer, & Redinius, 2004; Vilchinsky et al., 2010; Westbrook & Legge, 1993).

Other variables related to more favourable attitudes towards persons with disabilities are levels of contact (greater) and quality of contact (better) (Barr & Bracchitta, 2012; Krajewski & Flaherty, 2000; Seo & Chen, 2009; Smart, 2008). Gender also has significance with women typically exhibiting more favourable attitudes to persons with disabilities than men (Goreczny et al., 2011; Miller, 2010; Weisel & Florian, 1990) although some findings indicate that the variances in attitudes between the genders decrease with the passage of time (Loo, 2001). Lastly, several studies have been performed to investigate the probable association between extent of religious participation and varying attitudes towards persons with disabilities (e.g., Florian, Weisel, Kravetz, & Shurka-Zernitsky, 1988; Leyser & Romi, 2008; Lifshitz &

Glaubman, 2002; McQuilkin, Freitag, & Harris, 1990; Weisel & Zaidan, 2003) and found that religious affiliation does not inevitably imply more favourable attitudes towards such persons.

Since the emphasis of this study is to examine the perceptions of teachers with regard to ICT usage in the case of students with intellectual disabilities, the next sub-sections will examine teachers' attitudes to children with SEN, in general, and children with intellectual disabilities, in particular, in the context of inclusive education.

2.6.1 Teachers' Attitudes to the Inclusion of Students with SEN

The perspectives of teachers have a great influence on their attitudes towards inclusion and consequently their practice of teaching in inclusive environments (Avramidis & Norwich, 2002). Teachers who are motivated to assume responsibility for teaching a wide variety of students and are confident of their teaching and administrative skills can successfully take part in inclusive programmes. It has been contended by several studies (e.g., Avramidis, Bayliss, & Burden, 2000a; Avramidis et al., 2000b; Bradshaw & Mundia, 2006; Forlin, Douglas, & Hattie, 1996) that favourable attitudes of teachers, specifically, are crucial for the successful inclusion of students with SEN.

Huang and Diamond (2009) reported that general education teachers, in general, believed in the benefits of inclusion for children with and without disabilities. Other studies (e.g., Avramidis et al., 2000a, 2000b; Bennett, Deluca, & Bruns, 1997; Eiserman, Shisler, & Healey, 1995; Scruggs & Mastropieri, 1996) have proposed that the likelihood of teachers supporting inclusion is greater when restricted instructional modifications are necessitated. Moreover, this is even when they have limited self-reported knowledge of dealing with children with disabilities. However, when examining the readiness of teachers to be involved

in inclusive practices in the context of their own classrooms, the results demonstrate that the behaviours of teachers may not correspond with their beliefs.

The attitudes of American teachers towards inclusion was scrutinised by Scruggs and Mastropieri (1996) in a meta-analysis. They examined scrutinised 28 survey studies from the period 1958 to 1995 and found that inclusion was considered by 40% of the participants to be a reasonable claim for most students. This finding was, however, found to be influenced by the nature of the students' disability. Scruggs and Mastropieri (1996) also found that there had been no changes to the attitudes of the teachers over the studied period. In the same year, Vaughn, Schumm, Jallad, Slusher, & Saumell (1996) used focus group interviews to examine the attitudes of American special education teachers who did not teach in inclusive schools. These teachers reported very adverse views concerning inclusive schooling. However, this outcome was explained by the notion that a teacher's teaching experience (in years) could effectually influence his/her perceptions and beliefs on methods and systems of teaching. Other studies (e.g., (LeRoy & Simpson, 1996; Sebastian & Mathot-Buckner, 1998; Villa, Thousand, Meyers, & Nevin, 1996) revealed an improvement in the attitudes of teachers towards inclusion when they were personally involved in inclusive settings.

A study in the UK by Smith and Smith (2000) examined the perspectives of early-childhood and elementary general education teachers. Overall, the participants of this study revealed favourable attitudes to inclusion. However, they also drew attention to several factors that had a significant influence on the real-world management of inclusion, such as the provision of professional training for teachers (both general and special education), uniform class sizes, severity of disability, extent of support and cooperation, and sufficient time for preparation.

Another study in the UK by Avramidis and colleagues (2000a) examined the attitudes of primary and secondary teachers, some of whom had prior experience in inclusive education while others had not. Again, some of the participants had exposure to professional development programmes (i.e., training) related to inclusive education. Using mixed methods Avramidis and colleagues (2000a) found that teachers with experience and training in inclusive education reported more favourable attitudes to inclusion.

Subban and Sharma (2005), in an Australian study, examined the concerns and perspectives of general education teachers towards inclusion. Teachers in this study had prior experience with students with special education needs and had received professional training in special education. The study found that the participants demonstrated great confidence with regard to including students with disabilities in their classrooms. Additionally, continuing training, experience, and knowledge were found to be required for teachers to be assured and effective in inclusive education settings. Moreover, the study found that the severity of a student's disability and previous exposure to persons with disabilities greatly influenced the attitudes of teachers towards inclusion. In comparison, Woolfson and Brady (2009) investigated mainstream general class primary school teachers' attitudes concerning teaching students with disabilities and found that their prior teaching and training experiences had no significant effect on the teachers' beliefs about their self-efficacy in the context of inclusive education.

It could be seen that many of the studies investigating the attitudes of both general and special education teachers towards inclusion revealed several parallels and variances in the participants' attitudes. For instance, negative attitudes were not displayed by general or special education teachers who took part in a study by Semmel and colleagues (Semmel, Abernathy, Butera, & Lesar, 1991). Conversely, a study by Elhoweris and Alsheikh (2006) reported a largely favourable attitude towards including students with disabilities in the

general classroom. Nevertheless, special education teachers showed more support for the notion of full inclusion. Another study by Shade and Steward (2010) investigated pre-service general and special education teachers who had enrolled in a mandatory special education course. This study found that the attitudes of both types of teachers were appreciably and favourably altered from the time of their enrolment to the time of their completion of the course, a finding consistent with the findings of a study by Buell and colleagues (Buell, Hallam, Gamel-McCormick, & Scheer, 1999) that highlighted the significance of professional development programmes for teachers (both general and special education). Buell and colleagues (1999) further found that the confidence of special education teachers regarding their capacity and preparedness to work in inclusive settings was greater than those of their general education colleagues.

de Boer, Pijl and Minnaert (2011) examined the attitudes of teachers towards the inclusion of students with special educational needs in primary schools across a 10-year period (1998–2008), and found that the teachers, in general, had negative attitudes towards inclusive education. Moreover, the training and experience of teachers, and the student's type of disability, were found to have influenced the attitudes of teachers (de Boer et al., 2011). This study also found that students with intellectual disabilities were more frequently rejected by their teachers, and more negative attitudes were exhibited towards them by the teachers, in contrast to students with sensory and physical disabilities.

A study with an experimental group of 34 children with intellectual disabilities fully included in general education classrooms with support, and a control group of 34 comparable children in special schools was performed by Dessemontet, Bless and Morin (2012). This study found that the children in the general education classrooms demonstrated a little more advancement in literacy skills than their counterparts in special schools. However, in the matter of

mathematics and adaptive conduct no variances could be determined between the two groups. Overall, it could be seen that significant research attention has been paid to the attitudes of teachers to children with disabilities. Nevertheless, the attitudes of teachers to children with disabilities could not be predicted with any degree of accuracy.

The next section examines the attitudes of teachers to children with intellectual disabilities, in keeping with the context of the present study.

2.6.2 Teachers' Attitudes to Including Children with Intellectual Disabilities

The attitudes of teachers towards children with intellectual disabilities in their classrooms have received research attention across the globe. For instance, a study by Alghazo and Gaad (2004) used mixed methods to scrutinise teachers' views in the United Arab Emirates (UAE). The influence of gender, prior teaching experience, and the severity of student disability on the participants' responses was taken into consideration. The study found that teachers in the country had unfavourable attitudes towards the inclusion of students with intellectual disabilities in the general classroom. Specifically, the inclusion of students with severe intellectual disabilities was opposed and female teachers presented more positive attitudes than their male counterparts. Moreover, teachers with greater than five years teaching experience showed lower acceptance in respect of the inclusion of such students.

The attitudes of elementary school teachers towards the educational inclusion of students with intellectual disabilities was investigated by Memisevic and Hodzic (2011) in a study in in Bosnia and Herzegovina (BiH) using the *Attitudes towards Inclusion* questionnaire. The study found that the notion of inclusion was supported by a little more than half of the teachers. Moreover, the teachers believed that they did not receive adequate support to deal successfully with the matter of inclusion. In contrast to the study by Alghazo and Gaad

(2004), this study could not attribute any differences in attitude to the gender or experience of the participating teachers. Nevertheless, teachers of lower elementary students were inclined to be more supportive towards the inclusion of students with intellectual disabilities than teachers of higher elementary students.

Hastings and Oakford (2003) used the Impact of Inclusion Questionnaire (IIQ) to investigate the attitudes of pre-service teachers to the inclusion of students with intellectual or emotional and behavioural disabilities. This study found that the attitudes of the pre-service teachers were more favourable towards the inclusion of students with intellectual disabilities. In comparison to the Memisevic and Hodzic (2011) study, this study revealed more favourable attitudes among pre-service teachers who were qualified to deal with older students. However, the teachers' level of teaching experience did not contribute to any significant differences in attitudes.

The next sub-section examines the attitudes of teachers to inclusion in Saudi Arabia.

2.6.3 Attitudes of Teachers to inclusion in Saudi Arabia

A systematic review by Alkhateeb, Hadidi, & Alkhateeb (2016) reported a significant quantity of research (thirty-three studies) in Arab countries investigating the attitudes towards the inclusion of children with developmental disabilities in the period 1990 to 2014. These studies scrutinised the attitudes and perceptions of various groups of persons, including general and special education teachers, towards inclusive education. About a third of the studies (e.g., Alghazo & Gaad, 2004; Almotairi, 2013; Alshahrani, 2014; Anati, 2012; Bradshaw, 2009; El-Ashry, 2009) reported negative attitudes to inclusion whereas another third reported favourable attitudes and supportive views (e.g., Abbs, 2009; Alanzi, 2012; Dukmak, 2012). In contrast, three other studies reported impartial or diverse outlooks and

opinions (e.g., Al-Kindi, Al-Juhashi, & Al-Saffar, 2012). The same review found that many studies which reported favourable opinions of and outlooks towards the inclusion of children with development disabilities also indicated that these opinions and outlooks depended on certain factors such as, sufficient preparedness of teachers, adequate budgeting to support inclusion, teacher support and school accessibility, and availability of special groups of essential skills in the children with disabilities (Alkhateeb et al., 2016). In addition, the educational accomplishment of individuals, severity and type of disability, age, and prior encounters with individuals with disabilities was also reported to influence the perceptions and attitudes of teachers towards inclusive education. An associated finding was that the attitudes of special education teachers towards inclusion were more favourable than their counterparts in general education. Moreover, the attitudes of mainstream teachers were more favourable towards inclusive education (Alkhateeb et al., 2016).

An early study in Riyadh, Saudi Arabia by Alsaratawy, Alsaratawy, & Garar (1988) investigated the attitudes of teachers and headteachers towards inclusion in regular schools. The study found that the attitudes of most of the participants towards the inclusion of students with intellectual disabilities were adverse which could be explained by their viewpoint that the low IQ of these students would constrain their understanding of the complicated syllabus of regular schools. On the other hand, more positive opinions were reported towards students with hearing, visual, or other physical disabilities. In addition, male participants displayed less positive outlooks in comparison to their female counterparts. On the whole, this study revealed that the type and perhaps the extent of disability affected the attitudes of teachers and headteachers in Saudi Arabia towards inclusive education.

In a later study examining the attitudes of teachers and trainee teachers, Alsaratwy (1995) found that special education teachers and trainee teachers were more likely to have favourable

opinions on inclusion than general education teachers. The favourable opinions of the special education teachers were attributed to their training about SEN and/or their authentic knowledge of students with SEN. In contrast, the favourable opinions of the trainee teachers could be attributed to their limited encounter with actual teaching. Additionally, the study found that the type of disability affected the attitudes of the teachers. For instance, while teachers supported the inclusion of students with slight disabilities (e.g., partial visual or hearing deficits) they resisted the inclusion of students with graver disabilities. Experience of the education system, SEN awareness, and optimism about the teaching profession also influenced the outlooks of the teachers.

A study by Abduljabbar and Masoud (2000) investigated the attitudes of principals and teachers towards inclusive education in Saudi Arabia. They found significant differences of opinion regarding inclusion which could be attributed to position, educational qualification, type of disability, and manner of inclusion programme. It could be seen that the type of disability influenced the outlooks with misgivings being revealed by teachers about the inclusion of students with behavioural disorders and severe learning difficulties. More positive outlooks were associated with specialist training and SEN credentials.

Al-Faiz (2006) examined the attitudes of teachers to the inclusion of students on the autism spectrum in Saudi Arabia and found, in general, that the attitudes of the teachers were positive. This change in attitude from the earlier studies examined in this section could be understood to indicate that some of the preliminary misgivings with connection to inclusive education could have been mitigated with experience thus proving the findings of earlier studies (e.g., Avramidis & Norwich, 2002; El-Ashry, 2009) that experience plays a significant role in influencing the attitudes of teachers to inclusion.

A more recent study by Alanazi (2012) examined the attitudes of parents and teachers towards inclusive education and found that Islamic principles essentially informed the views towards and process of inclusive education in Saudi Arabia particularly those concerning diversity and fairness. The country's cultural traditions were another influence. Overall, the outlooks of the participants of this study to inclusion were positive except where children with cognitive impairments were concerned.

Alquraini (2012) performed a quantitative study to investigate the attitudes of special and general education teachers towards the inclusion of students with severe intellectual disabilities in general classrooms in the KSA. In contrast to studies performed in other countries (e.g., Memisevic & Hodzic, 2011), he found that general education teachers and male teachers had more positive outlooks to inclusive education than special education teachers and female teachers. Also, this study did not identify any significant influence on the teachers' attitudes due to grade taught, teaching experience, educational level, or exposure to a family member with a disability. Further, this study found that teachers in the KSA had more negative attitudes towards the inclusion of students with severe disabilities in general schools.

Overall, it could be seen that the attitudes of teachers and principals in schools in Saudi Arabia were affected by various factors, such as manner and degree of disability, lack of training, insufficient experience, and the sociocultural context of Saudi Arabia.

The next section examines the factors affecting teachers' attitudes to inclusion.

2.6.4 Factors Affecting Teachers' Attitudes to Inclusion

The examination of the attitudes of teachers towards inclusion revealed that various factors affected their attitudes. These factors can be categorised by their association with the teachers themselves, the school environment, and the students with disabilities.

Teacher-related factors: As caretakers of the environment and activities in classrooms, it could be inferred that they would be one of the chief persons behind inclusive policies. However, several factors have been recognised to influence their attitudes, such as age, education, and training (Avramidis & Norwich, 2002; Bornman & Donohue, 2013; Forlin, Loreman, Sharma, & Earle, 2009; Scruggs & Mastropieri, 1996).

School-related Factors: The supports provided to teachers can affect their attitudes towards inclusive education (Avramidis & Norwich, 2002). Supports in school can take various shapes and typically should be customised keeping the specific requirements of a student in mind. Supports can be of various types, such as: teacher aides, restricted class sizes, flexible teaching schedules, special equipment, adapted tests for the student, etc. (Donahue & Bornman, 2015).

Student-related Factors: The nature of a student's disability has been found to influence teachers' attitudes (Avramidis & Kalyva, 2007; Huang & Diamond, 2009; Scruggs & Mastropieri, 1996). This could be because more complex learning needs are present in students with more severe or multiple disabilities. Moreover, they need greater adjustments to the syllabus and personal tutoring. Avramidis and Kalyva (2007) found that students with severe intellectual disabilities (brain injury/neurological disorder), sensory impairments (visual, hearing), or autism were considered by teachers to be the most challenging to incorporate in an inclusive classroom. This could be because in contrast to students with mild

disabilities or students who do not hamper the learning of their classmates (e.g., those with Down syndrome or weak communication capabilities), students with considerable disabilities or autism or emotional or behavioural difficulties, require significant effort from the teachers (Avramidis et al., 2000a, 2000b; Buysse, Wesley, Keyes, & Bailey, 1996; Eiserman et al., 1995). As an aside, it must be noted that different researchers use different types of disability to represent behavioural, learning and language, physical, and severe disabilities. For example, Huang and Diamond (2009) used Attention-Deficit Hyperactivity Disorder (ADHD) to represent behavioural difficulties, Down syndrome to represent learning and language disabilities, cerebral palsy to represent physical disabilities, and severe intellectual disabilities to represent severe disabilities (p. 174). It must be also noted that teachers, in such studies, were asked questions that included only a disability label (e.g., learning disability) or overall zone of need (e.g., vision, mobility) without information about the individual strengths and challenges of a child. Hence, there was a great likelihood that these questions reflected not only the teachers' conventional awareness of various disability labels but also the adverse meanings associated with them (Foreman, 2005; Norwich, 1999).

The next section debates the definition of intellectual disability.

2.7 Defining intellectual disability

The popular understanding of intellectual disability is that it is a condition of defective cognitive performance, which, in turn, has widespread consequences on the existence of the persons thus labelled (Bennett, 2011; Carr & O'Reilly, 2016; Harris, 2006). However, since the early period of categorisation of mental conditions, there has been an ongoing debate with regard to its characteristics and definition. Certainly, the terms used to describe intellectual deficits have evolved over the past century. For instance, in the early part of the twentieth

century, popular diagnostic terms included imbecility, idiocy, mental subnormality and moronity (Harris & Greenspan, 2016). It could be inferred, from these diagnostic terms, that society has typically undervalued persons with intellectual deficits and as a result, the scientific terms employed to describe them have become terms used to deride people. Accordingly, classification systems which attempt to define intellectual disability must take societal stigma into consideration and endeavour to create terms that are non-derogatory (Harris & Greenspan, 2016). For instance, in 1959, the American Association on Mental Retardation (AAMR) proposed the term "mental retardation" to replace these belittling terms and defined it as signifying "subaverage general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behavior" (National Research Council [NRC], 2002, p.23). More recently, the decision to replace the term mental retardation with intellectual disability corresponded to the revision of the two major classifications of mental disorders: the ICD-10 and the American Psychiatric Association (APA)'s Diagnostic and Statistical Manual of Mental Disorders ([DSM], Harris & Greenspan, 2016). Accordingly, the diagnostic term intellectual disability in DSM-V is the equivalent of intellectual developmental disorders in ICD-11 (APA, 2013).At the present time, classification systems give prominence to either the neurodevelopmental disorder causing intellectual disability (APA, 2013) and the consequent deficiencies in adaptive thinking and operating in scholastic, societal, or real-world environments; or to impairment, deficiencies in operation, and the recognition of necessary supports (Schalock et al., 2010; Schalock, 2011).

Intellectual deficiencies were described generally by Esquirol (1845) as disorders of inadequate or partial mental progress, originating from recognised (or unspecified) biological or circumstantial causes. In his discourse on mental disorders, Esquirol (1845) identified two

levels of Intellectual Disability (ID): idiot and imbecile. In regard to the idiot, he suggested that, rational and ethical faculties do not mature, recording that "Incapable of attention, they cannot control their senses. They hear but do not understand; they see but do not regard. Having no ideas, and thinking not, they have nothing to desire…" (Esquirol, 1845 , p. 467). In contrast, the imbecile had nearly normal intellectual abilities yet would never achieve knowledge typical for age, convential educational level, or usual social associations (Scheerenberger, 1983). In 1846, Seguin acknowledged these two groupings and added feeble-mindedness and superficial retardation to them (Scheerenberger, 1983). In this context, Intellectual Disability (ID) or Intellectual Developmental Disorder (IDD) can be regarded primarily as an insufficiency of cognitive advancement that takes placing during growth. Insufficient cognitive advancement during growth affects adaptive thought and may cause functional deficiencies and disability (Harris & Greenspan, 2016).

The preceding discussions suggest that there is no single authorised definition of the term Intellectual Disability, which indicates that the notion of continues to be accompanied by uncertainty with regard to its existence. This can also be seen in the lack of agreement between the respected classification systems, such as the World Health Organisation's International Classification of Functioning, Disability and Health (ICF) and the International Classification of Diseases (ICD), and the American Association of Intellectual and Developmental Disabilities (AAIDD), with regard to the definition of intellectual disability. Nevertheless, intellectual disability is described by all globally utilised classification systems as the simultaneous presenting of deficits in intellectual and adaptive behaviour that can be assessed scientifically, and which emerge during the developmental phases of existence. While systems of classification have gone through frequent revisions, a prevalent basis of the

manner in which intellectual disability is identified has been the linking of psychologically measured imperfect intelligence and behavioural difficulties (Altermark, 2016).

Nevertheless, there are several acknowledged fundamental problems regarding the dependence of definitions on intelligence testing (i.e., of the intelligence quotient [IQ]) and the descriptive exercise of intellectual disability. Firstly, the measurement and conceptualisation of intelligence differs across psychometric tests and this can justify the finding that that IQ-test outcomes vary with IQ-tests (AAIDD, 2010). Also, it has been observed that in particular tests 'nonstable' inconsistencies take place between 'potential' and definite accomplishment (Borowski, Carothers, Howard, Schatz, & Farris, 2007). Another reason for disquiet for advocates of the correctness and everyday survival of IQ is the supposed 'Flynn-effect', indicating that mean IQ-scores in any populace rises over time. Essentially, this indicates that the number of persons satisfying the 'below IQ 70' condition for being intellectually disabled progressively reduces until tests are re-calibrated (O'Reilly & Carr, 2007). In other words, the timing of assessment influences the magnitude of the share of the population that will satisfy the conditions for intellectual disability. Thus, the choice of both test and timing might control whether or not a person is identified as 'intellectually disabled.'

For instance, the AAIDD (2009) views intellectual disability as a disability commencing before the age of 18 and "characterized by significant limitations both in intellectual functioning (reasoning, learning, problem solving) and in adaptive behavior, which covers a range of everyday social and practical skills," and the ICF acknowledges the interface between health, circumstantial and societal settings with regard to operating as mentally retarded. It could be seen from these that both the AAIDD and the ICF perceive intellectual disability merely as a disability that is typified by significant shortcomings in adaptive

conduct and intellectual operation (Salvador-Carulla & Saxena, 2009). In Saudi Arabia, the Ministry of Education in Saudi Arabia has adopted the AAIDD definition of intellectual disability (Alnahdi, 2014). This definition will also drive this study's understanding of the term intellectual disabilities wherever it is utilised in this thesis.

The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) (APA, 2013) defines intellectual disability (intellectual developmental disorder) as a "disorder with onset during the developmental period that includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains" (APA, 2013, p.33). This definition places emphasis on the connection between developmental deficits in overall mental operation and consequent problems in adaptive thought and operation. However, these aspects were not explicitly connected in DSM-IV-TR or in the AAIDD definition and are frequently regarded as standalone conditions, regularly indicated to be the definition's two prongs (Harris & Greenspan, 2016).

Mental retardation is considered by the ICD-10 to be a health condition occasioned by the mind's incapacity to fully develop. The ICD specifies four levels of mental retardation measured in terms of IQ (intelligence quotient): mild (IQ 50–69), moderate (IQ 35–49), severe (IQ 20–34), and profound (IQ below 20). However, the ICD-10 also stipulates that IQ must not be employed as the decisive aspect; instead clinical outcomes and adaptive conduct must also be utilised to establish the degree of intellectual operation (Kamlager, 2013). In other words, IQ cannot be truly considered to be an accurate element in the assessment of intellectual disabilities, which corresponds to the previously stated understanding that both the nature of the test and its timing might control a person's identification as intellectually disabled. The DSM-5 also specifies different levels of severity for intellectual disability: mild,

moderate, severe and profound. However, these are based on adaptive operation, and not IQ measures, on the basis that the level of support required by an individual is determined by his/her level of adaptive functioning (APA, 2013). Thus, it could be inferred that persons with intellectual disability are not alike and hence measures to facilitate their inclusion in educational environments would have to be tailored to suit individual needs.

The next section describes the characteristics associated with intellectual disability.

2.8 Characteristics of intellectual disability

Intellectual disability (intellectual developmental disorder), according to DSM-5 (APA, 2013), is characterised by:

> deficits in general mental abilities, such as reasoning, problem solving, planning, abstract thinking, judgment, academic learning, and learning from experience. The deficits result in impairments of adaptive functioning, such that the individual fails to meet standards of personal independence and social responsibility in one or more aspects of daily life, including communication, social participation, academic or occupational functioning, and personal independence at home or in community settings (APA, 2013, p.31).

These characteristics are separated into three (A-C) criteria which must be met for a person to be diagnosed with intellectual disability:

A. Deficits in intellectual functions. Intellectual functions include aspects such as rationalising, scheduling, problem-solving, conceptualising, discrimination, scholastic knowledge, and discovering from experience. These must be established by both medical evaluation and personalised, uniform assessment of intelligence.

B. Deficits in adaptive functioning. These may cause a lack of success with regard to conforming to age-related and sociocultural norms for individual autonomy and societal duties. Adaptive deficits can restrict the performance of one or more routine activities of daily existence, without ongoing support. Routine activities include interaction, social involvement, and autonomous existence spanning varied settings, such as home, educational institutions, employment and society.

C. Onset during the developmental period. Intellectual and adaptive deficits begin to manifest during the developmental period that is, childhood or adolescence.

It could be seen that the diagnosis of intellectual disability was a significant matter of concern (e.g., Luckasson & Schalock, 2013; Schalock & Luckasson, 2013) as the role of diagnosis is not merely to establish the existence of the disability in a person but also to determine his/her eligibility for facilities, assistance and legal safeguards.

The next section provides insights with regard to Information and Communications Technologies (ICT).

2.9 Information and Communications Technologies (ICT)

In general, ICT refers both to the principles and the design concerned with the processing of information, and also to electronic interaction, which encompasses all software and hardware necessitated for dealing with education and instruction (World Bank, 2006). ICT has also been described as encompassing all the kinds of technology required to transfer, archive, produce, convey or trade information (Etonyeaku, 2009). Broadly, ICT comprises technologies, such as television, video, radio, telephone, computers, software and hardware, satellite systems and networks (Etonyeaku, 2009).

ICT has progressively become advantageous in different facets of life, including education. Over the past few decades, ICT use has contributed to the alteration of the processes and routines of almost every manner of governmental or organisational enterprise (Karagiannidis, Politis & Karasavvidis, 2014). In education, an environment that places greater emphasis on students is constructed due to the use of ICT. Nevertheless, it is evident that ICT use, particularly in education and business, continues to evolve with the progression of digital communications and media (Li, Wang, Yuen, Cheung & Kwan, 2012).

Elston (2007) provided a general definition of ICT as "the technology used to manage information and aid communication" (p.5). The United Nations Educational, Scientific and Cultural Organization (UNESCO) (2007b) provided a wider definition, indicating that the term ICT "refers to forms of technology that are used to transmit, process, store, create, display, share or exchange information by electronic means. This broad definition of ICT includes such technologies as radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, and computer and network hardware and software, as well as the equipment and services associated with these technologies, such as videoconferencing, e-mail and blogs" (p.1). Moreover, Adeoye (2014) defined ICT as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information" (p.242). From the perspective of education, the National Council for the Accreditation of Teacher Education ([NCATE], 2010–14) defines ICT (or information technology) as "computer hardware and software; voice, data, network, satellite and other telecommunications technologies; and multimedia and application development tools. These technologies are used for the input, storage, processing, and communication of information." In general, it can be seen that ICT is not merely a collection of components, but also includes the processes to manage them.

In education and instruction, basic ICT is assumed to encompass basic equipment, such as the Internet, personal computers, associated equipment (e.g., printers, scanners, digital cameras, etc.), multimedia programmes, interactive whiteboards in classrooms, etc. (Hammami, 2016). However, the computer remains the foundation of ICT in the eyes of several educational researchers (e.g., Elston, 2007; Shelly, Cashman, Gunter & Gunter, 2007). These researchers observe that the promise of computer-based ICT is due to software applications that have the capacity to collect, analyse and convey knowledge. Due to advancements in technology and systems of communication, several studies identify ICT as encompassing computers and the Internet. This composition of ICT was extended by Shelly et al. (2007) by the addition of external devices, such as devices for input, output and visual display. Other studies have drawn attention to ICT tools, such as whiteboards (Winzenried, Dalgarno & Tinkler, 2010), social media technology, such as blogs and Facebook (Curran & Marshall, 2011; Mbati, 2013; Shih, 2012), mobile devices, such as laptops, tablets, iPads (Nguyen, Barton & Nguyen, 2014; O'Malley, Jenkins, Wesley, Donehower, Rabuck & Lewis, 2013; Şad & Göktaş, 2014), etc. For the purposes of this study, the all-encompassing definition of ICT as provided by Elston (2007) will be used.

The evolution of the use of computer-based technologies in education will be described in the following section.

2.9.1 Evolution of the use of computer-based technologies in education

A few decades after the advent of the personal computer, it is evident that one definite outcome of this development is the seemingly universal use of technology (Matulac, 2004). Moreover, technology use is an essential aspect of far-reaching alterations in educational systems (Bates, 2011), for example, the transformation of the focus of the classroom from

teachers to students, and the enlargement of the boundary of instructional resources. Thus, it can be inferred that the conventional notions of education have been transformed by the use of computers (Bach, Haynes & Smith, 2006), validating the historical declarations of several eminent educators, such as Thomas Edison (1922) who observed that "motion pictures would replace textbooks in classrooms", William Levenson (1945) who stated that "radio receivers would be as common in classrooms as the blackboard", and B. F. Skinner (1960s) who suggested that "new technology devices would vastly increase students' interest in learning" (Norman, 1999). Almekhlafi and Almeqdadi (2010) reported that studies performed across the globe suggested that instruction and education could be favourably influenced by the use of technology.

Motivations for teachers to employ technology to teach in their classrooms include the stimulation of student understanding, to inculcate capabilities appropriate for the twenty-first century, to remain up-to-date, to enjoy practical collaborative learning, to use different methods of instruction, to perform research, and to interact (Hakverdi-Can & Thomas, 2012; Hechter, Phyfe & Vermette, 2012). Computer technologies can assist students in developing their capacity for controlled, yet adaptable, review and analysis, permitting them to associate concepts, study explanations and scrutinise outcomes to generate meaning from knowledge (Donovan & Macklin, 1999).

Roblyer (2006, p.11) observed that "knowing the history of information and communications technology in education is useful only if we apply what we know about the past to future decisions." In the context of the current study, due consideration of present systems and former happenings is useful from the perspective of recognising trends which may inform the future, specifically concerning the experiences of countries which were early adopters of ICT

practices in education. In particular, evolving economies such as Saudi Arabia can utilise these experiences to develop their ICT capabilities, and to also improve its integration into instruction and learning in the country.

The progress of ICT from its entry into the classrooms of technologically progressive nations has been recorded by researchers. For example, it was observed by Taylor (1999) and later by Shelly et al. (2007) that the early use of ICT in the school environment was limited to print technology, copying textbooks. In the second stage, multimedia was the emphasis of technology use, with the use of print, audio and video technologies. The third stage emphasised the use of opportunities offered by ICT for coordinated interaction, while the fourth utilises the power of the Internet to provide adaptable learning models based on online teaching methods.

The first-generation Apple computer in 1976 was the first instance of the educational use of microcomputers. This was soon replaced by the Apple II computer, which became the most popular computer in public schools in America in the 1980s, due to its user-friendliness (Roblyer, 2006; Waugh, 2006). In the 1990s, the World Wide Web (WWW) resulted in an increase – especially in education – of the use of computer systems and applications (Roblyer, 2006; Shelly et al., 2007).

With advancements in applications and usage, ICT became assimilated into education, as more exhaustive programmes and projects were pursued by authorities to extend its reach to all students (Harrison et al., 2002; Higgins & Packard, 2004). Consequently, ICT has permeated into educational systems, with new databases and linkages being formed to make knowledge sources across the world available to students (UNESCO, 2005).

Akbaba-Altun (2006) observed that the effective assimilation of ICT is an intricate occurrence, as it is contingent on connecting variables, such as rising above matters related to the professional growth of teachers, monetary and technological assets, syllabus, outlooks of teachers and principals. Previously, ICT scheduling and strategising, project control, technical assessment and evaluation – specifically staff development, which offered the competencies and awareness needed by teachers to use ICT – were proposed by Hoffman (1996) as factors affecting the success of ICT integration. These factors are characteristic in project development, all the more when technological transformation is concerned.

Assimilating ICT into the process of education and instruction necessitates the involvement of both human (e.g., teachers) and technical (e.g., software and hardware availability) aspects (Lawson & Comber, 1999; Reid 2002). This point of view was endorsed by Hasselbring et al. (2000), Cantero (2000), and Blackmore, Hardcastle, Bamblett and Owens (2003) who observed that the effective assimilation and utilisation of ICT in education is contingent upon teachers and their competencies. Furthermore, teachers require confidence in their capacity to utilise ICT in their teaching approach. Hasselbring et al. (2000) also perceived that the professional development of teachers was more significant than the availability of hardware and software. Accordingly, authorities who oversee education in developed countries (e.g., the United States, Australia, etc.) are aware of the significance of teacher preparation and education. For example, as observed by Finger, Russell and Russell (1999) "while schools are obtaining increased levels of ICT infrastructure and increasing the number of computers, state education systems in Australia and the United States have also highlighted the importance of the professional development of teachers" (p.6). Moreover, Blackmore et al. (2003) suggested that teacher training should come before the assimilation of ICT into the classroom, and mentioned four elements with regard to effective integration:

- *Teachers first*: professional development of teachers must come before integrating ICT into educational programmes;
- *Complementarity*: instruction in skills in parallel with the introduction of technology;
- *Workability*: evaluating whether teaching and learning are improved by the new technology and what aspects will benefit teachers and students; and
- *Equity*: ICT causes resource restructuring, and equity should be the focus (Blackmore et al., 2003, p.48).

Thus, it can be seen that any preparation for the assimilation of ICT into education has to incorporate two aspects, namely, the professional development of teachers, and the ICT framework. Moreover, additional training may be provided in response to the challenge of teachers' attitudes towards ICT (Pan, 1999). These can help teachers to gain new competences, and also support and facilitate their integration of ICT into their teaching (Pan, 1999).

The next section discusses the use of ICTs with students with special needs.

2.9.2 Use of ICTs with students with special needs

In general, the cost to the community of supporting persons with disabilities (e.g., autism, intellectual disability) and their families is significant. For example, it was reported that the approximate cost of supporting persons with ASD and intellectual disability during their lifespan was £1.5 million in the United Kingdom and $2.4 million in the United States (Buescher, Cidav, Knapp & Mandell, 2014). Therefore, the pursuit of approaches to increase the effectiveness of the education and support of persons with disability, to enhance results

and lower dependence on specialist support, is a key aspect of research for such individuals and their family circles (Pellicano, Dinsmore & Charman, 2014). Contemporary scrutiny of the investigative evidence with regard to autism has placed emphasis on both the attention to, and sustained prospects of, creating and using technologies to deal with this requirement (e.g., Kientz, Goodwin, Hayes & Abowd, 2014; Wass & Porayska-Pomsta, 2014). Moreover, given the significant costs associated with offering specialist support, technologies may provide a handy and economical method of evaluating and addressing the learning needs of children with disabilities (Grynszpan, Weiss, Perez-Diaz & Gal, 2014; Knight, McKissick & Saunders, 2013).

From the perspective of the use of ICTs, Hawkridge and Vincent (1992) offered a classification of special needs, comprising four categories. The first is cognitive difficulties, which includes persons with autism and dyslexia. The second category is emotional difficulties, which refer to persons' emotional and behavioural difficulties resulting from psychological or physiological triggers, these include hyperactive children and disruptive youths. The third category is physical disability, and includes persons who are disabled since birth and have a long-lasting learning disadvantage, such as children with cerebral palsy or spina bifida. Also included are persons disabled by injury or illness. These persons are characterised by limited movement and control, hence even reading and writing are difficult. The fourth category is sensory disability, which refers to learners with hearing or sight impairment that can utilise ICT to access knowledge and to enhance language capacities. Thus, it is evident that persons with different disabilities have different levels of activity, and hence their levels of participation can vary. Accordingly, ICT use can offer persons with disabilities the opportunity to enhance performance and/or participate in activities (Douglas, 2001). Lewis and Neill (2001) recognised that ICT can provide support in the following areas:

collaborative interaction, physical regulation and right to use the standard syllabus, learning associated with the subject, incentive/impetus, information technology capacities, evaluation, record-keeping and support for teachers.

ICT has been scrutinised from the perspective of offering educational and technical inclusion for individuals with physical and/or learning impairments. For example, an investigation into inclusion in electronic classrooms studied six courseware settings for persons who were blind or visually impaired, mobility-impaired, or who possessed a learning impairment, and found that experience with network settings, provision of assistance without delay and adaptive technologies were pressing needs (Luke, 2002). In general, proposals pursuing widespread availability in web-based education systems involved guidelines for the enhancement and provision of computer-based content to distinct users with different preferences and specific accessibility requirements (Di Iorio, Feliziani, Mirri, Salomoni & Vitali, 2006; Nevile & Treviranus, 2006).

ICTs also provide support for persons with disabilities in social participation and interaction, offering them a secure atmosphere (Bishop, 2003). Cooperation and communication are required in inclusive educational settings. Cooperative learning, supported by ICT, is appropriate for dealing with the needs of individuals, specifically needs associated with disability regarding social groups and supporting peer communication (Lewis, Trushell & Woods, 2005; Mavrou, Lewis & Douglas, 2010; Tan & Cheung, 2008). Freire, Linhalis, Bianchini, Fortes and Maria da Graça (2010) used the notion of design for all to undertake a developmental study to assist the inclusion of blind students in cooperative learning, with the use of an interactive whiteboard. They used an approach based on the delivery, by a live mediator, of accessible literal descriptions. These descriptions assisted the students in

navigating through the various components and enabled them to discover the substance of the class by utilising screen readers.

Alfaraj and Kuyini (2014) used a quantitative approach to investigate the kinds of ICT tools used in schools in the KSA for children with Down's syndrome (DS). They found that the most commonly used technologies in the schools were computers, iPads and projectors, along with other devices such as mobile phones, DVD players, loudspeakers and so on. Moreover, they found that teachers, in general, were aware of the advantages of technology use to support children with Down's syndrome. However, a few challenges were also reported, such as the lack of resources, lack of software using Arabic, and a lack of training for teachers with regard to supporting students with Down's syndrome. Thus, it could be seen that the effective use of ICTs in education could be hampered by the educational infrastructure in a country.

Ahmad, Kumar, Nehra and Kumar (2012) drew attention to the specific assistance provided by technology to students with disabilities. These include increasing their autonomy in educational and occupational activities; increasing participation in classroom discussion; obtaining access to peers, mentors and role models; increasing self-advocacy; obtaining access to the complete extent of educational options; increasing participation in experiences that are otherwise not possible; succeeding in task-based learning experiences; securing greater levels of independent learning; preparing for transitions to college and careers; working along with peers; mastering academic tasks that they could not otherwise achieve; entering high-tech career fields; and increasing participation in social and recreational activities. It could be seen, therefore, that the use of ICTs can generally help students with disabilities to participate more deeply in a classroom, which would not otherwise have been

possible. Of course, it should be recognised that the degree and extent of participation could be constrained by the nature and extent of disability.

Studies have also drawn attention to the advantages of using ICT in educational settings with students with SEN. For instance, six applications of ICT were reported by Florian (2004) namely, the enabling of tutor programmes; cultivation of exploratory learning; use of ICT as a tool; assistance in interaction; usage for evaluation purposes; and usage as a management tool.

ICT has been believed to cause specialised benefits to students with special needs, such as psychological and behavioural impairments (Thomas, 1992). It has been considered to be a facilitator as it can help students gain access to learning which enhances motivation, promotes self-competition and assurance, and enhances self-respect. Other benefits of ICT mentioned in literature include the role it plays in the aid of persons with disabilities. For example, Midgley (1993) drew attention to the widespread agreement that the use of ICT is one of the most effective types of occupational therapies for many persons with disabilities. Accordingly, he suggested three models for the training of persons with disabilities. The first, or workshop, model uses the rationale that work experience is the solution to therapy. The second model, the educational model, offers training in the customary educational environment and places emphasis on learning over occupation. The last model is the systemic vocational rehabilitation model and implies the development of organised, goal-oriented methods that merges multiple forms of assistance to meet the individual needs of persons with disabilities.

Banes and Walter (2002) attested that ICT can aid in communication. Moreover, it is motivating to use and an encouraging challenge to most students. Nevertheless, it must also be noted that the students may be overtaken by the excitement of using it and digress into exploring matters that should be addressed through other means.

In the United States, the Individuals with Disabilities Education Act (2004) recognises assistive technology (AT) to be an essential component of the Individualised Education Plan (IEP). Consequently, the manner in which AT can influence academic outcomes for students with learning disabilities must be understood by IEP teams (Williamson-Henriques, 2013).

2.9.2.1 Use of ICTs with persons with intellectual disabilities

Since persons with intellectual disabilities are the emphasis of the current study, studies associated with the use of ICTs with such persons were reviewed. In one study, Gutiérrez-Recacha and Martorell-Cafranga (2011) studied the use of ICTs (specifically cell phone use, Internet access and use, and television viewing) with persons with intellectual disabilities and found, in general, that the behaviour patterns of persons with such disabilities with regard to ICTs were similar to those of the general public. They reported that the behaviour patterns exhibited perceptible variances only in specific facets. In certain instances, the variances could be explained by the disability, such as the complicatedness of the content of a television news programme could be difficult for persons with low IQ to understand. Also, Gutiérrez-Recacha and Martorell-Cafranga (2011) drew attention to the fact that the stigma often associated with persons with disability could influence their behaviour. It could be seen here that, overall, technology could improve the quality of living of a person with intellectual disability, but the nature of technology use could also have a role to play.

As seen in Section 2.1.2, persons with intellectual disabilities are characterised by deficits in intellectual functions and adaptive functioning. As a result, they require educational methods which are lower on supplementary detail and speech, but more expressive and demonstrative. ICTs are very effective in satisfying this need and consequently enhance the cognitive skills of such students (Bonnah Nkansah & Unwin, 2010).

2.9.2.2 Studies related to the use of ICTs with persons with intellectual disabilities

A study in Sweden, by Näslund and Gardelli (2013), investigated the use of, and access to, ICT and agency among youths and adults with IDs. The study found that the agency of participants changed by drawing upon interests, previous experiences and collaborating in ICT activities. Moreover, it drew attention to the manner in which persons with IDs have the capacity to influence their extent of activity and agency by using ICT, and the means by which this is achieved. The authors also recognised that a need exists for ICT educational programmes to be developed and take into consideration the age of the users as most existing programmes were designed keeping children in mind. Moreover, the use of ICT helped increase participants' self-esteem, and their belief in themselves and their abilities.

Stanger, Mims, Wood and Ahlgrim-Delzell (2016) studied the manner in which curricular programmes that incorporate assistive technology support literacy achievement for students with intellectual disability and autism. They reviewed five commercially available curricular programmes (Pathways to Literacy, Teaching to Standards: English-Language Arts, Early Reading Skills Builder, Early Literacy Skills Builder, and Access: Language Arts) which deal with a variety of literacy skills through clear methodical instruction and assistive technology. Overall, the authors demonstrated how assistive technology, when combined in an instructional procedure as an element of a literacy program, offered quantifiable gains for students with developmental disabilities in literacy and English Language Arts (ELA) skills. The five programmes all employed several of the same definite strategies. In other words, all programmes were "scripted, explicit, and systematic" (Stanger et al., 2016, p.62). Furthermore, four of the programmes (i.e., ERSB, TTS: ELA, ELSB, and ALA) combined constant time delay procedures to impart discrete foundational literacy capabilities, for instance, letter or word identification, blending sounds, phoneme identification, or matching

vocabulary from the literature with definitions. Evidence from all the programmes reinforced the usage of a least intrusive prompting approach to impart intricate literacy competences, including knowledge of story elements, sequencing, literal or inferential text comprehension, main idea and poetry.

In her thesis on examining the effects of an extracurriculum enhanced by technology on special education students with intellectual disability, Sibel Doğan (2015) reported that technology-enhanced extracurricular activities affected the participants favourably from the perspective of cognitive and physical development. However, she also noted that such activities needed to be regular and recurring for them to be most beneficial to the students. Also, the students' levels, based on their disabilities, should be taken into account when choosing materials and games for their use. Additionally, this study also found that the perception of teachers towards technology use was positive. Moreover, the teachers clarified that technology-based extra-curricular activities were more appropriate as supportive practices in special education, not as the principal syllabus.

Miller, Krockover and Doughty (2013) studied the use of iPads to teach inquiry science to students with a moderate to severe intellectual disability, and found that students showed greater motivation, involvement and autonomy when they used iPad electronic notebooks, in contrast to conventional science notebooks. Another study by Coleman, Hurley and Cihak (2012) compared teacher-directed and computer-assisted constant time delay for teaching functional sight words to students with moderate intellectual disability, and found that both techniques were successful. Moreover, this study showed that although students with moderate intellectual disability frequently need one-on-one instruction, they could benefit from instruction using software, such as PowerPoint.

The study of Ayres, Mechling and Sansosti (2013) assessed the use of mobile technologies with students with moderate/severe intellectual disability and/or autism spectrum disorders from the perspective of preparedness of school psychologists, and drew attention to the increasing need for providers of educational services to be equipped and prepared to recognise, advocate and use suitable supports.

Li-Tsang, Yeung, Choi, Chan and Lam (2006) assessed the efficacy of an ICT training programme for 105 persons with intellectual disabilities, and found that the persons were able to achieve a greater degree of computer literacy after methodical ICT training. Moreover, they were able to retain the acquired skills for the period of a month. Thus, this study determined that methodical training could effectively improve the computer literacy and skills of persons with intellectual disabilities.

Overall, it could be seen from the preceding discussions that students with intellectual disabilities have the capacity to examine, scrutinise and discover the natural world in their surroundings (Miller, 2012). Thus, teachers and other stakeholders in the education of students with intellectual disabilities could take advantage of the advancements in technologies to offer non-stigmatising support which permits these students to participate more deeply in classroom activities and to communicate their acquired literacy. The use of additional reinforcements in the classroom will permit teachers to recognise the knowledge and literacy students are obtaining, a matter which was not previously possible.

The next section describes ICT as a resource in the curriculum.

2.9.3 ICT as a curriculum resource

ICT has proven to be a great influence on instruction, learning and study in the education sector (Alotaibi & Almalki, 2016). Accordingly, several studies have demonstrated that the use of ICT is greatly advantageous for the enhancement of the worth of education. ICTs can facilitate quick, ground-breaking, intense and enhanced skill development (Hourigan, Murray & Riordan, 2011). Price (2009) suggested that the role of ICT in the involvement and motivation of students, and in assisting them to associate their school experiences to practical work, is significant. Istenic Starcic and Bagon (2014) drew attention to the evolving use of computers in education. O'Brien, Aguinaga, Hines and Hartshorne (2011) clarified that the familiarity of the present generation to computers is high, as they have been brought up in a technologically-advanced environment. Accordingly, teachers must have the appropriate skills to use ICT in the classroom to correspond to the probable skills of the students. The use of different technologies could enhance the students' performance, outlooks and capabilities – a need of most students with special educational needs. Moreover, O'Brien et al. (2011) suggested that the use of technology could increase the creativity and involvement of teachers, resulting in the greater inclusion of students with disabilities in the classroom. Additionally, the use of technology can facilitate the feeling of self-assurance and accomplishment in students (O'Brien et al., 2011).

Early recommendations with regard to the use of ICT in education were summarised into three approaches by Richmond (1997). The goal of the first recommendation is ICT literacy – gaining knowledge about the computer. The goal of the second is to use technology to facilitate education across the syllabus – using the computer to learn. The final approach relates to assimilating ICT into the syllabus – learning due to the computer, which involves both knowledge about the computer and using it in learning. However, this signifies that

considerable professional development for teachers is necessitated before these approaches can be used. Expanding on this theme, Lawless and Pellegrino (2007), in a study in the United States, placed emphasis on the necessity for a methodical investigation of the means by which ICT assimilation took place in schools, the aspects that improve its acceptance by teachers, and the enduring influences of these investments on both students and teachers.

Kozma (2005) proposed four perspectives to using ICT, taking note of its societal and financial implications. The first relates to using ICT to promote delivery of, and access to, education. In this perspective, ICT can enhance the manner in which teaching is delivered, by making teaching more effective, cheaper or easier to use. The second relates to ICT itself as the goal of education from the perspective that developing technical competencies enhances the capability of students to grasp technology in the work environment. The third perspective views ICT as a means to support the understanding of students; in other words, ICT can further a deeper understanding of subjects by students, as teams of students can participate in finding solutions for multifaceted, practical problems that overlap disciplines. The fourth perspective views ICT as supporting the creation of knowledge; along with modifications in pedagogy, syllabus and evaluation, technology can be utilised to foster the course of knowledge creation (Kozma, 2005, p.142–143).

The next sub-section describes the learning outcomes of ICT use.

2.9.3.1 Learning outcomes

Studies by UNESCO (2005), Vrasidas and Glass (2005), and Roblyer (2006) noted that the assimilation of ICT into education could offer occasions for effective teaching outcomes by assisting the processes of both teaching and learning. Moreover, reliable and appealing teaching and learning practices could be provided. Even earlier, it was proposed by Higgins

and Packard (2004) that educational institutions could not provide a high standard of education without the assimilation of ICT. In other words, they suggested that ICT should play a significant role in education.

A study by Beauchamp and Parkinson (2008) found that students who had moved from an ICT-rich primary school to a secondary school with limited ICT provision experienced some frustration, but remained enthusiastic about learning. Other researchers (e.g., Du Toit, 2015; Eady & Lockyer, 2013) observed that the use of ICT offers enhanced access to additional educational resources to both teachers and students.

From the perspective of teaching, ICT has been described as time-saving; delivering enhanced outcomes, by reinforcing the processes of teaching and learning; improving students' motivation to learn, by furthering their self-esteem and resolution; and encouraging greater independence in students (Wellington & Ireson, 2013). Hennessy et al. (2007), in a study in the UK, scrutinised pedagogical methods employing ICT tools such as interactive whiteboards, multimedia simulations and tools for data logging. Furthermore, they studied the manner in which the academic methods related to these tools could be adjusted to suit a classroom's structuring and cognitive resources. Hennessy and colleagues (2007) found that teachers were not limiting themselves to hands-on experiments, but were exploring 'what if' scenarios through ICT-based experiments, where the outcomes could be immediately and 'virtually' accessed. Thus, it could be seen that ICT could facilitate the narrowing of the gap between the formal and informal knowledge of students.

Other researchers (e.g., Harris, 2008; Pittard, Bannister & Dunn, 2003) have drawn attention to the potential of ICT to modify the learning pathways of students. Conventional approaches to teaching are teacher-centric and place emphasis on the teacher; thus, they are largely text-

based and involve addressing the students. On the other hand, ICT-based learning is largely student-centric or places emphasis on the student. Hence, from being the primary resource for information and knowledge, teachers evolve into an associate and co-learner for students. Similarly, the role of students can transform from being passive recipients of information to dynamic participants in their own education (UNESCO, 2005; Shelly et al., 2007). Moreover, it has been found that the use of ICT in education presents occasions to enhance the motivation of students, aids students in problem resolution, and enhances their attention span (Hennessy et al., 2010).

The use of ICT in education provides several benefits. Moreover, it offers opportunities to expedite learning for students with diverse learning styles and capacities, such as "slow learners, the socially disadvantaged, the mentally and physically handicapped, the talented, and those living in remote rural areas" (UNESCO, 2005, p.161). Moreover, ICT helps to make learning more successful, encompassing more senses and connections in multimedia and hypermedia contexts (UNESCO, 2005).

From the perspective of students, Deaney, Ruthven and Hennessy (2003) found that ICT resources were perceived to facilitate tasks, presentations, project reports and trial options. Moreover, the students connected ICT with modifications in the study setting and classroom associations. Also, the use of ICT increased their interest and motivation. However, the students also demonstrated concern that the use of ICT might supplant the beneficial influences of teaching. This last aspect was further explored by Bahr and Bahr (2009) who found that student learning may be adversely influenced by intricate ICT environments. Instead, mixed approaches to teaching may offset the occasionally information-overloaded ICT environment and enhance student learning outcomes. Moreover, they suggested that the

professional competencies of teachers, with regard to their diverse capacities to successfully design and assimilate technologies for learning, be considered by an educational framework for ICT (Bahr & Bahr, 2009).

Biagi and Loi (2013) attempted to measure the influence of ICT on learning outcomes. They took into consideration various factors namely, micro (e.g., characteristics of students and their families), meso (characteristics of schools) and macro (institutional), and the association between these, as suggested by Kikis, Scheuermann and Villalba (2009). Characteristics of students (e.g., gender, age, etc.) and their families (e.g., structure, socio-economic status) may influence the confidence of students both regarding, and usage of, new technologies. Students may also be influenced by their relationship with peers (e.g., colleagues in the classroom, friends outside school, siblings, etc.). Nevertheless, school-level facets also play a significant role in taking advantage of the potential of ICT in education. Furthermore, two primary avenues have been recognised as being critical in achieving successful assimilation of ICT in education. The first relates to the behaviour and knowledge of school principals and teachers (Brummelhuis & Kuiper, 2008; Law & Chow, 2008; Pelgrum, 2008). On the other hand, the second relates to the technological equipment in schools, such as Internet connectivity, technical infrastructure and pedagogical support (EURYDICE, 2010). Moreover, since the socio-economic background of families may influence the choice of school for their children, school characteristics cannot be deemed to be detached from family characteristics (Biagi & Loi, 2013).

Further critical aspects are the institutional-level factors, as these can lessen or intensify the barriers to ICT use at the school level. For instance, technological infrastructure (e.g., broadband speed and coverage) can impact ICT availability and usage at home and school

(European Commission, 2012). Additionally, several countries suggest the use of ICT for instruction, providing reinforcement (pragmatic advice and assistance for planning of lessons, effectual teaching, management of classrooms, utilisation of different resources, etc.) for the successful incorporation of these tools (Condie & Munro, 2007). Also, a crucial role can be played by countries in endorsing policies (national and local) targeted at imparting the necessary knowledge and competencies to teachers to incorporate ICT in their teaching. Lastly, institutional circumstances stipulate the quantum of resources accessible at the level of schools and their decisions with regard to budget allocation (Biagi & Loi, 2013).

Figure 2.1 depicts the factors affecting the ICT use of students and their school performance. It can be seen that micro, meso and macro levels affect both the students' use of ICT and their school performance. For instance, while some of these facts affect the way students utilise ICT at home and school, other factors may influence their learning (Biagi & Loi, 2013).

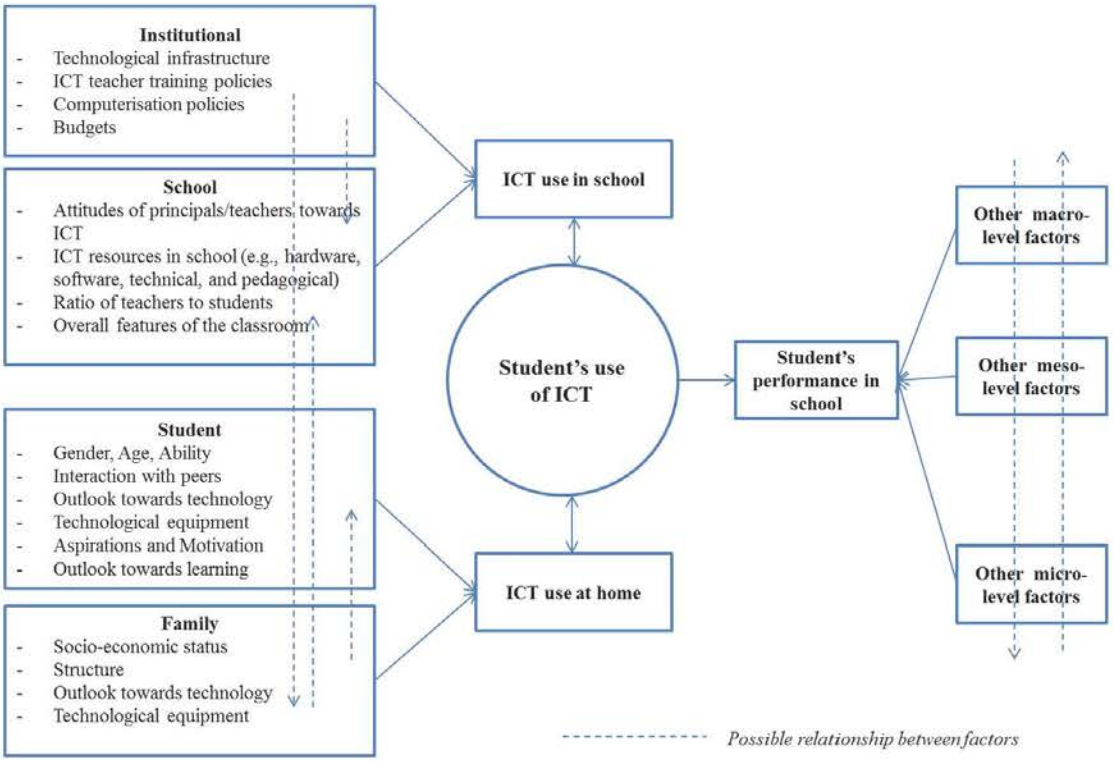


Figure 2.1:Factors affecting the ICT use of students and their school performance (Source: Biagi & Loi (2013))

A brief summary of the findings of several researchers with regard to the advantages of using ICT in education can be found in Table 2.2.

Table 2.2: Summary of research findings on the advantages of using ICT in education (Source: Ministry of Education, Saudi Arabia, 2013)

Advantages of ICT in education	**Author(s)**
Enhances the opportunities and motivation for students to learn	Blackmore et al., 2003; Busacco, 2001; Castellani, 2000; Ertmer, Addison, Lane, Ross, & Woods, 1999
Prepares students for the future use of ICT	Ertmer et al., 1999
Aids students in resolving problems	Blackmore et al., 2003; Deaney et al., 2003; Ertmer et al., 1999
Enhances the understanding of students	Blackmore et al., 2003; Charp, 2000
Promotes collaborative analysis	Blackmore et al., 2003
Facilitates learning for students with diverse capacities and learning styles	UNESCO, 2005
Improves the robustness of learning environments, engaging additional perceptions in a multimedia framework and further associations in a hypermedia setting	Shelly et al., 2006; UNESCO, 2005
Offer rich resources to students	Busacco, 2001; Castellani, 2000; Shelly et al., 2006
Facilitates the development of autonomous learning and communication abilities in students.	Charp, 2000, Deaney et al., 2003

The next section describes the teaching outcomes of ICT use.

2.9.3.2 Teaching outcomes

Researchers have suggested that the teaching process benefits from ICT. For example, early research by Charp (2000) drew attention to its possible impact on teachers' style of teaching

and classroom management. Also, early studies (e.g., Cox, Preston, & Cox, 1999a) and later studies (e.g., Shelly et al., 2006) agreed that teachers were helped by ICT to alter their style of instruction through the utilisation of media to supplement and enable the teaching process. Nevertheless, the degree of success was reported to be low as most teachers were found to merely dealing with the new requirements of ICT assimilation and maintenance (Cuban, 2001; Tearle, 2003). This persisting situation was described by MacDonald (2008) as an outcome of insufficient professional development, proposing that only a few teachers incorporate ICT in a manner that enhances the learning of students (Harrison et al., 2002; Hennessy, Ruthven, & Brindley, 2005).

Moreover, there are issues with regard to the integration of ICT with the curriculum. Leach and Moon (2000) drew attention to the irregular use of ICT in the curricula followed in the UK and compared this finding with the government discourse that made it mandatory for all facets of instruction and education to incorporate clear planning and assimilation of ICT. Further, Leach and Moon (2000) contended that adopting a more robust perception of teachers' professional knowledge could help to surmount the essential inconsistency between objective and actuality. A pedagogical framework was introduced, in a Europe-wide e-learning programme context, by Granić, Mifsud, and Ćukušić (2009) for online learning in secondary schools from static (e-learning) and mobile (m-learning) perspectives to deal with this aspect of separation between plan and implementation. Granić et al. (2009) found that administrative support, sufficient resources, and suitable on-going professional development were required for effective integration. However, the knowledge of teachers grew with experience along with their outlook of the effectiveness of the program. Granić et al. (2009) observed that successful realisation of the ICT framework provided opportunity for

cooperative and independent learning which enhanced instruction and education outcomes in the school network in the studied area that is, Europe.

The next section describes ICT tools.

2.9.4 ICT tools

Advances in ICT use in education have resulted in the utilisation of systems or tools that promote learning. The objective of these tools is to decrease the disparity between the capabilities of a person and the demands of the environment, from the perspective of enhancing individual performance and accomplishing the anticipated outcomes associated with learning (Luckasson & Schalock, 2012). Four categories of ICT tools are now presented: assistive, diagnostic, augmentative, and remedial. These are briefly described in the following sections.

Assistive technologies

The term assistive technology signifies any article, apparatus or product that is utilised to enhance, support or develop the capacities of persons with disability from the perspective of functioning (Bryant, Seok, Ok & Bryant, 2012). Alkahtani (2013) drew attention to the definition of assistive technology from the Individuals with Disabilities Education Act (IDEA), which states that the term assistive technology refers to "any item, piece of equipment, or product system, whether acquired commercially off-the-shelf, modified, or customised, that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities". Examples range from simple devices, such as adapted switches and spoons, to more complicated devices, such as electric wheelchairs, computers, devices to control the environment, and augmentative communication systems.

Bryant et al. (2012) observed that supportive technology transforms to assistive technology when the technology is utilised by an individual with an impairment to enhance, support, or develop his/her capacity to function. The assistive technology devices most commonly used include eyeglasses, non-speech touch/picture systems, speech synthesis devices, hearing aids, wheelchairs, handrails, raised toilets, extra wide doors, ramps, supplementary home modifications and computers. For persons with learning disabilities in particular, assistive technology devices could be practical aids throughout their existence and also across a broad array of intellectual levels.

Three categories of assistive technologies were suggested by Ganschow, Philips and Schneider (2001), namely low-tech, mid-tech and high-tech. In general, low-tech devices are non-electronic and straightforward as they require little or no training for use. Moreover, such devices are easily available at low cost and require minimal to no maintenance (e.g., highlighter tape or pens, pencil grips and customised furniture). Devices that are simple to operate electronically with nominal training, and which need simple maintenance, are classified as mid-tech devices. These devices are available for commercial purchase and are generally reasonably priced(e.g., electronic dictionaries, adapted keyboards and tape or digital recorders). On the other hand, high-tech devices contain complicated electronics and typically have microcomputer elements for information archival and recovery. In contrast to low-tech and mid-tech devices, high-tech devices are high-priced and constant care and extensive training are required (e.g., talking calculators, word prediction software, and hearing aid and/or assistive listening devices).

Augmentative technologies

In contrast to assistive technologies, augmentative technology is an optional means to assist persons with language disorders in utilising expressive or receptive knowledge. Augmentative technology implies the usage of tools, including elementary supports (e.g., picture communication systems) or handheld devices and computers (Beukelman & Mirenda, 2005) and is commonly used by individuals with different congenital conditions, such as autism, cerebral palsy and intellectual disability.

Any electronic or non-electronic device that is utilised to send or receive messages is an augmentative technology aid. Such aids may vary from communication books to devices that generate speech.

Remedial technologies

Zones of neuropsychological functioning concerned with learning and fundamental operation are the target of remedial technologies. The objectives of these technologies are to reinforce certain cognitive capabilities that are ineffective and to coach in compensatory approaches. The use of remedial technology is chiefly with two classes of persons: persons who have encountered a traumatic brain injury, and persons with learning impairments (Gaddes & Edgell, 1994). In general, for persons who have encountered brain injury, remediation deals with neuropsychological operations, such as awareness and attentiveness, recall, scheduling, regulating one's effort or conduct, and making changes in response to feedback.

Gaddes and Edgell (1994) observed that remediation is utilised to aid both children and adults in dealing with learning disabilities. For instance, problems with concentration, resolution of problems, orderliness, recognising mistakes and utilising feedback successfully are areas that remedial technology can treat. It must be noted that remediation for such persons is regarded to be useful but not therapeutic. Moreover, it is generally performed by a neuropsychologist.

For persons with learning disabilities, the objective of remediation is to support a specific area of study or change, such as in school or society. Typically, the intervention is modified to suit the disability and a person's strengths and weaknesses. However, the remediator, such as a teacher, will utilise the person's strengths to offset his/her weaknesses.

Diagnostic technologies

Diagnostic technologies, accompanied by approaches for data display, have publicised active scrutiny in the assessment of learning disability which attempts to enhance diagnostic accuracy and explain the neurobiological basis of learning disorders. It was found by Bigler, Lajiness-O'Neill and Howes (1998) that preliminary examinations attempted to discover irregularities or abnormalities of brain morphology for persons with learning disability who use computerised tomography. The structural imaging of the brain is magnetic resonance (MR) imaging which permits higher specificity in recognising abnormalities in the brain. Functional magnetic resonance imaging (fMRI) has the potential to recognise anatomic/function discrepancies in learning impairments (Waichigo, 2013).

Diagnostic technologies (e.g., electrophysiological and metabolic imaging techniques) provide approaches through which human brain activity can be examined during cognitive processes. Moreover, computerised electrophysiological studies have recognised several brain irregularities in persons with learning disabilities, although it was argued by Bigler et al. (1998) that no uniform exemplars have surfaced.

The availability of different kinds of tools indicates that persons with disabilities, in general, and with intellectual disabilities, in particular, could be aided by the selection of ICT tools to suit their various needs. However, in the case of educational environments, it could be

assumed that assistive technologies, and in some instances augmentative technologies, would be the most obvious tool for use with persons with intellectual disabilities.

The next section describes the progress of ICT in the educational system in the KSA.

2.10 ICT in the Saudi educational system

The advent of ICT in the educational system began in 1985 through the introduction of three modules, namely, introduction to computer science, programming and information systems, and basic programming, for high school students in KSA. The success of these modules resulted in the addition of computer studies to the curriculum by the MoE in 1991. Information systems, computer applications, computer science and information technology have been taught since 1999. High school students and teachers were provided with several computer training courses that eventually led to the formation of the first phase of computer utilisation in the education system of the KSA. The Saudi MoE assumed the responsibility to enhance and employ the ICT infrastructure for teaching and learning, and integrate the utilisation of computers in several subjects of the curriculum in the second phase (General Directorate for Planning, 2005).

Furthermore, the MoE introduced computer labs to enable students to practice on computers and gain practical experience under the guidance of qualified teachers. The conventional methods of memorising were replaced by practical means of attaining knowledge and skills. The students were able to experiment, observe, induce and learn through their experiences on real-time computer applications. In order to cater to the requirements in digital content, the Saudi MoE included digital technology centres in its agenda and established them in several regions of the KSA. These digital centres were established to support the curriculum and were equipped with production units of digital teaching aids. Two substantial decisions were taken

due to the government's urge to increase the utilisation of ICT in education. The first decision was the introduction of ICT as a mandatory subject in schools specifically meant for girls, and in elementary public schools, in 2003. The second decision was the promotion of the utilisation of computers through a national project and is depicted on the website of the KSA MoE as follows:

> The Schools' Net Project will connect all Saudi Schools and Educational Directorate Districts by means of a wide area network covering the entire KSA and local area networks within every educational directorate and school. The Schools' Net Project will provide every student, teacher, parent and educator with a multitude of services and a huge source of reference information. The Schools' Net services and content include, but are not limited to, all subjects' curricula, educational references, electronic books, one or more Teachers' Guides, services for students and other users with special needs, course syllabuses, interactive multimedia, teacher training, school management systems, web design tools for schools, e-mail, chatting, announcements, Internet links, a students' magazine, a teachers' magazine, educational statistics, students' training, students' sites, information technology skills for all, and a Q&A bank. These contents and applications will be mostly in Arabic. The first phase of the School's Net Project will provide one million students with their IT requirements in a ratio of one PC to ten students. (Tatweer.edu, 2006).

The various objectives of this project include, among others, the development of students' skills and preparation for the future through ICT use; using ICT in all educational activities and thus improving teachers' potential; providing educational resources to both students and teachers and fostering an environment of rich information; and contributing to the creation of qualified generations of students who have mastered the use of ICT (Tatweer.edu, 2005).

The future of ICT looks promising in not only the educational sector, but also in other aspects of life in the KSA. Constant promotion and increased awareness of ICT would only strengthen the cause of its implementation in various applications. The national policy of the KSA reflects the ICT implementation in all segments of society, including the educational sector.

2.10.1 The educational system in the KSA

Since its official launch in the 1920s, the education system in the KSA has witnessed extraordinary development. Previously, access to education was granted only to the children of the wealthy and the elite. However, favourable government policies have led to the establishment of several schools and universities in the past few decades, causing an enormous advancement in the education system of the KSA. Students of all social classes have a right to education and the government provides free education to every entitled citizen. A mix of Islamic religious preaching and academic subjects (including sciences) comprise the curricula of education in the country. The curricula and the textbooks are standardised across the KSA. The guidelines followed in the United Kingdom or the United States are also followed in the KSA's education curricula to a large extent. As found in the American education system, the school and higher education academic term in the KSA usually lasts between nine and ten months in a year (CIA World Factbook, 2017).

The Ministries of Education and Higher Education formerly shared the responsibility for education in the KSA. However, since 2015, the Ministry of Education (MoE) has assumed responsibility for all levels of education in the KSA. The MoE was established in 1954, with the aim of providing education to both males and females. General education schools (junior, primary, middle and secondary schools), teacher training, education for students with special

needs and adult education were the prominent constructs taken up by the MoE. Moreover, the Ministry provided students' textbooks and classroom furniture, in addition to building and maintaining the schools (MoE, 2017a). The Ministry of Higher Education (MoHE) was established in 1975 and its primary role was to deliver university level education (BA, MA and PhD). Additionally, the Ministry assisted worthy students by providing scholarships for higher studies in foreign countries. The MoE and the MoHE were merged in 2015 into the MoE (MoE, 2017b).

The next section describes the system for special education in the KSA.

2.10.2 Special education in the KSA

2.10.2.1 Historical background

Children with disabilities were not offered educational services in the KSA until the second half of the twentieth century. Thus, in the preceding period, parents used to teach their children with disabilities at home (Ajmi, 2006). In 1958, a Saudi citizen used the Braille system to teach a group of visually challenged pupils to read and write. Thus, it can be inferred that education for students with disabilities in the KSA began in this period. Consequently, Braille classes for the visually challenged were held in the evening hours in public schools (Al-Salloom, 1995; Al-Mousa, 1999). The decision taken in 1960 by the Saudi MoE to establish the Al-Noor Institute in Riyadh to offer education for 40 visually impaired male students was a significant milestone in special education in the country and resulted in increased attention to the development of the country's education sector to involve all categories of students with disabilities (Al-Sunbol, 1998).

The Al-Noor Institute received special equipment and financial support from the MoE and the King donated a permanent headquarters (MoE, 1996). In order to provide educational,

professional and social services to students with visual, hearing and intellectual disabilities, the Department of Special Education was founded in 1962 (Al-Mousa, 1999). Several institutes were established in the cities of Riyadh, Al-Madinah, Makkah and Jeddah for both boys and girls between 1962 and 1971.

The three aforementioned categories of students' disabilities were accorded distinct departments in the Directorate General of Special Education (DGSE), which was revamped from the Department of Special Education in 1972 (MoE, 1996). Two new departments for the planning, preparation and printing of textbooks aimed at students with disabilities, were further added to the DGSE in 1984. In addition to fulfilling the requirements of students with visual, hearing and intellectual disabilities, the DGSE was required to devise plans for rendering education with regards to exceptional requirements, such as health impairment, multiple disabilities, talent, giftedness and autism (Al-Mousa, 2007).

The MoE and the General Presidency for Girls' Education (GPGE) supervised the two distinct special education programmes for boys and girls, respectively. The terms of reference for special education institutes for girls were transferred to the GPGE by Ministerial Order No. 131, in 1992. Several internal departments and divisions, which were similar to those within the DGSE, comprised the structure of the GPGE (Al-Mousa, 2007). Following the merger of the GPGE with the MoE in 1992, the educational supervision office of special education for girls was merged with the DGSE (MoE, 1995).

Conforming to Islamic teachings, the modern Saudi educational system aimed to offer elementary education to everyone, including students with special educational needs (SEN). According to Article 56 of the Education Policy in the Kingdom of Saudi Arabia (EPKSA), education must be rendered to students with mental or physical disabilities (MoE, 1995).

Special education services aimed to satisfy the necessities and protect the rights of differently abled people through special education services and further developing such services through adequate regulations and legislation. This resulted in an enhancement in the quality of special education services and, subsequently, to the accessibility of educated experts to deliver such services. The Saudi educational system witnessed the formal introduction of the notion of Learning Disabilities (LD) in 1996 which is defined by the Saudi Ministry of Education (2013) as

> Disorders in one or more of the basic psychological processes involved in understanding or using spoken and written language which are manifested in disorders in listening, thinking, talking, reading, writing spelling, or arithmetic and are not due to factors related to mental retardation, visual or hearing impairments or educational, social and familial factors. (p.23)

It can be seen from this definition, that the scope of LD in the KSA pertains to deficiencies in skills associated with various subjects. In other words, children with LD are typically considered to achieve poor academic outcomes in some subjects. However, it is apparent that the Saudi understanding of LD encompasses students without disabilities who may still require SEN provisions due to their poor academic achievements although these provisions are different from the provisions offered for students with disabilities (Al-Shareef, 2017). In the KSA context, LD encompasses the wider emphasis of the disorders related to the fundamental phonological processes concerned with comprehending or utilising written or spoken language. Thus, the scope of the term seems to be limited to difficulties in reading, writing, and spelling (MoE, 2013a) which is in contrast to LD in the UK which is typically used with "people with global (as opposed to specific) difficulties, indicating an overall impairment of intellect and function" (British Dyslexia Association, 2018). Overall, it could

be seen that the definition of LD in the KSA does not consider "impairment of intellect or function" and cannot be considered to adequately include intellectual disabilities. Consequently, from the perspective of inclusive education, there is a clear need to revisit and revise the guideline definitions associated with various disabilities in my country. However, as stated in Section 2.7 (Defining intellectual disability), the AAIDD definition of intellectual disability has been adopted by the MoE and this definition will be the basis of the understanding of intellectual disabilities in this thesis.

Several courses resulting in a bachelor's degree in LD were provided by a teacher training package introduced by the Department of Special Education of the King Saud University in the early 1990s. Segregated schooling was imparted to a majority of students with special needs due to the substantial rise in the enrollment of students with disabilities and the number of special education institutions (Al-Khashrami, 1995).

The following points were noted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in recognition of Saudi Arabia's endeavours with regard to special education in the country (UNESCO, 1995; cited by Matawi, 2003).

- The importance of integrating students with SEN alongside other students, and supporting their position in society, were the emphasis of official policies overseeing the sphere of special education.

- The number of students assigned to special categories could be seen to increase, as substantiated by formal MoE statistics, due to the enhanced participation of the Kingdom in offering care for these categories.

- The expansion of staff capabilities in all types of special education were promoted by policy makers, specifically concerning staff responses to the requirements of students with SEN in mainstream schools.

The origin and evolution of special education in the KSA has passed several stages, as evidenced by studies. Individual efforts comprised the first stage of the development of special education. This was followed by a stage in which special schools for visually challenged, hearing impaired and students with intellectual disabilities were established by the government. The models of special education services, meant for students with SEN, were diversified in the final phase. Applying mainstreaming schemes (explained and defined in Section 1.4.2) as a central strategy can be an instance of such diversifications (Al-Mousa, 2010). The primary reason for developing special education in the KSA was to pay heed to students with SEN and help them solve their problems and enable them to contribute to society (Al-Mousa, 2005). The outcome of this was that the number of students increased from 39,030 to 56,476 (with a less imbalanced gender balance) and the number of mainstreaming schemes and institutes rose from 47 in 1991, to 3,928 in 2013, which is depicted in Table 2.3 (MoE, 2013b).

Table 2.3: Distribution of male and female students in special education and mainstreaming in the school years 1991, 2013 (Source: MoE, Saudi Arabia, 2013)

	1991		**2013**	
	Male	**Female**	**Male**	**Female**
Number of institutes/programmes	31	16	2855	1073
Number of students	36,949	2081	39,745	16,731

Significantly, the growing practice of identifying additional requirements and the enhanced provision of additional support services in the KSA caused an increase in the quantity of students with SEN, without signifying the rise in the rate of disability. Categories of support services offered to students with disabilities (physical disabilities, multiple disabilities, gifted and talented students) were not previously considered (Al-Mousa, 2007). A significant increase in the number of students receiving special education services in not only the designated institutes but also in the mainstream schools has been observed, with 73% of the girls and 93% of the boys being found to receive special education in mainstream schools in 2007 (Al-Mousa, 2010). The increase in the number of students deriving benefits from additional support services was found to be in both male and female students. However, two important factors caused a discrepancy, in which additional support services were received by two-thirds of the males compared to one-third of the females in 2013 (Table 2.3). The first factor was that disability was found to be relatively higher among male students than female students. The second factor was that education was conventionally offered to male students by the mainstream schools (Al-Mousa, 2010).

It is apparent that the delivery of care and additional support services to students with SEN are due to the positive impact of the Saudi culture and praiseworthy efforts of persons

working in the Saudi educational sector. Moreover, considerable effort is evident in terms of the provision of facilities to enhance the coverage of special education in the country and to guarantee that students with SEN receive free and suitable education on par with that of their peers (Al-Kahtani, 2015). However, some criticisms have also been reported (e.g., Al-Fahili, 2009), such as special education programmes intended for implementation in remote rural areas were proved to be wasteful, as a neglible response was found due to the lack of qualified teachers and the limited number of students with SEN. Another criticsm, originating from the MoE, was that the provision of general education was compromised to accommodate the growth of special education (Al-Mousa, 2007). However, such hindrances have also been witnessed in developed nations. The quality of special education services was affected in rural areas of the USA due to several factors, such as an absence of state-regulated childcare facilities, limited training provided to teachers and a lack of resources (McCurry, 2007). Hodkinson (2008; cited in Aldaihani, 2011) reported that insufficient training of SEN teachers was found to deter the inclusion of students with SEN in the UK. According to Hodkinson and Vickerman (2009; cited in Aldaihani, 2011), in order to acquire the necessary skills and knowledge in heterogeneous classrooms, the teachers need to be formally trained in higher education institutions.

Several recommendations have been suggested by the Saudi MoE that include scrutiny of the content of special education courses, imparting information to teachers, and providing adequate training to SEN teachers and professionals (Al-Kahtani, 2008). Al-Kahtani (2008) recommends that the integration of SEN students in the classroom can be eliminated through adequate educational activities and programmes for facilitating their integration in the community. Moreover, he posited that the media must be encouraged to promote the rights of students with SEN. Students with intellectual disabilities need to be motivated to actively

participate in societal and career-related work and must be allowed to avail the services meant for the general usage. The existing institutions for special education must be maximally revived, as it is generally found that students with SEN, multiple disabilities and autism are unsuitably subjected to special programmes conducted in mainstream schools. Instead of the mainstream schools, the existing special education institutions in cities – with adequate space and infrastructure – must cater to the special requirements of students with intellectual disabilities. Nevertheless, it is evident that Al-Kahtani's (2008) recommendations have not been entirely carried out in the field, as at the time of the writing of this thesis. For instance, the participation of several mainstream schools in providing inclusive education was cancelled in the 2008 academic year. Consequently, the parents and the guardians of SEN students demanded that special education services be offered to students in locations that were in close proximity to their residence, irrespective of the material and human costs involved. A roll-back to the previous practice of mainstream schools offering SEN services was also being considered. The present study's detailed examination of the perceptions of teachers at the school level justifies the need of future studies that are required to gauge the extent to which the existing recommendations are to be practically implemented. The next section describes the status of mainstreaming in the KSA.

2.10.2.2 Mainstreaming in the KSA

In the KSA, the term 'mainstreaming' has gained attention in recent years due to efforts by the Saudi MoE (represented by the DGSE) to promote the manner of services offered to groups with special needs in the country. This is despite the country's relative lack of experience in the field of special education (Al-Mousa, 2010). Hence, the term is utilised in this study to signify special education schemes that are offered to students with SEN in mainstream schools. The integration of students with SEN is still in a nascent stage in the

KSA and hence this aspect forms the the primary reason for the inclusion of mainstream schools in the present study. The existing practices depict that the mainstream schools are still learning the 'nitty-gritty' involved in the field of special education. It is worth mentioning that various definitions of mainstreaming have been recently presented.

According to Kauffman, Gottlieb, Agrad and Kukic (1975, as cited in Al-Mousa, 2010):

> Mainstreaming refers to the temporal, instructional, and social integration of eligible exceptional students with normal peers based on an ongoing, individually determined, educational planning and programming process, and requires clarification of responsibility among regular and special education, administrative, instructional and supportive personnel. (Al-Mousa, 2010, p.17)

Full and partial are the two distinct forms of the mainstreaming schools in the KSA. According to Al-Mousa (2010), the establishment of self-contained classes in regular schools implies partial mainstreaming. Hence, apart from gaining the special education, students with SEN are in a position to mingle and interact with regular students in the classroom, as well as during extracurricular activities. The classes for students with SEN can be categorised into two types. The first category of classes follows a curriculum specifically meant for students with visual impairments, hearing impairments, intellectual disabilities and with multiple disabilities. The second category of classes follows the curriculum formulated by the public schools (Shahrani, 2006). The support programmes that pertain to special education are established by the alternative, full mainstreaming in mainstream schools. Peripatetic teacher programmes and teacher consulting are some of the instances of support programmes (Shahrani, 2006). The students with SEN are imparted education along with normal students

for a major part of the working hours in mainstream schools, wherein the public curriculum is followed.

Al-Mousa (2010) believes that it is broadly accepted that mainstreaming is efficacious at several levels, namely, psychological, educational, economic and social levels. The definition of Florian (2012) can be cited for distinguishing mainstreaming from inclusive education. The definition states that inclusive education is an accommodation of personal differences within the processes and structures that are accessible to all learners. Since the existing programmes are still in the stages of partial mainstreaming, the present study employs the term 'mainstreaming' as a reference to special education programmes that are provided in the KSA public schools.

As mainstreaming allows students with SEN to obtain the required education at a school located close to their residence, they can live with their parents and maintain a stable life in their community, (Al-Mousa, 1992). The interaction of students with SEN with their normal peers is greater in a mainstream learning environment, resulting in an increased involvement and acceptance in the classroom activities.

The first significant project of including students with SEN in the learning process – in order to attain the objective of mainstreaming in secondary high schools – occurred in 1984, at the Al-Noor Institute for blind people in Hafuuf in the KSA (Al-Mousa, 2010). Other secondary schools across the KSA also reported the successful implementation of this initiative (Aldakhiil, 2006). A survey of opinions on the implementation of mainstreaming in government schools was conducted by the DGSE in 1985. A questionnaire about the implementation of mainstreaming was circulated among teachers and students of Al-Noor Institutes and other public schools in the KSA. It was found that both teachers and students

were in approval of the teaching method. Therefore, in 1990, the DGSE adopted and implemented the mainstream method for both normal and special students at all secondary education levels (Aldakhiil, 2006).

In 1996, the Saudi MoE resolved that additional support services were required by 20% of the students studying in public schools. The educational process had a qualitative forward leap, as the policy makers became aware of the need for additional support services, and were convinced about the value of providing such services to students with SEN. The involvement and motivation of public school personnel in educating students with SEN was enhanced by the training programmes established by the DGSE (Al-Khashrami, 2003). Since then, the mainstreaming of students with SEN has been on the rise and is depicted in Table 2.4 (also see Table 2.3).

Table 2.4: Special education, mainstreaming and students in different categories 2014/15 (Source: Battal, 2016)

Category of special need	**# institutes and programmes**	**# students**
Hearing impairment	586	6881
Visual impairment	363	3214
Intellectual disabilities	1101	20576
Autism	220	1464
Multiple disabilities	58	490
Learning disabilities	2393	26225
Hyperactivity	30	81
Physical and health disabilities	90	4530

Category of special need	# institutes and programmes	# students
Total	4796	63461

The majority of the students with SEN were integrated into mainstream schools by 2000 (Al-Mousa, 2000). Moreover, an increasingly broad range of SEN students, including the hearing impaired, autistic, motor or multiple disabled and learning disabled, were able to access educational services (Al-Mousa, 2007). According to Faiz (1996), 12 mainstreaming programmes were established throughout the KSA in 1996, and the mainstreaming programmes for hearing impaired students were implemented in various public schools in the northern state of Sakaaka.

For students with intellectual disabilities, the mainstreaming of schools was implemented in Al-Jouf city in 1990. Later, the mainstreaming was spread to other parts of the KSA. Mainstreaming was first conducted in 1998 in Riyadh. The number of programmes of mainstreaming gradually grew over a period of time. A total of 465 programmes in boys' schools and 52 programmes in girls' schools were conducted in 2006 in Riyadh (National Committee for Special Education [NCSE], 2006). Regulations, legislation and official policies about students with intellectual disabilities were some of the major issues that impacted the growth of mainstreaming strategies in the KSA (Al-Mousa, 2005).

2.10.3 The objectives of introducing ICT into the educational system in the KSA

The introduction of ICT in the educational system of KSA has several objectives, the most prominent of which is to eliminate illiteracy among Saudi citizens by providing efficient education, while considering the religious, cultural and economic aspects of the KSA (MoE, 2005).

Additionally, it is anticipated that students attain the following results, as mentioned in their textbooks:

- Training students to adapt themselves to use computer systems and databases that are vital in a technologically developed environment.
- Assisting students in acquiring intellectual skills, such as organisation, understanding, data analysis, creativity and solving problems.
- Augmenting the essence of teamwork among students.
- Spreading awareness of the significance of ICT among students (Al-Wakeel, Al-Mubarak, Al-Dalan, Al-Hadlaq & Al-Mosa, 2002; Al-Wakeel, Al-Uraini, Al-Salama & Al-Mubarak, 2005).

It is important to observe that all students and citizens of the KSA, irrespective of whether they are supervised by the MoE or not, are considered as a part of the Saudi ICT educational strategy. The citizens could be the members of the MoE's ICT clubs and groups, which were established as a part of the secondary schools' computer labs in 1996. A significant quantum of resources required for setting up new computer labs is saved if the advanced equipment and computers of schools are utilised by students. Awareness about ICT can be enhanced among society members, educators and learners through the establishment of such user-friendly computer labs. Furthermore, courses meant for enhancing teachers' abilities, cost-efficient training programmes and encouraging the youth to be proactively involved in meaningful activities would enable citizens to appreciate the utilisation of ICT. The significance of ICT clubs in spreading awareness of technology among community members, and in consolidating the ICT-related interactions of teachers and students, was realised by the Saudi MoE.

Additionally, ICT clubs provide the necessary infrastructure to those students who may not have access to the Internet and modern devices. Thus, ICT clubs bridge the gap and eliminate the disparities among students in accessing ICT (Al-Zahrani, 2001).

The role played by teachers and other members of the society in encouraging the utilisation of computers in the educational field is considered by the Saudi educational policy makers. Educational policies play a significant role for learners. Teachers can either learn afresh or update their ICT-related skills, as the Saudi educational policies lay emphasis on teachers' computer training. The Jehazi scheme is an example of one of the policies that are associated with delivering new programmes under the supervision of the MoE. Under this scheme, electronic gadgets, such as laptops, scanners, printers, etc. are provided at subsidised rates and teachers are allowed to purchase them through reasonable repayment schedules. This scheme has three chief objectives. The first objective is about spreading awareness of the significance of IT among teachers, the second objective is about ensuring that a maximal number of teachers are trained on ICT related aspects, and the third objective is to promote the use of the Internet and other online facilities provided by the government among teachers. Several pre-sales and post-sales benefits are available under the Jehazi scheme. The most prominent benefits are a free one-year Internet membership, a free one-year membership to an online computer magazine, a free six-hour training course, and assistance to attain an international computer driving licence (ICDL). Furthermore, the provision of a portable computer, a laser mouse and a USB storage drive constitute the additional benefits under the scheme (Oyaid, 2009).

The utilisation of ICT in the KSA has not only garnered attention in the educational sector but also in other sectors. The national policies of the KSA spread awareness of the use of computers among the people. The home computer initiative is a scheme financed by the

Communications and Information Technology Commission and The National Commercial Bank. This initiative can be cited as an instance of the shift in governmental policy from the educational sphere to the national sphere. The home computer initiative is an affordable five-year repayment scheme through which the government intends to equip one million families in the KSA with a computer device. Modern computer devices that use the Microsoft Windows and Office software are being provided with one-year free maintenance under the home computer initiative. In addition to this, affordable IT training courses, free educational content and a 15-hour monthly Internet membership are other services provided under the initiative (Communications and Information Technology Commission, 2006).

2.10.4 Studies related to ICT in the Saudi educational system

Alharbi (2013) observed that the education system of a country is improved through ICT utilisation in schools and, keeping in tandem with other countries, this concept was quickly adopted by the KSA. The concept of using ICT was supposed to be integrated in the education system. However, ICT utilisation was introduced as a subject in the Saudi education system. Several labs were constructed in schools to impart education on computers to students and help them familiarise with the concept. The subject on computers was treated on a par with other subjects of the curriculum (Alharbi, 2013). Roblyer and Doering (2013) did not identify any significant association between the general learning environment and ICT.

Haimour and Obaidat (2013) posited that in order to improve the level of computer literacy in schools, the Saudi government has been striving to integrate ICT wholly into the education system. Al-Maini (2013) posited that a specific programme called 'Watani' was formulated by the KSA for encouraging the utilisation of ICT in schools. The researcher states that a project called 'Tawteer' was formulated by the Saudi education ministry for increasing the

learning and teaching of ICT (Al-Maini, 2013). However, the author does not find the utilisation and implementation of ICT in the KSAn schools to be a successful mission. Inadequate ICT training, resistance from teachers and deficiency of funds were cited as some of the major reasons that hindered the successful implementation of ICT in education (Al-Maini, 2013).

The training of girls and teachers in the KSA is aided through modules that are formulated on the basis of the usage of technology in education. Alshehri (2014) reports that in order to deliver methodological services in ICT implementation, the education ministry of the KSA has established 27 technical centres to help the Saudi teachers. The performance of teachers in classrooms was enhanced through the significant support provided by such endeavours.

Almalki and Williams (2012) analysed the implementation of ICT in Saudi schools and observed that lack of training and confidence in teachers was found to be detrimental in the utilisation of ICT lessons in schools. Inadequate administrative support, lack of time for computer lessons and negative perceptions of teachers were the other unfavourable factors identified by Almalki and Williams (2012) in the implementation of ICT. The utilisation of ICT in Saudi schools was also affected by the religious and cultural beliefs of the KSA.

According to the eighth development plan formulated by the Ministry of Economy and Planning, the official perspective of the future of education underlines the fact that the attainment of the futuristic vision of education in the KSA is not solitarily dependent on ICT. Although ICT is anticipated to play a significant role in the success of futuristic education, the other factors cannot be ignored. As a matter of fact, ICT is considered to a part of the whole package of the future of education in the KSA (Ministry of Economy and Planning, 2008). The overall aims and objectives of the Saudi Arabian government are intended to be attained

through the five- and ten-year development plans that stipulate the interweaving of health, agriculture, labour and education ministries. Students' confident and positive behaviour regarding technology, students' participation in the comprehensive development plans and students' contribution in establishing a robust knowledge-based economy can be collectively facilitated through the futuristic vision of education. An efficient education system facilitates the acquisition of communicating, analysing and high-order thinking skills and it also promotes the concepts of self-research and self-education. An efficacious education system enables students to be aware of the global circumstances and prepares them to identify and solve various problems related to peace, global warming and poverty. The students are also educated to maintain their original Islamic and Arabic identities (Ministry of Economy and Planning, 2008). Introduction of ICT as a subject in all academic years, provision of online ICT centres and utilisation of ICT in distance learning are considered as primary components of the ICT utilisation in the education system of the KSA. The futuristic educational vision regards the KSA as a society that generates information and knowledge, which can be used for enhancing the quality of products and services, increasing productivity and improvising the overall proficiency.

The next section describes teachers' use of ICT in teaching students with special needs (intellectual disabilities).

2.11 Teachers' use of ICT in teaching students with special needs

In general, special education teachers have a significant part to play in helping students with special needs access the curriculum. These teachers may employ various strategies and tools to modify and attune the curriculum to suit students with SEN. The advent of ICT tools, such as assistive technology devices, is one of the most important modifications in special

education from the perspective of curriculum access. Furthermore, the knowledge of special education teachers of the choice, usage, and assimilation of ICT devices to enhance learning opportunities for students with special needs benefits these students (Gustafson, 2006).

Thus, it can be seen that ICTs have a role to play in the education of persons with disabilities. Since persons with disabilities have varying educational needs, meeting their requirements is complex. Such persons must, as their normally developing peers, acquire competences and knowledge to be able to successfully operate in society. However, by definition, they have extra requirements (also known as special educational needs or SEN) due to shortcomings in function which influence their capacity to benefit from typical approaches to instruction and hence their educational progress is hindered (UNESCO, 2006). From this perspective, the use of ICT is significant as it can facilitate the delivery of education of high quality for students with SEN. Through the introduction of ICTs into the process of teaching-learning, the quality of education can be improved. Moreover, modification to syllabus can be supported and novel learning experiences can be introduced. In this manner, the specific educational requirements of various groups of learners, including students with SEN, can be met. Although ICTs can be used to achieve various purposes in education, they can be grouped into three chief categories from the perspective of students with special educational needs (SEN), namely, ICTs for compensation use; ICTs for didactic use; and ICTs for communication use. These three categories will be briefly described next.

ICTs for Compensation Use

In this context, ICTs are viewed as forms of technical assistance that permit students with SEN to actively participate in interactive activities. For instance, a student with a motor disability may receive assistance to write or a student with a visual impairment may receive

assistance to read. Thus, from this perspective, it can be seen that ICTs aid in developing the abilities of students to regulate their settings, make decisions about what they encounter, make information accessible, and consequently improve interactions with other persons not only in the neighbourhood but also in wider contexts, such as globally. That is, ICTs can facilitate the recovery of natural function or provide an alternative to compensate for shortcomings (UNESCO, 2006).

ICTs for Didactic Use

As an educational tool, ICTs have inspired a new perspective of education and initiated a makeover of approaches to education. In particular, the use of ICT has inspired diverse and novel instructional and evaluation strategies for students with varying educational needs (UNESCO, 2006).

At this point, it is imperative to note that ICTs, as an educational tool, is appropriate for effecting inclusive education. Within the inclusive curriculum, educational initiatives must aspire to take the distinct requirements, differences, and competences of an individual into consideration to improve individual progress. As a result, students with special needs must receive full support to accomplish their objectives at a suitable rate. Thus, ICTs become a significant resource for inclusion (UNESCO, 2006).

ICTs for Communication Use

Technology can facilitate communication in persons with disabilities, frequently termed Alternative and Augmentative Communication. Since the needs of students with specific communication difficulties are varied, there are assistive devices and software available to suit different disabilities. For instance, the computer is a resource that can simplify and

facilitate communication, permitting a person with impaired communication to display his/her competences. In the case of persons with impairments both in motor and communicative abilities, computers can aid them in commencing communication, and to convey their needs and requests (UNESCO, 2006).

Moreover, ICTs can be used to facilitate approaches to distance teaching by offering special services between physically distributed students and teachers, in particular, where there is a lack of teachers (e.g., in special education) (UNESCO, 2006).

The next section describes the qualification of teachers in the KSA.

2.11.1 Qualifications of teachers in the KSA

The qualifications of primary school teachers in the Kingdom of Saudi Arabia (KSA) differ from one another. Secondary school certificate, a two-year diploma after secondary school, a three-year diploma after intermediate school, a non-educational bachelor's degree, an intermediate college degree covering the three-year degree after secondary school, educational bachelor's degree and a master's degree in education are some the qualifications of primary school teachers. A qualified teacher's minimum qualification is a secondary school certificate and maximum qualification is a Master's degree in education (Alqahtani, 2011). Additionally, teachers are generally provided training for teaching in general schools and are not trained for any kind of special education, particularly those relating to learning disabilities. It is a generally followed procedure wherein the educational institutions do not provide any specific course on special education to the trainee teachers. Teachers who learn to cope with differently abled students must also comprehend special educational needs that cover hearing and visual impairment, intellectual disabilities and gifted education. Accordingly, several primary and intermediate schools in the KSA have special educational

resource rooms and teachers for educating students with intellectual disabilities. Additionally, teachers undergo courses in special education and qualify for their positions through exceptional teaching meant for students with intellectual disabilities or gifted students. In order to prepare teachers for rendering the special education, a relevant course was provided by just one university from 1983 to 1999. However, by the year 2006, the number of universities offering special education in the KSA grew to four. Additionally, the need for providing special education to students with intellectual disabilities in mainstream classrooms has been acknowledged by the schooling system of the KSA. Therefore, the KSA currently has ten universities that offer special education courses.

The next section describes the perceptions of teachers towards ICT use in teaching.

2.11.2 Teachers' perceptions towards ICT usage in teaching

Teachers' ICT utilisation is affected by their perceptions, apart from the several hindrances and supporting factors. Teachers' perceptions on ICT's utilisation necessarily determines the quality of ICT application as several scholars have posited that the way of using technology is closely related to the teachers' perceptions. Apart from obstructing the implementation and utilisation of ICT in schools, the negative perceptions of teachers also affect the benefits of learning, which are expected as a consequence of instructional reforms (Demetriadis et al., 2003a). On the other hand, positive perceptions on ICT usage in the classroom motivate the technologically incapable teachers to acquire pertinent skills and be instrumental in the implementation of ICT utilisation in instruction (Mumtaz, 2000).

Two purposes are served through the knowledge and appreciation of teachers' perceptions about ICT. The first purpose is the determination of the method and the reason of adopting ICT utilisation (Cox, 2003; Levin & Wadmany, 2005) and the second purpose is the

determination of the actual utilisation of ICT. Cox (2003) discovered that the professional growth of students and teachers caused by their constructive perceptions on ICT, further spurred the ICT utilisation in the field of education. According to Levin and Wadmany (2005), ICT is likely to be accepted and adopted in education if the teachers' perceptions are in favour of introducing the ICT concept. In addition to causing increased adoption of ICT in the field of education, the teachers' perceptions influence students to adopt a similar approach. Students' values and beliefs and their ICT-related perceptions have been found to be largely influenced by their teachers (Hu, Clark & Ma, 2003; Wood, Mueller, Willoughby, Specht, & Deyoung, 2005). According to the Oxford Dictionary (2017), perception is the "way in which something is regarded, understood, or interpreted." It is imperative to note that the way of interpreting and accordingly attuning one's individual beliefs constitute the teachers' ICT-related perceptions.

Several factors, such as time, equipment, access, technical support and training, affect the teachers' ICT utilisation. Nevertheless, Ertmer (1999) reported that teachers would not use ICT even though all barriers are eliminated and this is due to the fact that previous research has demonstrated that ICT utilisation in the field of education is distinctly determined by teachers' perceptions. Additionally, teachers' rationale for ICT use in the field of teaching determines their perceptions on ICT utilisation. Teachers using ICT under the rationale of computer awareness are less likely to have positive perceptions that those who use ICT for pedagogical purposes (Drenoyianni & Selwood, 1998). Although teachers possess certain apprehensions, uncertainties and reservations on ICT usage, several studies have revealed their positive perceptions towards the same. The below-mentioned studies are relevant to the topic of utilisation of ICT in education field, despite some of them being outdated.

In a study on teachers' needs for knowledge and skills, Williams, Wilson, Richardson, Tuson and Coles (1999) studied the teachers' perceptions towards ICT. The study outcomes revealed that teachers were motivated and interested to learn the various aspects of ICT and their positive attitudes indicated a constructive trend in the field of education. Teachers' ICT-related perceptions were impacted by the broad range of benefits derived from the implementation of ICT. Nevertheless, in spite of the positive perceptions and increased comfort level of teachers on the ICT usage, many teachers stated that they lacked the necessary knowledge and skills required to maximise the ICT utilisation and that they were lagging behind their students regarding the computer terminology. Some teachers observed that their peers were apprehensive in attaining the necessary computer knowledge and skills and they used computers restrictively. The findings stated above are similar to the study outcomes of Andrews (1997), which revealed the teachers' perceptions that ICT promoted students' isolation and caused inhuman influence and incompetence in the educational field. The teachers also believed that educators faced the prospects of de-skilling due to the ICT usage.

Kyriakidou, Chrisistomou and Banks (1999) conducted a comparative Cypriot-British study in which teachers were found to improve their perceptions after getting exposed to increased ICT usage. However, this transformation was not before the teachers were found to be incompetent and anxious in applying their ICT-related skills. Practical course on computer literacy was found to improve teachers' perceptions on ICT (Muir-Herzig, 2004). Kyriakidou et al. (1999) found that a majority of teachers had positive opinions on ICT, especially for personal usage. However, a minority of teachers were found to have negative views on the topic. All responding teachers stated that ICT played an important role in areas of learning

and teaching and it was useful in the educational field. Further, a majority of the teachers (60%) believed that they were confident in using computers and they liked working on them.

The teachers and mentors participating in early training courses were surveyed for ICT utilisation through a questionnaire by Cuckle and Clarke (2002). Three different statements of the questionnaire, that is, "most of the department staff are enthusiastic or quite interested in using computers in teaching"; "computers are considered appropriate in teaching my subject"; and "I would like further training for using computers" expressed the positive perceptions of teachers on ICT. A majority of the teachers state that their colleagues were enthusiastic about computers and were looking forward to use them. The teachers also expressed that computers were applicable to their field. A small percentage of teachers (10%), though, expressed disinterest in ICT usage. Overall, teachers and mentors expressed enthusiasm regarding the ICT utilisation. Moreover, they had the ICT-related skills and were enthusiastic in updating them regularly. Students and teachers were encouraged to employ ICT in their school activities and additional emphasis was laid on the adequate training of the concerned people (Cuckle & Clarke, 2002).

Apart from examining the teachers' perceptions on the usage of computers and ICT in the future, Madden et al. (2005) evoked teachers' responses on modern technological progress. Their study intended to examine the teachers' perceptions of the Internet and its applicability in the field of education. The ability to use the Internet was found among most of the respondents, including young educators of technical subjects. The teachers' responses differed according to their subjects of specialisation. Science teachers, design and technology teachers and ICT teachers were found to be using the Internet confidently, as their scores were positive. However, they were aware of the limitations of the Internet. Teachers of history and

drama were comparatively non-critical as they were not confident and expressed negative views on ICT usage. The teachers of maths were found to be neither confident nor diffident. It was found that teachers, especially women teachers, perceived that the Internet was more competently used by students than the teachers. Consequently, younger teachers were well poised to use the Internet when compared to the older ones.

The reliability of websites was a matter of concern among teachers who otherwise agreed on the use of Internet as a valuable source of obtaining teaching and learning materials. Nevertheless, teachers who were confident on ICT implementation expressed that the Internet content was reliable for use in educational field and it contributed immensely to the aspects of teaching and learning. Teachers expressed concerns on two problems of Internet usage, namely, encountering undesirable online individuals and unrestricted access to adult content. Thus, it can be summarised that although teachers were found to favour ICT utilisation, they adopted a cautious approach too.

Unfortunately, studies on perceptions of Saudi Arabian teachers on ICT are inadequate. The available studies on teachers' attitudes towards ICT employ various attitude measuring scales, such as computer attitude items (Pelgrum & Plomp, 1993), attitude towards computer scale (Francis, 1993), and the 16-19 computer attitude scale (Selwyn, 1997). Nevertheless, despite having other objectives, several studies reveal teachers' perceptions on ICT usage. For instance, an overall positive opinion of teachers towards ICT can be found in the study of Al-Saif (2006), even though some of the teachers were found to be reserved due to their ICT-related experiences. Teachers opined that the teaching and the learning processes were benefited through ICT implementation and felt the need for adequate training in ICT as it improved communication between teachers and learners. Al-Showaye (2002) posited the

teachers' perceptions on the advantages of modern methods of education being bestowed upon students in comparison to traditional methods of learning. The researcher stressed the significance of persistent training provided to teachers and motivating them to improve their skills. The perceptions of EFL (English as a foreign language) teachers towards ICT were examined in an Arab study conducted in Syria. Positive perceptions towards ICT were reported by a majority of teachers (62.4%) in a study conducted by Albirini (2006). Furthermore, teachers were generally found to interact with people who used ICT and were comfortable in using computers without any anxiety. The teachers were willing to enhance the ICT utilisation as they realised the importance of computers in the modern age. The teachers believed that computers reduced the efforts and time consumed by students and motivated them to improve their knowledge. Computers were considered to be important for use in all subjects, thereby increasing the quality of education. Teachers found the time spent in learning the usage of computers to be worth the effort as computers were considered to be efficacious and rapid means of accessing the required information. Teachers were also found to learn more about computers by buying and working on them. The positive perceptions of teachers on ICT that are generally found in the existing literature are bound to proliferate over a period of time. Nevertheless, a significant number of teachers are found to be unwilling, uncertain and uneasy in implementing ICT in their daily usage.

The next section describes the advantages and disadvantages of the use of ICT in teaching students with special needs (intellectual disability).

2.11.3 Advantages and disadvantages of the use of ICT in teaching students with special needs

Drigas and Ioannidou (2013) stressed that the "successful integration of (ICT) into learning environments has the potential to benefit all students as well as students with special educational needs" (p.41). For instance, studies have found that utilising learning environments enhanced by technology for students with intellectual disability teaching supports enhanced learning outcomes (Wehmeyer, Palmer, Davies, & Stock, 2011). Furthermore, students' cognitive competencies, such as reading comprehension skills, can be reinforced by assimilating technology into special education (Stetter & Hughes, 2011). Likewise, there are several studies which demonstrate that the maths (Bouck, Bassette, Taber-Doughty, Flanagan, & Szwed, 2009), literacy (Coyne, Pisha, Dalton, Zeph, & Smith, 2012; Lin, Chen, Wu, & Yeh, 2008), and reading comprehension (Chen, Wu, Lin, Tasi, & Chen, 2009) competencies of students with intellectual disabilities are enhanced by computer supported learning. Also, students are aided in learning daily life skills and in transferring them to real life in learning environments enriched with Kinect technology (Chang, Chen, & Huang, 2011).

A study by the British Educational Communications and Technology Agency (BECTA, 2003) found that the use of ICT in schools for students with SEN can help such students to communicate, actively contribute to lessons, and be more successful in learning. For instance, ICT use, in general, can provide benefits, such as that its use can facilitate greater independence in students; expose the hidden potential of students with impairments in communication; assist students in exhibiting accomplishments which would otherwise not be possible with the conventional approaches; and permit assignments to be customised to be appropriate for the competences and capabilities of individuals (BECTA, 2003).

Specifically from the perspective of ICT use for students, the benefits of ICT use include such items as the improvement of the independent access for students to education by computers (Moore & Taylor, 2000; Waddell, 2000) and allowing students with SEN to work at their own pace and thus undertake and complete tasks (UNESCO, 2006). Furthermore, using the Internet, students with visual impairments can gain access to information together with peers without visual impairments (Waddell, 2000). Moreover, communication is facilitated for students with profound and multiple learning difficulties (Detheridge, 1997), and self-assurance and social standing at school and in society can be gained by students using voice communication aids (Worth, 2001). Also, students are motivated to use the Internet at home for schoolwork and leisure interests due to increased ICT confidence (Waddell, 2000).

From the perspective of teachers and non–teaching staff, ICT offers various benefits by enabling teachers working with students with SEN to communicate electronically with colleagues thus decreasing their isolation (Abbott & Cribb, 2001; Lewis & Ogilvie, 2002) and by supporting reflection on professional practice through online interaction (Perceval-Price, 2002). Moreover, ICT helps to enhance skills and create a deeper understanding of the access technology used by students (Waddell, 2000); improve collaboration with peers resulting in improved professional development and increased success in the use of ICTs with students (Detheridge, 1997; Lewis & Ogilvie, 2002); and the creation of accessible resources, such as large print or Braille, is facilitated as materials are already available in electronic form (for example, from the Internet) (Waddell, 2000).

Parents and carers of students with disabilities can also benefit from ICT use. For instance, parents and carers are encouraged to have greater expectations of their children's sociability and probable degree of participation due to the use of voice communication (Worth, 2001).

Overall, it could be seen that considerable potential exists with regard to the educational uses of ICTs. However, these are not unaffected by several challenges and dangers. Innovative technologies can offer a channel to investigate new methods of learning that move away from conventional educational systems and create valid alternatives to inflexible, tedious styles to educating persons with SEN. Nevertheless, it could be inferred that if utilised without a commitment to the values of parity, involvement, and accountability, these technologies can become obstacles to education (UNESCO, 2006).

Lidström and Hemmingsson (2014) suggested, in a study limited to persons with motor, speech, visual, and hearing impairments, that while the type of ICT used among persons with disabilities varied, ICT appeared to specifically help students with spelling, writing, and interaction. On the other hand, Williams, Jamali, and Nicholas (2006) drew attention to six uses of ICT in an educational setting. These include facilitating tutor programmes; enhancing exploratory learning; use of ICT as a tool; help in communication; use for assessment purposes; and use as a management tool.

With regard to persons with intellectual disabilities, the increased use of ICT has been found to favourably influence the quality of life for such persons (Wehmeyer, Smith, Palmer, Davies, & Stock, 2004). Tanis et al. (2012) drew attention to the three potential benefits of ICT use for persons with intellectual disabilities as described by Parette (1991). That is, "(a) the facilitation and automation of therapeutic regimens and educational activities; (b) the provision, restoration, or extension of a person's physical abilities; and (c) the provision of opportunities for greater participation in the mainstream society" (p.165).

Maguire and Zhang (2007) suggested that the advantages of using ICT in education included expediting transmission of a broad range of knowledge; offering occasions for constant

learning; creating lessons centred on students, that is, lessons customised based on the strengths and weaknesses of students; offering an stimulating learning environment; and permitting occasions for autonomous learning. Similarly, Katz (2005) drew attention to several advantages of ICT use from the perspective of teachers. For example, he suggested that the use of ICT can aid teachers in lesson planning and widen the possibilities of resources for use. Moreover, ICT use can offer teachers the prospect of demonstrating expanded competence to both their students and peers. Furthermore, ICT use can assist and improve their teaching and also offer access to current information.

On the other hand, James (2002) drew attention to some disadvantages to using ICT in education, such as students who find it difficult to work alone may continue to have difficulty with independent learning; and the high cost of education as ICT use include the cost of procuring the required tools and devices as well as the provision of appropriate training for teachers. Vajargah, Jahani, and Azadmanesh (2010) also drew attention to the costs associated with ICT use in teaching. That is, ICT use can be constrained by limited budgets for ICT tools and associated materials.

The next section describes the barriers to the use of ICT in teaching students with special needs (intellectual disability).

2.11.4 Barriers to ICT usage in teaching students with special needs

Although it is recognised that ICT plays a significant role in education, there are also some challenges and barriers with regard to its adoption. Recognising the factors that hinder the full and appropriate use of ICT is imperative to ensure that policy makers are provided with practical and all-inclusive solutions (Waichigo, 2013). Scheuermann and Pedro (2009)

observed that there are three classes of barriers to the use of ICT in education: school level, teacher-level and system level

- *School-level barriers.* The lack or inferior quality of ICT infrastructure (hardware and software), restricted availability of ICT equipment, inadequate experience in ICT projects and badly maintained computers are included in this category. Conversely, non-optimised use of ICT resources may also be experienced in schools with high-quality ICT resources that are inappropriately organised (Waichigo, 2013). Other barriers are the unplanned or ad-hoc approaches to ICT integration in schools (Grover, 2012).

- *Teacher-level barriers.* Absence of appropriate ICT skills and inadequate or ill-chosen teacher training, which influences their motivation and confidence in the use of ICT falls into this category (Waichigo, 2013). Additionally, teachers may have negative attitudes towards ICT and be constrained by lack of time and excessive workloads (Grover, 2012). Moreover, personal factors, such as age, can affect the teachers' receptiveness to and use of ICT. For example, studies by Perrotta (2013) and Hammami (2016) mentioned that age can explain the limited use of ICTs in class by teachers.

- *System-level barriers.* These barriers signify the inflexible structure of the conventional education system encompassing areas such as the content of the curriculum (Waichigo, 2013). Another area is the absence of suitable policy directives both at country and school levels (Grover, 2012).

As mentioned earlier, the barriers to using ICT in education could be teacher, school or system related. Many studies have recognised the various obstacles at teacher and school level (e.g., Abu Samak, 2006; Al-Alwani, 2005; Alev, 2003; Almaghlouth, 2008; Al-Rashed, 2002; Beggs, 2000; Bingimlas, 2009; Bitner & Bitner, 2002; Cox et al., 1999a; Isleem, 2003; Jones,

2004; Korte & Husing, 2006; Mumtaz, 2000; Mustafa, 2002; Newhouse, 2002). However, the most frequent and significant barriers at the teacher level are: attitudes of teachers towards technology, their resistance to change, time constraints, their lack of confidence with regard to the use of technology, and absence of awareness and competence in making use of technology. Frequent school level obstacles are: insufficient access to technology; shortage of useful training; absence of technical support; costs of hardware and software, and so on. It could be seen, therefore, that the successful use of ICT with students with special needs would require elimination or regulation of these different obstacles (Al Mulhim, 2014).

Studies (e.g., Hoppestad, 2007; Kling & Wilcox, 2010; Wehmeyer, 1995, 1998, 1999) have drawn attention to the noticeable inadequacy of use of technology with persons with intellectual disabilities. Recognised circumstances that influence the inadequate use of technology by persons with intellectual disabilities include: device costs; insufficient information regarding device; obstacles in gaining an assessment and; insufficient training with regard to device usage (Wehmeyer, 1998). Another recognised barrier is the manner in which the technology is designed. Regardless of an emphasis on including facets of universal design, the design features of devices continue to be impediments to their use by persons with intellectual disabilities (Mirchandani, 2003; Wehmeyer, Palmer, Smith, Davies & Stock, 2008). The barriers may be physical or cognitive in nature.

Wehmeyer and colleagues (2004) investigated the effect of technology use by persons with intellectual disabilities by employing Carroll's (1993) first-order domains of cognitive competencies (memory and learning, reasoning, idea production, language, cognitive speed, auditory reception, visual perception, and knowledge and accomplishment). Research on ICT use was studied within each of these domains (Wehmeyer et al., 2004) and it was inferred

that, in many instances, inadequate cognitive access and the inability of devices to include facets of universal design acted as obstructions to their practical usage in different areas, such as mobility, activities of existence living, interaction, environmental regulation, community assimilation, education, jobs, and sports and pastimes.

The study by Bonnah Nkansah and Unwin (2010) drew attention to the lingering effects of socio-cultural beliefs and perceptions about disability, ignorance of the capabilities of people with disabilities, and the high cost of special education, as being significant barriers to the use of ICTs in teaching students with disabilities.

ICT itself as a barrier

ICT has been recognised to significantly aid in differentiated teaching, the setting up of an innovative educational setting, and the reinforcing of teaching in inclusive settings (Istenic Starcic, 2010; Istenic Starcic, Cotic & Zajc, 2013). However, Istenic Starcic and Bagon (2014) posited that ICT could itself be a significant impediment to inclusion. For example, lack of access to ICT resources, and inadequate resources for training and implementation.

The implementation of ICT in teaching methods is obstructed by several factors that demotivate teachers in adopting its usage. The factors that restrict ICT utilisation can be internal, as well as external, depending on the sources. The internal obstacles can be the teachers' perceptions and attitudes towards ICT, and their individual proficiencies; whereas, the external obstacles can be the lack of adequate training programmes, managerial support, technical support, and accessibility and availability of hardware and software. Lack of time, for instance, can be considered as both an internal and external obstacle in ICT implementation.

Inadequate administrative and technical support, shortage of time in preparing lessons and inadequate access to hardware and software are some of the external impediments to teachers' ICT utilisation. Muir-Herzig (2004) observed that lack of expertise, need for teacher training, lack of managerial support, lack of rationale, restricted access and inadequate teachers' time are the major impediments in the integration of ICT in schools. Ertmer (1999) reported that adequate training, support, equipment, and time provided by schools, enable teachers to integrate ICT into their teaching mechanisms. According to Franklin, Turner, Kariuki and Duran (2001), lack of time is reported by several teachers as a major impediment in ICT implementation. Several researchers (Smerdon, Cronen, Lanahan, Anderson, Iannotti & Angeles, 2000; Williams, Coles, Wilson, Richardson & Tuson, 2000a; Downes et al., 2001) have identified several hindrances that affect the adoption of ICT in the field of education. These hindrances include lack of technical support and advice, lack of support in integrating ICT into the curriculum, lack of administrative support, inadequate training facilities, lack of students' and teachers' time in getting accustomed to using computers and the Internet, Internet inaccessibility, lack of instructional software and inadequate quantity of computers.

Explaining the internal barriers, Scrimshaw (2004) stated the following four eventualities that may prevent teachers from using ICT:

- Probability of teachers' perceptions about their educational beliefs being incompatible with ICT;

- Possibility of teachers' personal drawbacks, such as lack of computer skills;

- Probability of social obstructions, such as lack of peer support, in scaling up the level of ICT utilisation; and

- Possibility of impediments in schools, such as lack of technical support, for ICT implementation.

According to Pelgrum (2001), the implementation of ICT was impeded by four material and six non-material obstacles. Inadequate quantity of Internet-ready computers, insufficient copies of software, inadequate peripherals and inadequate quantity of computers were the four material obstacles. Lack of technical staff, lack of supervisory staff, inadequate teacher time to get acquainted with computers, inadequate student time to use computers, non-integration of ICT in instruction and teachers' lack of ICT-related knowledge and skills were the six non-material obstacles. Moreover, it is difficult for teachers to acquire computer skills and integrate ICT into the curricula without having proper access to computers. Deficiency of suitable resources and materials restricts the processes of teachers' ICT-related learning. According to Granger, Morbey, Lotherington, Owston and Wideman (2002), providing accessibility to full-time technical support and providing adequate training facilities to teachers are as crucial as providing the latest equipment. Haydn and Barton (2008) posited that regular ICT utilisation in day-to-day teaching is facilitated by the data projectors. Thus, apart from the aforementioned material barriers, the availability of data projectors in the classrooms is vital for successful ICT implementation. Subsequently, computers would be used as per the educational requirements, and not for any other inconsequential purpose.

The barriers perceived by 170 educational practitioners in implementing ICT, as revealed in the outcomes of BECTA's online survey, were reported by Jones (2004). The impediments that restricted the acceptance of ICT were grouped in the report as school level barriers and teacher level barriers. The school level barriers were (1) impact of public examinations; (2) technical issues (lack of technical support, apprehensive thoughts); (3) lack of accessibility to

resources (owing to lack of teachers' individual access to ICT resources, poor organisation of resources, poor quality of hardware, lack of hardware and incompatible hardware); and (4) lack of teachers' time allowed by schools to utilise ICT. The teacher level barriers were associated with the shortcomings of the teachers, namely, (1) lack of awareness of the benefits of ICT utilisation; (2) inequalities (owing to differences in age and gender); (3) anxiety; (4) negative attitudes and resistance to change; and (5) personal deficiencies, such as lack of competence (due to lack of time for various types of training) and lack of confidence. Interrelationships between each of the identified impediments to ICT utilisation were revealed by the outcomes of the BECTA study. For instance, other barriers, such as the quantum of training, availability of technical support and personal access to ICT, directly influenced teachers' confidence. It can be stated that although the aforementioned studies reveal the usage of several terms (teacher or school level, internal or external barriers, and material or non-material obstacles), the primary barriers or obstacles of ICT utilisation are interrelated and are found to be common across various countries.

The factors that obstruct ICT utilisation are examined by similar studies that focus on the KSA's educational scenario. The utilisation of the Internet and the information technology in the intermediate and secondary schools of the KSA was analysed by Al-Showaye (2002). A total of ten teachers were interviewed and 143 teachers responded through a questionnaire. Lack of training, obsolete computer facilities, inadequate quantity of computers, big class sizes, inadequate computer facilities, lack of technical support and lack of time were among the most significant of the 16 factors identified. Students, parents and school management were the three main factors that affected teachers' ICT utilisation. The barriers that are associated with the school management include teachers' non-pursuance in encouraging students to learn using ICT, intervention of head teachers in the teaching methods (especially,

in the use of computer technology) and dilution of teachers' roles by assigning unrelated tasks to them. The impediment caused by the management affects the time spent by teachers for preparing and presenting the ICT-related lessons. The barriers that are associated with students are lack of students' fervour in learning about ICT utilisation, reluctance in verifying the misconceived thoughts on ICT, and not seeking teachers' help in overcoming their difficulties in learning. The barriers associated with parents are illiteracy, lack of computer awareness, misinterpretation of computer usage, negative perceptions of the role of computers, and lack of parental interest in motivating children to use computers. Students' willingness to learn and enhance their ICT skills was affected by their parents' negative perceptions and the school management, as teachers were compelled to concentrate on academic issues and not on ICT utilisation.

Al-Ghamdi (2001) concentrated on the materialistic barriers of the ICT implementation in secondary education. The impediments listed by the author were ill-equipped computer laboratories, lack of maintenance, overpopulated classes, deficiency of local networks, inadequate resources and obsolete computers. Teachers' inabilities of mastering pedagogical methods, improper schedules, deficiency of time, several classes being conducted and inadequate training courses on the latest ICT-related developments were the non-materialistic barriers. Al-Saif (2006) conducted a research on computer utilisation in girls' secondary schools, in which the barriers of ICT usage were found to be identical to those of earlier studies. However, some barriers that were not listed in the previous studies were identified. These barriers were apprehensions of causing damage to computers, deficiency of Arabic educational software, high maintenance costs, indifference towards ICT utilisation, and teachers being not trained for producing programmes. Al-Asmari (2005) analysed ICT utilisation in higher education institutes among EFL teachers, and the barriers of ICT

implementation were found to be identical to the established ones. The barriers were unreasonable and unorganised censoring by the government, inappropriate Internet usage, incompatible content, cost of setting-up the Internet, lack of time, inefficient server, inferior Internet connection, unsuitable infrastructure, inadequate number of technicians, restricted access to computer labs, lack of support, deficiency of resources, inadequate quantity of computers and ineffective hardware. Al-Obaid (2002) observed that teachers' poor hold over the English language also proved to be a barrier in ICT implementation, as most of the online educational content is in English.

The barriers and hindrances in implementing ICT in the educational field were found to be similar in studies conducted in the neighbouring countries of the KSA. Al-Ammari (2004) conducted a study in which it was found that the absence of technical support, lack of computer skills, insufficient time allotted for computer classes, inadequate infrastructure, huge number of students, length of the curriculum and lack of time were the usual external barriers in the implementation of ICT in Qatari elementary schools. Apprehensiveness about using computers and damaging them, fear of equipment failure, fear of unrestrictive student behaviour in labs, lack of awareness of the significance of computers and teachers' lack of computer knowledge and experience were cited as the internal barriers by Al-Ammari (2004). Al-Khateeb (2007) analysed the barriers of ICT implementation in Jordanian schools and found that all responding teachers coped with several barriers in implementing ICT. Nevertheless, lack of ICT resources, lack of data projectors and lack of maintenance were found to be the most frequently stated hardware-related barriers.

Barriers caused by ICT implementation procedures must be thoroughly examined and appropriate means need to be devised to surmount the impediments. Thus, it is imperative to know the barriers encountered by educators in implementation of ICT.

The next section describes the factors, incentives and motivators with regard to the use of ICT in teaching students with special needs (intellectual disability).

2.11.5 Supporting factors, incentives, and motivators for ICT usage in teaching students with special needs

Even though several important barriers exist with regard to teachers' use of ICT, correspondingly, there are also noteworthy factors to motivate them to use ICT. For instance, favourable outlooks towards ICT, the capacity of ICT to make lessons more stimulating and entertaining, the capacity of ICT to enhance students' achievements, the capacity of ICT to enhance presentations, to make lessons more varied, and in conserving time and energy (Abu Samak, 2006; Albirini, 2004; Aldossry, 2011; Alshumaimeri, 2008; Baytak, Tarman & Ayas, 2011; Cox et al., 1999b; Cox, Webb, Abbott, Blakeley, Beauchamp & Rhodes, 2003; Cunningham, Kerr, McEune, Smith & Harris, 2003; Jones, 2004; Priest, Coe, Evershed & Bush, 2004; Punie, Zinnbauer & Cabrera, 2006; Selwood & Pilkington, 2005; Serin, 2011).

Studies have found that the attitudes of teachers towards technology could impact their readiness to use it. That is, their attitudes could work either to impede or encourage ICT use. Many researchers (Abu Samak, 2006; Albirini, 2004; Cox et al., 1999a; Jones, 2004; Mumtaz, 2000) acknowledge that "teachers' beliefs about teaching and learning with ICT are central to integration" (Mumtaz, 2000, p.1). In general, the inference is that the likelihood of teachers using ICT in teaching is directly related to their outlook (Al-Zaidiyeen, Mei & Fook, 2010; Cox et al., 1999a; Lau & Sim, 2008).

Several factors are recognised to influence the attitudes of teachers towards technology. For example, the amount of ICT training experience (Chen & Chang, 2006; Tsitouridou & Vryzas, 2004; Sadik, 2006), as there is typically a favourable association between outlooks toward educational technology and associated training (Abu Samak, 2006; Cavas, Cavas, Karaoglan & Kisla, 2009; Gobbo & Girardi, 2001; Sa'ari, Luan & Roslan, 2005; Jegede, Dibu-Ojerinde & Ilori, 2007; Lau & Sim, 2008; Kahveci, Sahin & Sebnem, 2011).

Teachers' attitudes toward ICT are also influenced by their access to ICT (Cavas et al., 2009; Chen & Chang, 2006; Cox et al., 1999a; Sepehr & Harris, 1995). Dawes (2000) suggested that being familiar with the attitudes of teachers toward ICT could show "much more about what equipment the teacher has access to, what training they have had, and what sort of community they are part of, than it does about the willingness of the teacher to learn about or use ICT" (p.298).

It has been suggested that ICT use in education has the capacity to make a boring lesson more entertaining by increasing collaboration, fun and activity (Baytak et al., 2011). The entertainment aspect of ICT appeals to students and enhances their attentiveness (Wishart & Blease, 1999). It could be seen that this opinion found consensus among researchers.

Time is a factor that can serve as either a barrier to ICT use in education. However, it can also motivate the classroom use of ICT in the classroom. Punie et al. (2006) observed that the effect of ICT on teaching could be assessed by the pupil "engagement, differentiation, creativity, and by the fact that less time is wasted" (p.12). Selwood and Pilkington (2005) found that, in general, the greater number of teachers were in consensus that using ICT could lessen their quantum of work, thus conserving their time and effort. Further, Selwood and Pilkington (2005) clarified that the use of ICT for the creation of materials to be used in

teaching and learning gave rise to resources that could be shared and reused, with the outcome that further materials could be prepared in lesser time. Moreover, Selwood and Pilkington (2004) specified that while the initial expenditure, in terms of time and effort with regard to ICT use, could be substantial, this would stabilise and indeed reduce over time.

BECTA'S study on the effect of ICT use in education (Somekh et al., 2007; BECTA, 2004) reported that the use of ICT in teaching may decrease teachers' work if a few other factors were made available, such as good quality ICT training for teachers, access to hardware and software, and adequate technical support. According to BECTA (2004), "As with ICT more generally, positive impacts on teachers' workloads depend on the ways in which the ICT is used. Appropriate, not just increased, use of ICT is crucial: it is important to judge where the introduction of ICT could lead to real benefits, and also to balance these potential benefits against the costs" (p.3). It could be seen that teachers play a significant role in boosting the use of ICT in schools, in general, and with students with special needs, in particular. Accordingly, they require support and adequate training whilst employing ICT in their teaching.

Scrimshaw (2004) identified the most effective factors that enabled teachers to adopt ICT in their pedagogy. Evidence from an online survey of teachers' perceptions of factors that encourage ICT utilisation, and evidence from literature that recommended efficient techniques of defeating the barriers in ICT implementation, were used in Scrimshaw's (2004) research. Individual-level enablers and school-level enablers were the two broad categories of factors that encouraged teachers to adopt ICT in their teaching. Availability of training facilities, access to interactive whiteboard, availability of technical support, unrestricted access to hardware and software, availability of quality resources and access to personal electronic

devices constitute the individual-level enablers; whereas, access to resources, efficient timetabling of equipment and rooms, provision of interactive whiteboards in classrooms, favourable policies on ICT utilisation in the curriculum, managerial support, ICT training programmes for staff and onsite technical support constituted the school-level enablers. Laying emphasis on the benefits of ICT utilisation, ensuring access to authentic systems, being capable of using ICT in pedagogy and spreading awareness of ICT in education are some of the other enabling factors. Granger et al. (2002) analysed the interview responses of teachers and head teachers of four different schools, and used the social perspectives as the basis for identifying various emerging circumstances that affirmed ICT utilisation in education. The circumstances that supported ICT utilisation were listed as motivation by head teachers, administrative commitment in implementing pedagogically relevant ICT, cooperative relationships among teachers and informal ICT education. Teachers stand to gain more knowledge through the Internet or informal discussions. It signifies that informal training methods may sometimes prove to be more effective and viable, when compared to formal training sessions. Williams et al. (2000a) examined teachers' requirements during the process of ICT integration in schools, and affirmed the aforementioned circumstances. Persistent support, training and access to ICT were the three interrelated categories of teachers' requirements that were identified by the researchers. Three interlinking factors – teacher, resources and institution – were identified by Mumtaz (2000) in a study of components that influenced teachers' ICT utilisation. The researcher had conducted a review of literature spanning from 1980 to 2000. Despite the reviewed literature being obsolete due to several changes taking place in the education sector, the structure of the study is still applicable. Two significant points were identified by the researcher. The first point was that a supportive network for using ICT, and adequate time for managing the ICT implementation,

was not given to teachers. The second point was that the teachers willing to adopt ICT were demotivated due to the restrictive and inadequate availability of resources, such as software, computers, etc. It is imperative to observe that the term 'limited resources' referred to the absence of computers in those days, whereas the same term refers to insufficient quantity of computers in the present context. The inadequacies are prevalent, in spite of an increasing amount of resources specifically meant for pedagogical applications. Additionally, the individual factors of teachers impacted the ICT utilisation in classrooms. The individual factors are grouped as personal factors, social factors and external factors, which are described as follows:

- Personal factors were comprised of teachers' backgrounds in formal computer training, their commitment to professional learning and their attitudes and beliefs.

- Social factors were comprised of the national policies, school policies, administrative support and inspirations from peers and the principal.

- External factors were comprised of user friendliness, quality of hardware and software, access to resources and availability of resources.

Studies that have affirmed the impact of the above-mentioned three factors (personal, social and external) on ICT utilisation are described below.

Personal factors: According to Mumtaz (2000), making academic lessons enjoyable, motivating, diverse, easy and interesting for both teachers and students, were the important personal factors. Furthermore, providing online support, amending the administration for enhancement of efficiency, acknowledging teachers with due respect, affording power to teachers, allowing access to computers for personal use and improving the presentation of

materials constitute the additional personal factors. Ensminger et al. (2004) posited that internal and external incentives were the personal factors that encouraged teachers to implement ICT in classrooms. Downes et al. (2001) reported that the main inducements for teachers to acquire ICT skills were the internal incentives that were focused on personal rewards. Adequate remuneration, recognition of teachers' work, recognition from peers, fulfilment of pedagogy-related objectives, opportunities of self-satisfaction, opportunities to implement novel teaching techniques, and opportunities of providing advanced instructions are some of the personal rewards cited by the researcher.

Social factors: Marcinkiewicz and Regstad (1996) posited that subjective norms are generally followed by teachers, which require them to consider and act according to the expectations of other people (such as students, parents, colleagues, head teachers and professional entities) regarding ICT utilisation in teaching. Thus, if the other people deem it unnecessary to use computers, then the teachers' perceptions regarding the ICT utilisation would be affected accordingly. Czerniak et al. (1999) identified that parents, colleagues and community members collectively affected the probabilities of teachers using technology in science classrooms. Several studies have demonstrated that support from co-workers (Preston, 1999), senior faculty members (Norton, McRobbie & Cooper, 2000) and head teachers (Mulkeen, 2003) encourage teachers to integrate ICT utilisation. Williams et al. (2000a) report that, apart from the role played by the positive attitudes of senior managers and head teachers, the leadership of teachers can also affect the success of ICT integration in classrooms. The integration and utilisation of ICT in the fields of teaching and training requires the provision of persistent support to teachers. Ensminger et al. (2004) report that proper communication and adequate managerial support is required for encouraging teachers' to utilise ICT.

External factors: Williams et al. (2000a) analysed the responses of surveys conducted in 400 Scottish schools and identified several external factors that affected the ICT utilisation. Teachers' lack of Internet awareness, lack of skills and lack of Internet access were the factors that curbed ICT utilisation. Czerniak et al. (1999) conducted a survey of teachers working in US private and public schools and found that teachers' ICT utilisation was improved by external factors, namely, staff development opportunities, technological support and availability of resources. Furthermore, several studies have identified quality training as a stepping stone in implementing ICT in schools and encouraging teachers to use ICT in teaching. Al-Aqaily (2002), and Wasserman and Millgram (2005) posited that teachers need to be encouraged to acquire the fundamental ICT skills through adequate training, and gradually explore the advanced options and gain confidence. Williams, Coles, Wilson, Richardson and Tuson (2000b) reported that a holistic approach must be employed by the training module, wherein teachers are supported after the completion of their formal training. The post-training support must include constant updating of educational objectives, knowledge, skills, priorities and delivery. The training programme must be centred on pedagogical concepts and must be relevant to classroom applications. Teachers must be trained on the practicalities and must be provided with opportunities to interact and work with other teachers. Scrimshaw (2004) observed that the varying requirements of teachers must be considered in the training module, which should ideally be flexible, uninterrupted and sustained. The researcher further posited that teachers must be allowed to practice ICT utilisation, as they need a longer duration in efficiently integrating ICT into their mode of teaching. Thus, ICT implementation in classrooms is dependent on the lesson time allotted to teachers. Ensminger, Surry, Porter and Wright (2004) consider the aforementioned factors to be vital for implementing ICT in education. Up to a certain extent, teachers and schools

determine the circumstances, supporting factors, motivating factors and reasons of effective ICT implementation. Nevertheless, the objective of implementing ICT in education is attained through the significant role played by teachers.

The research gap identified by the review of literature is presented in the next section.

2.12 Research gap (theoretical rationale for the study)

The earlier sections of this chapter provided an overview of various aspects of inclusive education, intellectual disability, ICT and ICT use. Accordingly, several ideas have been introduced and discussed from sources in extant literature. These ideas can be recognised as contributing cumulatively a theoretical framework or rationale for the present study.

Essentially, a theoretical framework is a blend of what has been examined (extant literature) within the setting of the study (context of the study) to recognise the gaps in the literature to develop the basis for the study. The early stages of performing a study involve reading and reviewing past work from the perspective of recognising gaps in the literature. My review of literature assisted me in not only recognising topics to be included in the study's methodological structure, such as the methods of data collection, in particular, but also drew attention to various significant challenges concerning the matter under consideration in the context of Saudi Arabia. First, the inclusion of students with intellectual disabilities into mainstream inclusive education settings was still work in progress (Al-Mousa, 2010). Moreover, ICT use in education, in general, was still in its nascent stage. A study by Al-Mohaissin (2002) submitted that the poor condition of ICT use in the country is the outcome of the delayed and inadequately studied launch of ICT in education. Consequently, on scrutinising studies based in the KSA, gaps could be discovered which were produced by the insufficient planning of policy makers for the launch of the educational use of ICT, and their

use of studies which were not positioned in a suitable setting, as the basis for their greatly influential resolutions (Al-Hadlag, 1998). Educational researchers have only recently devoted adequate attention to addressing this gap in literature, so as to develop a comprehensive and established awareness of the current status of the educational use of ICT, in order to offer policy makers with vital information – generated in a suitable environment –which they can utilise to make enlightened decisions. As a result, the theoretical framework of this study is based on a mixture of studies from countries in the West and the Middle East (that is, Saudi Arabia and its neighbours in the Persian Gulf). The intent in the decision to use a wide distribution of studies from different settings is to facilitate a greater awareness of the current scenario regarding ICT use in education and to recognise probable opportunities for research in view of the absence of relevant literature based in the Saudi context.

Similar to other countries across the world, computers have become a common feature of daily existence in the KSA. They are everywhere, namely, at home, at work, at supermarkets and malls, at libraries, at banks, and are also used for leisure. Since computers are such a vital component of present day existence, it is only reasonable that all individuals in a country be provided with access to computers, and taught how to use and take advantage of them to suit their individual needs. Consequently, schools in their role as providers of education should include ICT in all aspects of education, to offer students the experience they need to use computers in different areas of life. Another reason for the introduction of ICT in education in the KSA is also to enable the country to be able to participate fully in the global economic scenario which has a great dependence on ICT.

Nevertheless, ICT use in education has several benefits from the perspective of education itself. For instance, teachers have reported that they use ICT because it facilitates the learning of their students (Al-Showaye, 2002). The use of ICT can not only enhance the depth and

intensity of learning, it can also stimulate the improvement of thinking capabilities of a higher order, encompassing inquiry and integration (Al-Saif, 2006; James, 2001). The Saudi government has provided full support, first, to the introduction of computer studies as a subject, succeeded by the full integration of ICT in education (Oyaid, 2009). Indeed, as Al-Wakeel (2007) reported, ICT in Saudi schools has been connected to "raising the standards" of teaching and learning in them, which will in turn directly influence the enhancing of the productivity and employability of students: a key objective of the Saudi government, to equip Saudi citizens to compete in the global economic arena to attract international investment.

However, the use of ICT if viewed from the perspective of students with special needs – such as students with intellectual disabilities – places greater emphasis on such students being able to lead more independent lives (e.g., Pellicano et al., 2014). Moreover, the use of ICT, such as assistive technologies, can offer support for such students in social participation and interaction (Bishop, 2003). However, as can be seen from the extant literature, attention – in Western and Saudi literature – to the use of ICT in the education of students with intellectual disabilities has been limited. This could be due to the fact that the inclusion of students with disabilities, in general, and with intellectual disabilities, in particular, in mainstream education is still a nascent field and, thus, under considerable scrutiny and investigation. Consequently, the use of ICT in the education of such students is a matter that is only recently gaining attention. Studies, in general, seem to be placing greater emphasis on the different forms of ICT in use (e.g., Alfaraj & Kuyini, 2014; Di Iorio et al., 2010; etc.) or the matching of ICT equipment to students with different types of disabilities (e.g., Hawkridge & Vincent, 1992).

Studies (e.g., Aljohani, 2006) have drawn attention to the lack of research in the KSA with regard to the influence of ICT on educational outcomes, in general. Thus, it is obvious that

there will also be limited investigation into the impact of ICT with regard to the educational outcomes of students with intellectual disabilities.

Overall, the following gaps in research could be seen from the preceding review of literature:

1. Limited studies were observed to have explored the impact of ICT use in education on students with disabilities, in general, and with intellectual disabilities, in particular. Also, there was notable absence of studies in the Saudi context.

2. Significant attention has been given to the definitions of ICT, evolution of ICT use in education, types of ICT tools, and different uses of ICT in education. However, not much emphasis has been encountered with regard to the use of ICT in the education of students with intellectual disabilities in studies across the world, in general, and in the KSA, in particular. Furthermore, an absence of research was found with particular regard to the impact of ICT use in inclusive educational settings.

3. Another gap encountered was with regard to the perceptions of teachers in relation to ICT use in the education of students with intellectual disabilities in inclusive school settings.

In schools, teachers are the persons who directly interact with students and, thus, are also the origin of ICT-based instruction for the students. The attitudes of teachers may be influenced by their perceptions of ICT use in teaching, both advantages and disadvantages. Moreover, they may be affected by their perceptions of students with disabilities. Nevertheless, it could be inferred that they are the most significant contributors to the success or failure of the implementation of ICT in schools from the perspective of the students. However, the teachers themselves may be constrained by limitations in the provision of ICT for their use, such as inadequate or obsolete equipment, lack of suitable educational software, and so on. Thus, it could be seen that it would be a useful endeavour to obtain awareness of the perceptions of

teachers with regard to ICT use in the education of students with intellectual disabilities in the KSA, and to understand the factors that support or hinder their use of ICT. This would help school administrators and policy makers in the Ministry of Education (MoE) in the KSA to undertake appropriate measures to improve the provision of ICT tools and equipment in schools, and to ensure that teachers were provided with the adequate training and support to perform their teaching duties effectively.

However, it must be noted that while awareness of teachers' perceptions with regard to ICT in areas – such as the concept of ICT, advantages and disadvantages of ICT use, the barriers and factors that hinder or support their use of ICT, and so on – is important, these cannot be viewed as distinct from the surrounding environment. Consequently, an awareness of the social and cultural context is required to completely understand the information gathered during the course of the study. Therefore, information about the context of Saudi Arabia was recognised to be significant for two reasons. Firstly, collecting information about the Saudi educational system, in general, and positioning the study socially and culturally would aid in achieving a greater understanding of the broader perspective of events. Secondly, reviewing prior studies based in the KSA would uncover information about the current scenario in the KSA, and draw attention to gaps that could be addressed by forthcoming research. Thus, the present study will focus on the following: the perceptions of teachers of the concept of ICT; advantages and disadvantages of ICT use; barriers to ICT use; and factors contributing to the development of ICT use in the KSA.

2.13 Summary

This chapter provided insights into inclusive education, the concept of disability, intellectual disability and the characteristics of intellectual disability. Moreover, the attitudes of persons,

specifically teachers, to the inclusion of students with SEN, in general, and with intellectual disabilities, in particular, was explored. Additionally, the concept of ICT was introduced from the specific perspective of its use in education. Moreover, an overview was provided of the progress of ICT in the Saudi educational system. Subsequent sections described teachers' use of ICT in the education of students with intellectual disabilities. These were explored from the perspectives of teachers' perceptions, advantages and disadvantages, barriers and supporting factors. Finally, the ensuing research gap or theoretical rationale for the study was presented. The next chapter will describe the methodology utilised in the study.

CHAPTER 3: RESEARCH METHODOLOGY

The objective of the present chapter is to shed light on the design and research methodology adopted for this study, and the rationale for the selection of the methods. A review of the research tools, and data collection and analysis techniques will also be included. The emphasis of the initial part of the chapter will be on the research paradigm and methodology that the researcher adopted in order to address the study's research questions. Subsequently, the researcher will focus on the various data collection methods and their advantages and drawbacks, followed by an in-depth description of the data collection tools, as well as the participants and sampling techniques chosen for this study. The later sections will explain how the data collected has been analysed, followed by a discussion of the ethical issues and the study instruments' validity and reliability, respectively, and how these have been dealt with in the context of the selected paradigm.

The next section describes the research philosophy of the present study.

3.1 Research philosophy for the study: pragmatic paradigm

Grix (2010) submitted that two distinct paradigms form the foundation of research in the context of social sciences and education, namely, the positivist and interpretivist paradigms. In turn, a study is directed by these paradigms to the choosing and use of quantitative and/or qualitative methods. A belief that a subjective investigation should be undertaken with regard to specific occurrences in the social sciences characterises the researcher in the interpretivist paradigm. Accordingly, a fundamental feature of studies utilising the interpretivist paradigm is the requirement that participants provide in-depth descriptions of their experiences to the researcher. In other words, the researcher must take into consideration not only the participants' viewpoints, but also the setting in which these viewpoints are nurtured, with the

intent of understanding, describing and decoding social occurrences (Cohen, Manion & Morrison, 2013; Grix, 2010).

Conversely, features of the positivist paradigm include the usage of practical methods stemming from the natural sciences, which make use of impartial investigations of social truths and occurrences and result in principles or principle-like simplifications (Cohen et al., 2013). In consequence, a principle critique of this paradigm is that it considers human conduct to be unresponsive, fundamentally regulated and measured, thus disregarding purpose, uniqueness and autonomy (Cohen et al., 2013).

Methods used by studies utilising the positivist paradigm typically incorporate testing and the gathering of quantifiable data. Also, quantitative analysis is the usual approach utilised to scrutinise the findings. Impartial or balanced narrating and generalisation of outcomes are other features of positivist studies. Moreover, such studies can be replicated and may involve the demarcation of independent and dependent variables (Bhattacharjee, 2012; Myers, 2013). On the other hand, in interpretive studies, researchers are subjective and their involvement in and effect on the study is anticipated. In general, qualitative approaches and research instruments, such as case studies, interviews, etc., are used by interpretive studies. That is, prominence is given to awareness of the context (Adebesin, Kotzé & Gelderblom; Bhattacherjee, 2011; Myers, 2013).

A third paradigm, the pragmatic paradigm, integrates and makes the most of the attributes of the positivist and interpretivist paradigms (Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2009). In pragmatic studies, prominence is afforded to the issue in question instead of procedures, and all existing methods can, therefore, be used to obtain knowledge of the issue (Creswell, 2014). Therefore, in pragmatic research it can be argued that the decision

with regard to the usage of quantitative and qualitative (that is, either or both) approaches is contingent on the presently stated research questions and the phase of the inductive-deductive cycle of research currently in progress (Teddlie & Tashakkori, 2009).

It was evident to me that the pragmatic paradigm would be the appropriate choice for my study, chiefly owing to its characteristics of being empirical and non-generalisable. Additionally, I was aware that the pragmatic paradigm could facilitate the expansion of my knowledge with regard to an occurrence, due to its usage of the features of both its underlying paradigms namely, the interpretivist and positivist paradigms. From the standpoint of the present study, this implies the expansion of my knowledge concerning the current scenario in relation to the use of ICT in schools for students with intellectual disabilities in the KSA, and also the aspects that serve as barriers to the usage of ICT with such students from the standpoint of special education teachers. Thus, it could be noted that establishing the research approach for use in pragmatism is finally contingent on what is most appropriate for the goals of the study (Creswell, 2008). As a result, I selected a mixed methods approach for use in my study.

In the KSA, children with special educational needs (SEN), such as intellectual disabilities, are presently educated either in inclusive mainstream schools or separately in special schools (Al-Mousa, 2010). Various programmes, such as resource room programmes, self-contained classroom programmes, teacher-consultant programmes, itinerant teacher programmes, etc., may be utilised by regular schools to offer special education services to students with special educational needs (SEN) (Al-Mousa, 2010). Partial mainstreaming through self-contained classes was followed in the schools participating in the current study. That is, the students with SEN received instruction in regular curricular and non-curricular activities together with students without SEN. However, special education teachers also provided such students with

special classes in self-contained classrooms. In certain instances, the presence of special education teachers may also be required in mainstream classrooms. However, this is determined by the severity of SEN and the number of students with SEN in a class.

The mixed methods approach seemed to me to be the most ideal and effective manner in which to collect and examine the complexity and significance of the deep and perceptive narratives of teachers in the KSA, and accordingly I chose this approach for use in the present study. Moreover, this approach would serve to further my own awareness of their viewpoints concerning the usage and success of ICT in the education of students with intellectual disabilities in the KSA. I describe the research design in the next section.

3.2 Research design – A mixed-methods sequential exploratory study

Various studies have been performed in the KSA concerning the education of students with intellectual disabilities or mental retardation (e.g., Al-hano, 2003; Alnahdi, 2012; etc.). Again, various studies have explored the use of ICT in education in the KSA (e.g., Al Mulhim, 2013; Al-Sulaimani, 2010; Oyaid, 2009, etc.). The paradigm and methods utilised in these have ranged from grounded theory to case study research, and some have utilised the mixed methods approach. However, the two themes – intellectual disabilities and ICT use – have largely remained separate in studies and consequently, the researcher anticipates that this will be among the first studies in the KSA to investigate ICT use in the context of the education of students with intellectual disabilities in inclusive school settings.

In my opinion, the best source of information about the efficacy, or lack thereof, of an educational initiative are teachers, as they are the most closely associated with both students and the overall school system. However, as I did not know how or where to start in my endeavour to obtain information and awareness of the current scenario in the KSA with regard

to the use of ICT with students with intellectual disabilities, I purposed to first meet a small group of teachers and interview them, so that I could get an idea of what they were experiencing and their perceptions of the present situation. Subsequently, I could use their insights to inform a more general investigation with a wider population.

I was encouraged by the general opinion, in the social sciences, that qualitative data provided a more profound awareness of an issue being studied, while a more superficial awareness was provided by quantitative data. Qualitative understanding stems from examining the viewpoints of one or more individuals. In contrast, quantitative understanding originates from investigating a large number of individuals and assessing specific and controlled variables. While it may seem that varying perspectives are offered by qualitative and quantitative approaches, both offset the other and draw attention to comprehensive, consistent and precise information that places emphasis on both statistics and details (Driscoll, Appiah-Yeboah, Salib & Rupert, 2007). Mertens (1998) submitted that investigating human behaviour from multiple perspectives presents immense validity to a study, together with providing a more complete representation of human behaviour and knowledge.

Mason (1994) proposed that studies can cause the success of the analysis and its trustworthiness to be enhanced if they utilise both quantitative and qualitative approaches to produce significantly distinct data. The use of mixed methods in the present study helped me to assess the research questions while considering them from various perspectives.

There are two principal benefits of using a mixed methods approach (Sandelowski, 2003). Firstly, the researcher is allowed to gain an indepth understanding of the issue under consideration. Secondly, the verification of data is facilitated, as the outcomes of one approach can be contrasted against the other. Furthermore, the researcher is offered enhanced

certainty by this manner of research design if the outcomes of the quantitative and qualitative approaches are consistent with each other. For example, if the interview outcomes are in harmony with the procedures employed in the design of the investigation, the outcomes of such studies are confirmed (Robson, 2002).

However, the mixed methods approach has its own drawbacks. While the advantages of the two underlying approaches are available to the researcher, he/she must also be aware that their limitations may also affect the study, specifically those limitations that are not removed by their merging. For instance, the data may not be automatically linked to the various research philosophies and paradigms, where the methods offer different points of focus to the study (Bazeley, 2004). Thus, it is plain that the mixed methods approach cannot be utilised in all types of educational inquiry, without establishing specified aspects to ensure the appropriateness of the approach. As a result, the mixed methods approach is applicable only in specific conditions. In my view, data analysis is the most complex aspect of using mixed methods. The trickiest exercise is to draw conclusions from both underlying methodologies. Moreover, the examination of the quantitative and qualitative data could proceed in varying directions. That is, they could either agree or disagree. Nevertheless, I resolved to advance with the mixed methods approach to examine the use and effectiveness of ICT in the context of students with intellectual disabilities in the KSA. Using interviews, I could obtain in-depth information about the opinions of teachers in this regard, and a survey would help me obtain information that could perhaps lead to generalisable conclusions. Moreover, the nature of my research questions indicated that an in-depth exploration of the Saudi context was required using a qualitative approach which could then be utilised to facilitate a wider exploration in a succeeding quantitative phase.

In other words, my 'rule of thumb' was guided by Cohen et al. (2013) who, when deliberating on the most suitable design to perform any study, suggested that:

> There is no single blueprint for planning research. Research design is governed by the notion of 'fitness for purpose'. The purposes of the research determine the methodology and the design of the research. (p.115)

Thus, it could be seen that, as a general rule, no specific approach could be deemed the most appropriate for any study, as all approaches realise their own definite goals. Moreover, each has its strong points and limitations (Yeasmin & Rahman, 2012). Therefore, a scrutiny of the various methodologies employed in educational research is required to ascertain the role, strengths and limitations that characterises each methodology and the points of distinction from other methodologies. I estimated that this methodological approach would be utilised to inform the questions that were caused by the study, and would be utilised across the various methodological phases, that is, through data collection, analysis and interpretation.

My study utilised the instrument development model of exploratory sequential mixed methods (Creswell & Plano Clark, 2011). The whole objective of my using mixed methods research is that this manner of research recognises that the combination of qualitative and quantitative research facilitates a deeper awareness of the problem being considered than if either of the approaches was utilised independently (Creswell & Plano Clark, 2011). Moreover, the occurrence of both inductive and deductive investigations in the same study is permitted by the use of mixed methods. Mixed method designs involve both sequential and parallel data collection. The advantage of parallel designs is the capacity to view the situation under consideration from various perspectives, that is, the possibility of triangulation exists. On the

other hand, sequential designs utilise the scrutiny of one of the forms of data to direct the collection of the second kind of data.

The instrument development model is used by researchers when their need is to create and execute a quantitative instrument on the basis of the qualitative outcomes. The researcher, in this design, first explored the research topic qualitatively with a small number of participants. The findings from this phase then guided the creation of elements and scales for a quantitative instrument. Subsequently, the researcher executed and confirmed this instrument quantitatively in the second phase of data collection. In this form of sequential research design, the development of the instrument elements connects the qualitative and quantitative methods. A known flaw of this approach is that researchers using this variant have a greater likelihood of placing emphasis on the quantitative facets of the study (Creswell & Plano Clark, 2011).

Figure 3.1 depicts the mixed-methods sequential exploratory design utilised for the study.

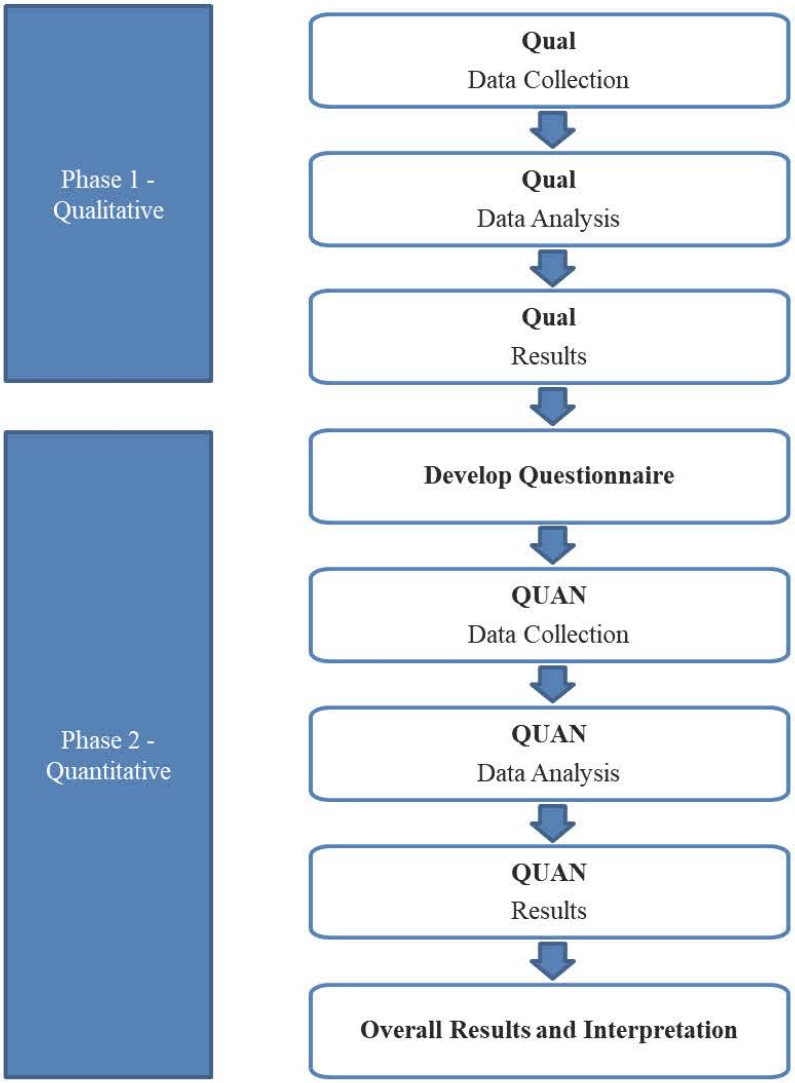


Figure 3.1: Mixed-methods sequential exploratory model (Adapted from Creswell & Plano Clark, 2007)

The study's implementation of the sequential design will be examined in the next section.

3.3 Mixed methods implementation in the study

As described in the preceding section, I decided to utilise a mixed methods approach in the study. The research design was accordingly undertaken using this approach. The present study utilised a sequential exploratory design. In other words, the first phase of the study involved a qualitative approach to data collection, followed by a second phase which utilised a

quantitative approach. The first phase, an exploratory study, utilised semi-structured interviews for data collection. A goal of this first phase was to use the findings to design a questionnaire for use in the second phase.

The study was conducted in fifteen schools in Jeddah city, Saudi Arabia and was focused on schools for boys. These schools were invited to participate by virtue of a selection method that categorises them according to their geographic location; i.e. the northern, southern, western and eastern sides, as well as the centre of Jeddah city. The fifteen boys' schools were chosen from these locations. The two phases of data collection are described in the following sub-sections.

3.3.1 Phase 1: Qualitative study

The first phase of the present study utilised semi-structured interviews for data collection. I conducted interviews with fifteen special education teachers who work with students with intellectual disabilities in Jeddah, Saudi Arabia, to gain insights into their perceptions and awareness with regard to the use of ICT with such students. As observed in Chapter 2 (Literature Review), the number of studies concerning the use of ICT in the KSA with students with disabilities, in general, and with intellectual disabilities, in particular, is limited. Therefore, I believed it was essential to obtain insights from special education teachers in the KSA regarding their use of ICT. The first phase made it possible for me to gain a preliminary understanding of what these teachers knew or believed about the use of ICT with students with intellectual disabilities.

I had been working on elaborating the study's research questions, over several months, through reviews of related literature. Thus, I sought to experimentally assess, with an illustrative group of teachers, whether the questions would be capable of extracting the

manner and intensity of information necessitated to produce data with which the study could advance. A second purpose was related to the identification of themes associated with the use of ICT for students with intellectual disabilities. Accordingly, I decided to commence the study with semi-structured interviews, which would give me the opportunity to have extended discussions with the teachers and, thus, uncover useful information based on the extent and profundity of their responses. Moreover, this format offered the teachers the opportunity to ask for clarifications and for me to provide details, where required, regarding my questions or the issue under consideration (Cohen et al., 2013).

My use of interviews in the present study is described next.

3.3.1.1 Interviews

The aim throughout the qualitative phase was to gather information to answer my research questions. I had been reviewing literature for several months preceding this exercise and in parallel developing research questions. Subsequently, I wanted to empirically assess, with this indicative sample of teachers, whether the research questions were robust enough to gain the manner and extent of data required to develop a repository of data from which the study could advance. Another objective was to identify themes relating to the use of ICT for children with intellectual disabilities in my country. I decided to start the study with semi-structured interviews. This provided me with the opportunity to have extended discussions with participants which I believed would reveal in depth information. Of course, this would depend on the extent and intensity of the interviewees' responses. Moreover, I believed that this format would also provide the teachers with the opportunity to clarify any questions and for me to supply information concerning my research topic or the research or interview questions, as and when required (Cohen et al., 2013).

Interviews are used by researchers as an adaptable person-to-person approach to obtain more profound information from participants through the use of predetermined or digressive questions. Overall, interviews offer several benefits; they are flexible and permit researchers to gain awareness of the perspectives of participants (Rubin & Rubin, 2012). Moreover, they underline the need to focus on the narratives of participants as these could provide the answers sought by the researchers (Rubin & Rubin, 2012).

Typically, interviews should be utilised as a method of data collection that is sensitive enough to facilitate the unearthing of personal and circumstantial opinions and discrepancies. Two terms associated with the conduct of interviews are standardising and scheduling. Standardising implies that each participant is asked the same questions using the same choice of words. Relatedly, scheduling implies that the participants are asked questions in the same sequence. I selected semi-structured interviews for use in the present study. These are interviews that are not rigidly structured and permit the asking of open-ended questions. Moreover, the interviewer can appropriately customise the sequence of questions if he/she notices that the interviewee's narrative is providing insights in a specific direction. Thus, a researcher can utilise semi-structured interviews to obtain a broader and more intense awareness of a matter. Moreover, the flexible nature of semi-structured interviews, in that they are not rigidly 'scheduled' or 'standardised,' permits more comprehensive gathering of data. Accordingly, from the viewpoint of the study, the interviewer can give attention to a group of themes or issues that require exploration (Phellas, Bloch & Seale, 2012). Another reason for the choice of semi-structured interviews was their appropriateness for small studies (Drever, 1995). However, semi-structured interviews have their own shortcomings. For example, the lessened ability to precisely imitate a focused interview as the questions posed to the different interviewees may vary, which could affect the obtaining of responses that are

consistent with regard to depth and quality. In this study, I took measures to control this issue by using a reminder sheet listing the principal questions to be asked, while leaving adequate margin to insert questions based on the interviewees' responses. Moreover, I made allowances for the fact that generalisability of responses in semi-structured interviews is challenging to claim due to the limited number of participants in qualitative studies (Bryman, 2008). It must be noted that in qualitative studies, the researcher has a significant role to play and can indeed be regarded as the data collection instrument (Denzin & Lincoln, 2011). The researcher, indeed, enacts a "central role in generating and interpreting data in qualitative research" (Xu & Storr, 2012, p. 1).

Modern day technology has created several options for the manner in which interviews can be conducted (for example, remotely via Skype or telephone, or face-to-face), the places or settings where they can be conducted, and has provided different tools to record the exchanges (Hancock, Windridge & Ockleford, 2009). I, however, decided to proceed with face-to-face interviews, where both interviewer and interviewee are physically present in the participants' regular environment, that is, in their schools. I used a digital recorder to record the discussions so that I could access them at a later stage, as required for additional analysis or evaluation.

I used information from my review of extant literature regarding intellectual disabilities, the use of ICT in schools and the use of ICT for students with disabilities in order to develop questions for the interviews. The literature offered insights into the different aspects of teachers' use of ICT, such as their perceptions towards the use of ICT in teaching; advantages and disadvantages of the use of ICT in teaching students with special needs; barriers to ICT usage in teaching students with special needs; supporting factors, incentives, and motivators

for ICT usage in teaching students with special needs (e.g., Alharbi, 2013; Cox et al., 2003; Coyne et al., 2012; Drigas & Ioannidou, 2013; Kahveci et al., 2011; Madden et al., 2005; Somekh et al., 2007; Waichigo, 2013; Wasserman & Millgram, 2005; Wehmeyer et al., 2011). These insights were of great use for developing interview questions for my study since its primary objective is to investigate the perceptions of teachers in the KSA with regard to the use of ICT in the education of students with intellectual disabilities. Overall, my areas of focus in the interviews were the present usage of ICT by the teachers, their perceptions of ICT, and their opinions regarding the future of ICT use in the KSA. I believed that questions pertaining to these aspects would help me obtain deep insights into these teachers' use of ICT in their classrooms with students with intellectual disabilities and also the underlying factors which were facilitating or obstructing their ICT use in the school environment. Please see Appendix A for the interview questions.

Although the number of participants was limited to 15, the whole course of interviews required more than five weeks to complete. This did not include the time I took to get authorisation and set up contact with the schools and consequently the teachers. Before commencing the interviews, I offered the participants an in-depth account of the objectives of my study, and also put them at ease by explaining that the data obtained from the interviews would be digitally archived and used solely for academic purposes. Thus, I could ensure that the participants were confident with regard to anonymity, ethical proprieties, observance of discretion, neutrality, and other moral factors (British Educational Research Association [BERA], 2011).

Another reason for my use of semi-structured interviews in the study is their flexibility in creating an environment where trust can be established and indeed flourish. Trust is an essential facet of Middle Eastern societies, such as in the KSA, where close relationships and

traditions are the norm, and consequently vital to my study. Gaining acceptance from the potential interviewees and confirming their readiness to take part in the potentially extended process of data collection was, therefore, a critical consideration in this study. Accordingly, I made every effort to nurture a personal association with each participant to enhance the usefulness of the interviews. The duration of each interview ranged between 30 and 45 minutes and was conducted in Arabic to forestall any challenges due to translation. I recorded the interviews using a digital recorder only after seeking and obtaining the permission of each participant.

3.3.1.2 Pilot interviews

I undertook a set of pilot interviews before progressing to the main study to assess operational matters (for example, the probable duration of the interviews, issues with using the digital recorder, and so on) and also to evaluate the robustness and value of the interview questions (Cohen et al., 2013). I used a sample of five special education teachers of students with intellectual disabilities from two of the chosen schools in Jeddah. Each teacher was interviewed at a time and location that suited him.

The pilot interviews helped me realise that some modifications were required in the interview questions in order to help the participants appreciate the emphasis, precise significance and purpose of the interviews. I consequently made some revisions and vague or confusing questions were rephrased or removed. The rephrasing of questions was to facilitate understanding while making sure that correctness was preserved with regard to language and cultural attributes. Furthermore, I organised a group of experienced persons to review the robustness of the substance of the interview questions. The reviewers included scholars with expertise in intellectual disabilities and others with expertise in study evaluation and design.

Their review helped to assess whether the different elements of the interview addressed the various factors under scrutiny. Moreover, I also requested their suggestions with regard to the wording and appropriateness of the interview questions. This request resulted in the modification of the manner in which some of the questions were articulated and in the phrasing of some others.

Moreover, the pilot interviews served to enhance my acquaintance with the present scenario in mainstream schools in the KSA. I thought that I might encounter some resistance from the school administration and the teachers during the actual process of the pilot interviews. Instead, I was made to feel welcome and my confidence in the process and the success of my study increased. Moreover, the pilot interviews helped me to measure my own skills as an interviewer and also gave me the eagerness and optimistic stimulus to advance to the main study. Furthermore, the pilot interviews provided preliminary knowledge with regard to the interview settings (for instance, locations in the schools, timing, environment and so on).

The next section discusses the sampling process followed for the interviews.

3.3.1.3 Interview sampling

In qualitative studies, sampling typically necessitates a flexible, reasonable, and practical approach. In addition, and importantly, sampling provides a rational approach to the selection of an appropriately-sized sample to address the questions of the study. Thus, I needed to locate participants who would be ready to participate in comprehensive interviews.

In general, qualitative studies use sampling techniques, such as convenience, theoretical, snowballing and purposive sampling (Cohen et al., 2013; Creswell, 2003; Teddlie & Yu, 2007). For my study, I decided to use the purposive sampling approach to identify participants for the interviews after duly considering the study's background. Purposive sampling

techniques, also termed nonprobability or purposeful or qualitative sampling, involve selecting certain units or cases "based on a specific purpose rather than randomly" (Tashakkori & Teddlie, 2003, p.713). Patton (2002) describes purposive sampling as a mode of sampling that recognises information-rich participants, that is, participants who can contribute information corresponding to the study's context.

Through the Saudi MoE, I obtained the details of 20 teachers working with students with intellectual disabilities in fifteen mainstream boys' schools in Jeddah (more details can be found in Section 3.5: Ethical issues). I then wrote to these schools, attaching a copy of the letter of permission I had obtained from the LEA in Jeddah to carry out the interviews, and received acceptances from fifteen teachers. The principal condition for the selection of teachers was applicable teaching experience; only teachers with a minimum of two years' experience in teaching students with intellectual disabilities were considered. The principle triggering the choice of a purposive sample was so that I would have the opportunity to judge and deliberately choose participants with the required information and the readiness to participate in the study. In other words, this implies that I looked for teachers who were working with students with intellectual disabilities and were using ICT in the education of such students. Moreover, I took the experience and training of the teachers into consideration, as these are aspects that may influence their contributions to the study. Additionally, I controlled for and scrutinised the experience and training of the sample of teachers. The use of ICT in education in the KSA is of fairly recent origin and, correspondingly, its use with students with intellectual disabilities. Therefore, the teachers' experience and knowledge of ICT could impact their contributions to the study.

After the participation of the teachers had been approved, I got in touch with them to discuss and agree on the schedule for the face-to-face interviews. Moreover, I confirmed that their

participation would remain anonymous; they could pull out from the study at any time; and their inputs would remain confidential. I notified them that we would not proceed without their informed consent. Furthermore, I informed each teacher that the interviews would not take more than 45 minutes of their time, and that I would send them an email transcript of the interview which they could review for accuracy and the narrative, substance and assessment of the interview, and offer their feedback regarding any modifications or the addition of supplementary comments.

Table 3.1 provides details of the fifteen teachers who participated in the interviews. The names have been masked for confidentiality.

Table 3.1: Interviewee details

Teacher Identifier	**Age**	**Overall years of experience**	**Special education qualification**	**Tenure in current school**	**Type of school**	**School Location**
T1	33	9	Bachelor's degree	5	Primary school	North of Jeddah
T2	34	10	Bachelor's degree	6	Primary school	North of Jeddah
T3	30	6	Bachelor's degree	3	Primary school	North of Jeddah
T4	43	16	Bachelor's degree	9	Primary school	West of Jeddah
T5	28	4	Bachelor's degree	4	Primary school	Centre of Jeddah
T6	29	5	Bachelor's degree	3	Primary school	East of Jeddah

Teacher Identifier	Age	Overall years of experience	Special education qualification	Tenure in current school	Type of school	School Location
T7	30	6	Bachelor's degree	5	Primary school	East of Jeddah
T8	31	7	Bachelor's degree	5	Primary school	West of Jeddah
T9	28	4	Bachelor's degree	4	Primary school	South of Jeddah
T10	29	5	Bachelor's degree	4	Primary school	Centre of Jeddah
T11	41	16	Bachelor's degree	11	Primary school	Centre of Jeddah
T12	35	10	Bachelor's degree	8	Primary school	South of Jeddah
T13	32	8	Bachelor's degree	6	Primary school	East of Jeddah
T14	37	12	Bachelor's degree	10	Primary school	West of Jeddah
T15	39	15	Bachelor's degree	12	Primary school	South of Jeddah

3.3.1.4 Analysis of qualitative data - thematic analysis

After the semi-structured interviews were completed with the fifteen teachers, I created transcripts of the interviews. Subsequently, I used thematic analysis as the approach to analyse the interview data and employed the six-step process suggested by Braun and Clarke (2006). Braun and Clarke (2006) defined thematic analysis as "a method for identifying, analysing and reporting patterns (themes) within data" (p.79). Furthermore, thematic analysis

facilitates the encapsulation and categorisation of large quantities of information into convenient ideas or themes, utilising an approach that can be used by several diverse interested parties (Coolican, 2014). Adaptability and the ability to clarify the noteworthy themes to be identified in the process of thematic analysis are other benefits of this method (Howitt & Cramer, 2008).

In accordance with Braun and Clarke (2006), my first activity in the thematic analysis was to acquaint myself with the data obtained from the interviews by reviewing and re-reviewing the original interview transcripts (in Arabic). My objective in doing this was to look for patterns and implications in the data. This activity also involved the taking of notes to facilitate coding in the later stages of thematic analysis. In other words, my reviewing and re-reviewing developed "ideas and identification of possible patterns" thus presenting "the bedrock" (Braun & Clarke, 2006, p.87) for the residual analysis. For example, an area of interest in the present study is the barriers to using ICT, as could be seen in Section 2.11.4. Thus, I looked for associations in the text to barriers to ICT use. Subsequently, I performed the English translation of the transcripts and sent them for back-translation to a colleague at the King Abdulaziz University in Jeddah, who was not otherwise connected to the study.

As a succeeding activity, I undertook the initial generation of code and collected data associated with each code. The recognition of characteristics, obscure or evident, of the data is a component of the coding process. This process generates codes which are the truly critical constituent of the unprocessed data that can be significantly assessed in connection with the issue under consideration (Boyatzis, 1998). The evaluation of initial codes was manually performed by me in the present study. I achieved this by scrutinising the whole dataset and emphasising important segments. I allocated an illustrative code name to each emphasised

segment of text. Continuing with the example of barriers to using ICT, I designated a theme with its complementary code, as follows:

Theme: Barriers to using ICT

Code: Barr ICT

I next assembled all the data relevant to the theme. An inductive method wherein the identified themes are strongly related to the data has been recommended for use (Braun & Clarke, 2006). The data were then scrutinised from the viewpoint of the general background and corresponding to the clear emergent themes to attain an exhaustive and unique awareness of each theme. Different interpretations and perspectives arose from the process of combining the perceptions of the participants with my own. However, different outlooks were allowed to exist and original inferences were developed.

The analysis of data has been depicted as an activity that involves magnifying the implication of the interviews and exposing the individual understanding of the subjects, while also offering new outlooks from the researcher on the matter under consideration (Kvale, 1996). Therefore, I continued to review and re-review the transcripts even after I had identified many themes from the interviews, and repeatedly equated these to the theoretical background and extant literature. In other words, I searched for nuances in the teachers' narratives that indicated the beliefs of the teachers concerning ICT use with students with intellectual disabilities; their actual use of ICT with such students; their perceptions of the use of ICT with students with intellectual disabilities; and the support (or otherwise) provided by the educational infrastructure in the country. This activity made it possible for me to produce a list of relevant themes and their accompanying sub-themes. Afterwards, I kept a record of

each theme in a Microsoft Word document and assigned a name and code for ease of use. Also, I arranged the responses by theme under the associated categories.

The fourth activity in thematic analysis involved the reviewing of the recognised themes to confirm that the data and codes were in agreement with these, an activity that was performed in two stages. The coded data extracts were first examined. In this activity, I reviewed all sets of the arranged data thoroughly to make sure that a definite pattern was generated and that the data were consistent with the allocated theme. At this point, I found that some of the extracts did not match the presently existing themes and created new themes to accommodate them. The whole dataset was next scrutinised. I reassessed all the themes to weigh the extent to which each accurately symbolised the meaning of the whole dataset, an activity which involved coding additional data in the themes. Braun and Clarke (2006) submit that due to the on-going nature of coding, the need for re-coding can be foreseen. The three final sub-themes produced for the theme 'Barriers to ICT use in the work environment' can be seen in the following example. These correlate to the various school-level barriers encountered by teachers (e.g., Waichigo, 2013).

Theme: Barriers to ICT use in the work environment

Code: Barr ICT Work

1. Lack of encouragement for teachers to use ICT effectively
2. Lack of availability of ICT devices
3. Lack of technical support and maintenance

The fifth activity in the thematic analysis involved the definition and naming of themes. This activity of definition and fine-tuning summarises, both separately and jointly, the essence of the themes, and also describes the characteristics of the data depicted by a theme (Braun &

Clarke, 2006). Accordingly, I offered an exhaustive description of all the themes, calling attention to the noteworthy features of the data, with due care given to the themes and the research questions. Later, I generated working titles, that is, precise descriptions that could help a reader recognise the essence of the theme, for all the themes.

In the last step, I developed a report regarding the analysis of the qualitative data, drawing attention to the findings in each theme to serve as the foundation of an examination of the study's noteworthy consequences. This report also provided sufficient validation of the themes recognised in the data (Braun & Clarke, 2006). (Please see Appendix C for an example of the thematic analysis.)

The outcome of the thematic analysis was the recognition of eight themes, namely, Perceptions of the concept of ICT; Advantages of ICT use; Disadvantages of ICT use; Barriers to ICT use in the Work Environment; Teacher-related barriers to ICT use; Financial barriers to ICT use; Factors contributing to the development of ICT use by teachers; and Factors contributing to the development of ICT use in schools.

The next section describes the quantitative phase of the study.

3.3.2 Phase 2: Quantitative study

3.3.2.1 Purpose and rationale

Utilising the questionnaire as a data collection instrument in this study is intended mainly to gain a breadth of analysis that complements the depth from the interviews, especially with the ability of self-administrated questionnaires to reach a wider base of respondents than interviews. Furthermore, the adoption of a questionnaire as a data collection instrument would

help in achieving the purposes of this research, in terms of offering a descriptive account of the target population's views, principles, practices and relationships (Cohen et al., 2000).

Similar to the interview instrument or any other data collection method in social research, questionnaires have their own strengths and weaknesses. The advantages may be summarised in the fact that they are useful in depicting the aspects of a large population. In the current study, the population refers to teachers who work with students with intellectual disabilities in the city of Jeddah. Another advantage is that questionnaires can yield more generalisable findings. Further, they are appropriate for use in descriptive and explanatory studies, such as the current study. In addition, this instrument provides better privacy to teachers than interviews. This is extremely helpful, as far as this study is concerned, as the questionnaire addresses issues that have to do with perceptions and feelings. In a nutshell, as a data collection instrument, questionnaires offer stability, consistency and uniformity of measure, without many modifications.

On the other hand, there are a number of limitations that may arise as a result of using this instrument, including ambiguous content or misunderstood questions that are difficult to detect or be clarified instantaneously. In addition, it may not be possible for teachers to report their true perceptions and feelings for the researcher to observe. A technical issue may arise with the questionnaire design and layout as it has to be eye-catching and come with a minimal number of pages. While paying attention to this aspect, the questionnaires' content may be affected and so may the questions posed, in terms of their quantity and quality. However, since the questionnaire for the current study was created based on the findings from the interviews with the participating teachers, these limitations did not arise.

3.3.2.2 Instrument Design

A self-administered questionnaire was utilised in this study. This questionnaire was designed by the researcher and incorporated standard demographic elements consistent with the questionnaires used in other studies examined in the literature review. Careful consideration was undertaken to ensure that both the style and content of the questionnaire followed the typical guidelines for the design of questionnaires for a study (Cohen et al., 2013). Accordingly, the ensuing questionnaire was a simple, appealing, uniform tool for data collection that accomplished its purpose. Also, common pitfalls that could adversely affect the successful use of the questionnaire were avoided.

As mentioned in Section 3.2, my use of the exploratory sequential mixed methods research design indicated that I would use the findings from the qualitative phase to create the instrument for use in the quantitative phase. Accordingly, as I performed the thematic analysis of the interview data, I kept track of different statements in the teachers' narratives which I believed seemed appropriate for inclusion in a survey instrument. After I completed the thematic analysis, I consolidated the various statements, grouping them as appropriate. I also determined the manner of response (e.g., yes/no question, use of 5-point or 7-point Likert scale) that could be utilised to obtain the most meaningful quantitative data for further analysis in my study. It must be noted at this juncture that several of the participant narratives utilised negative terminology and hence the inclusion of statements from these narratives in my questionnaire could lead to biased outcomes in the quantitative data.

I organised the resulting questionnaire (see Appendix B) into four sections for ease of use. I also organised the sections to correspond with the logical progression of the research questions of the study. Moreover, they were in keeping with the questionnaire sequence

suggested by Cohen et al. (2013) which moves from "objective facts to subjective attitudes and opinions through justifications" (p.398).

The questions in the questionnaire were close-ended questions that provided multiple options provided for the participants to choose. A Likert scale was used for some of the questions, with rankings ranging from "Strongly disagree" to "Strongly agree" provided for the respondents. Close-ended questions facilitate both ease of analysis, from the perspective of the researcher, and are quick response, from the perspective of the participants (Reja, Manfreda, Hlebec & Vehovar, 2003). No open-ended questions were included in the questionnaire, as the subjective perceptions of teachers had already been obtained through the interviews.

Every attempt was made to ensure that the questions were kept brief and instructions were provided to help the participants navigate through the questions. The questions were carefully worded as the researcher was aware that the questions would have to be translated from English into Arabic, since the participants of the study were native Arabic speakers.

A brief description of the contents of each section of the questionnaire follows.

3.3.2.3 Questionnaire Content

Section I: Demographic Information

The first section of the questionnaire contained eight questions designed to obtain demographic data about the participants. This section contained questions designed to invite details about the respondents' age (with the assumption that the teachers would be at least 21 years of age); educational qualification; work experience with students with intellectual disabilities; experience with ICT utilisation; whether the teachers had been provided with training courses for the effective integration of ICT in teaching; whether their schools

recognised the importance of ICT; if students with disabilities at their schools had access to ICT tools; if they utilised ICT tools with students with intellectual disabilities in their schools; and if students with intellectual disabilities have access to ICT tools.

Section II: Teachers' perceptions of using ICT for students with intellectual disabilities

The emphasis of the second section of the questionnaire was the views of the teachers with regard to using ICT for students with intellectual disabilities. The first question in this section provided a list of 11 statements regarding the teachers' perceptions of the concept of ICT and the respondents were required to indicate their ratings for each of these on a Likert scale (rankings ranging from Strongly Disagree to Strongly Agree).

The second and third questions in this section invited the respondents' perceptions on the advantages (18 statements) and disadvantages (13 statements), respectively, of ICT use. Again, a Likert scale was provided to facilitate responses.

Section III: Main barriers encountered by teachers in using ICT for students with intellectual disabilities

The third section of the questionnaire invited responses with regard to the main barriers encountered by teachers in using ICT for students with intellectual disabilities. The themes recognised from the interview responses revealed that the barriers were of three types namely, barriers encountered in the work environment; teacher-related issues; and financial issues. The first set of questions in this section pertained to barriers in the work environment, namely, the lack of encouragement to use ICT, the lack of ICT devices, and the lack of adequate technical support for the ICT devices. The second set of questions was associated with teacher-related issues, such as lack of continuous training, poor awareness of the advantages of ICT, and non-availability of educational software in Arabic. The third set of questions was

related to financial issues, such as the cost of educational software and inadequate budgeting provision in schools for ICT procurement.

It must be noted that a Likert scale was provided to facilitate responses to the different questions in this section.

Section IV: Main factors contributing to the development of the use of ICT for students with intellectual disabilities

The final section of the questionnaire invited responses with regard to the main factors contributing to the development of the use of ICT for students with Intellectual Disabilities. The factors were sub-divided as personal factors relating to the teachers (three questions) and more objective factors related to the schools (five questions). Again, a Likert scale was provided to facilitate responses to the different questions in this section.

The next section describes the process followed to pilot the questionnaire.

3.3.2.4 Piloting the Questionnaire

The questionnaire had to be piloted to verify its validity and reliability prior to its actual use in the study. Accordingly, the questionnaire was distributed to ten teachers, from whom the researcher had earlier received consent to participate in the pilot study. These teachers were briefed by the researcher and requested to complete the questionnaire with the researcher observing their progress. This permitted the researcher to view the reactions of the respondents, first-hand, and to receive their feedback after they had completed the questionnaire. The feedback received was utilised to fine-tune the questions and produce a final version of the questionnaire. Modifications made in the final questionnaire included the correction of typographical errors, simplification of the wording of some of the questions,

removal of overlapping questions, and the modification of question sequences and content, where relevant. Ambiguous questions were also rephrased to improve clarity.

After the pilot phase was completed, the full implementation of the questionnaire was undertaken. The questionnaire was distributed in the participating schools and the researcher met the school head-teachers to explain the questionnaire to them and to answer any questions. The researcher kept close telephonic contact with these head-teachers to receive updates on the progress of the distribution and collection of the questionnaire.

3.3.2.5 Sampling for the Questionnaire

The participants for the second, or quantitative, phase of the study were teachers from the fifteen participating boys' schools. Special education teachers working with students with intellectual disabilities, in particular, were invited to participate. The only other criteria for inclusion were availability at the time of the distribution of the questionnaire and readiness to participate. Overall, 20 copies of the questionnaire were distributed in each of the fifteen schools resulting in 300 copies. However, only 100 of the completed questionnaires were complete in all aspects and, thus, only these were utilised for the analysis of data.

The next section describes the approaches used for data analysis of the quantitative data.

3.3.2.6 Analysis of quantitative data - statistical analysis

3.3.2.6.1 Data coding and entry

Before commencing the analysis of the quantitative data, the data were first scrutinised to ascertain completeness. In other words, I ensured that there were responses to the majority of the questions asked. I then checked it for accuracy to ascertain that questions were answered with the maximum level of precision and truthfulness. It was also important to check that the

questions were well-understood by participants; thus, any answers deemed to have no link to a question were cancelled out. Data reduction was also considered in the ensuing stage of the preparation for data analysis. This implied that the responses would be coded to the questionnaire items and alternative procedures would be followed for absent or contradictory values. Data from the finalised set of completed questionnaires were entered into a computerised programme namely, the IBM Statistical Package for Social Science Software (SPSS). I saved the entered dataset before performing the data analysis process.

3.3.2.6.2 Analysis

Quantitative data from the questionnaire were statistically analysed using SPSS (v22) following the completion of the quantitative phase of the study. The different statistical tests utilised in the study were: (i) frequencies and percentages, (ii) descriptive statistics, (iii) cross tabulation and chi square analysis, (iv) correlation analysis, and (v) reliability analysis. A brief description of the different tests follows.

Frequencies and percentages

These tests are used to illustrate the frequencies and percentages of observations that exist for each data element or group of data elements (Lavrakas, 2008).

Descriptive statistical analysis

Descriptive statistical analysis was used to explain the basic features (e.g., mean and standard deviation) of the collected data. This was accompanied by summaries of the sample and the measures, along with simple graphs.

Cross-tabulation and chi square analysis

A cross-tabulation is a "joint frequency distribution of cases based on two or more categorical variables" (Michael, 2001, p.1) which can be further scrutinised using the chi-square statistic

($\chi 2$) to determine whether the variables identified in the study are related statistically (i.e., independent or dependent. Cross-tabulations were performed in the present study to scrutinise the statistical relationship between, for example, experience of teachers with ICT utilisation and perceived advantages of ICT; insufficient external funds and work experience of teachers; insufficient school budget and work experience of teachers, etc.

Pearson's Correlation analysis

The purpose of correlation analysis in a study is to evaluate the association between two continuous variables, such as the association between two independent variables or between an independent and a dependent variable (O'Brien & Sharkey Scott, 2012). In the present study, correlation analysis was utilised to evaluate the association between the various barriers encountered by teachers in using ICT; and also, the various factors contributing to the development of ICT use in schools.

The next section discusses the ethical issues encountered by the study and the measures taken to offset these.

3.4 Ethical issues

There was a meticulous consideration of the ethical issues related to the study. There is not a culture for social and scientific research in the KSA at the same level as in Europe or the USA. For that matter, the researcher had to make the necessary arrangements to ensure that people were aware of his genuine intentions during the research process. Prior to the commencement of the empirical work, it was important for the researcher to make the aims and purposes of the research clear for the participating schools' head teachers and classroom teachers. He also ensured that permission was sought to gain access to the school teachers. In-depth information and full explanations were provided to those wanting to know more about

the nature of the study. It was also necessary to make the required steps to ensure the data collection process went smoothly and without any complications or interruptions. As such, the teachers were informed about the aims and purposes of the research, both in verbal terms and in written form in the covering letter attached with the questionnaire and invitation for potential interviewees wishing to take part in the ensuing interviews. In the letter, teachers were assured that their identity would be kept anonymous. They were also asked to give their approval for recording the interviews; informed that they had the right to withdraw from the research at any time; and reminded of the significance of answering questions as honestly as possible to ensure consistency and reliability of the research.

All ethical requirements set out by University of Birmingham were adhered to by the researcher and all others involved in the research. It should also be mentioned that all research participants were informed that information collected from them would be treated as highly confidential, and any data would be utilised only for the purpose of research. Permission for the study was sought from the Ethics Committee based at University of Birmingham. In addition, the research proposal comprised a detailed account of the research methodology and highlighted the researcher's awareness of the significance of having a careful consideration of ethical issues related to the study. As a result of the researcher's stated endeavour to adhere to the guidelines and policies set out by the University, the study was approved by the University's Ethics Committee. Another important step, while in the KSA, was to seek the approval of the LEA in Jeddah in order to gain access to schools that were sent letters from the local authority requesting full cooperation with the researcher to facilitate the data collection process.

The next section describes the measures taken to ensure the validity and reliability of the study.

3.5 Validity and reliability

Issues related to validity and reliability were carefully considered in both the qualitative and quantitative phases of the current study.

Qualitative phase

The validity of a study is the degree of accuracy with regard to its description of a social phenomenon under consideration (Hammersley, 1990). In the present study, the analysis commenced with the examination of small portions of extracts from the interview transcripts to recognise emerging themes. Subsequently, the remaining portions of the interview transcripts were scrutinised to check for other instances of the same theme. For example, the narrative of one teacher described the impact of inadequate provision in the school budgets for ICT devices as a barrier to his use of ICT in his classrooms. The researcher then examined the remaining data to locate other instances where the school budget was reported to be a barrier by the other participating teachers. Reliability was defined by Hammersley (2013) as "the degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions" (p.67). The reliability of the present study was achieved by testing the standardised interview schedule prior to actual use, to make sure that the questions would be understood by all interviewees in a similar manner. Moreover, the responses obtained would be scrutinised on the consideration that they were not uncertain or ambiguous. Additional confirmation for the reliability of the study was provided by comparing the researcher's analysis of some segments of the interview transcripts with another researcher's analysis of the same segments (Silverman, 2006).

Quantitative phase

In assessing the validity of the questionnaire, the researcher endeavoured to determine whether he could "draw meaningful and useful inferences from scores on the instrument"

(Creswell, 2013, p.160) and establish whether the questions could be easily understood and presented no ambiguity to the participants when responding to them. On the other hand, investigating the reliability of a questionnaire indicates the assessment of the internal consistency of items. That is, measuring "the degree to which the items that make up the scale are all measuring the same underlying attribute" (Pallant, 2013, p.6). It was observed by Cohen et al. (2013) that "for a research instrument to be reliable, it must demonstrate that if it were to be carried out on a similar group of respondents in a similar context (however defined), then similar results would be found" (p.199). The content and face validity of the study's questionnaire were established in the following manner:

- Questions for the questionnaire were derived from both the interview themes and questionnaires used in the other studies examined in the literature review.

- A draft of the questionnaire was piloted on ten teachers. The feedback received from the participants was taken into consideration when creating the final version of the questionnaire.

- The final version of the questionnaire was sent to three experts from the Saudi MoE who possessed excellent skills in Arabic and English, both spoken and written. As part of aface validity check, these experts were asked by the researcher to assess the Arabic translation and the quality of the utilised terms and phrasing. Valuable comments were also provided by the researcher's supervisors, which aided in improving the effectiveness of the questionnaire. The final version of the questionnaire was subsequently implemented in the study.

3.6 Summary

This chapter provided an overview of the design and research methodology adopted for the present study and the rationale for the selection of the methods. Accordingly, a review of the research tools and data collection and analysis techniques was included. The research paradigm and methodology adopted by the researcher to address the study's research questions was described. Also described were the various data collection methods and their advantages and drawbacks, the data collection tools used in the study, participants and sampling techniques chosen for this study. The later sections explained the manner in which data collected was analysed. This was followed by a discussion of the ethical issues and the study instruments' validity and reliability, respectively, and how they have been dealt with in the context of the current study.

CHAPTER 4: PRESENTATION OF FINDINGS

4.1 Introduction

As mentioned in the Introduction to this thesis, the objective of this study is to examine the current uses of information and communications technology (ICT) in the classroom for students with intellectual disabilities in the Kingdom of Saudi Arabia (KSA), and the perceptions of teachers about the subject; the factors that hinder the use of ICT with students with intellectual disabilities in the KSA from the viewpoint of teachers; and the views of teachers about the possible factors that may be considered when developing a practical ICT programme for students with intellectual disabilities in the future. This chapter describes the findings from the qualitative and quantitative phases of the study.

The findings from the first or qualitative phase are described in the next section.

Part 1: Qualitative Findings

This section presents the findings from the exploratory interviews in the first phase of the study.

The study's research questions are first restated for the benefit of the reader:

Q1: What are the perceptions of teachers with regard to the use of ICT for students with intellectual disabilities in the KSA?

Q2: What are the main barriers encountered by special education teachers in using ICT for students with intellectual disabilities?

Q3: What are the main factors that contribute to the utilisation of ICT for students with intellectual disabilities?

As discussed in Chapter 3 (Methodology), the first stage of the study entailed the collection of data from one teacher from each of the fifteen participating boys' primary schools in Jeddah, KSA, using semi-structured interviews. Thus, a total of fifteen interviews were completed. Table 4.1 provides an overview of the profiles of the interviewed teachers.

Table 4.1: Teachers' Profiles

Teacher Identifier	**Age**	**Overall years of experience**	**Special education qualification**	**Tenure in current school**	**Type of school**	**School Location**
T1	33	9	Bachelor's degree	5	Primary school	North of Jeddah
T2	34	10	Bachelor's degree	6	Primary school	North of Jeddah
T3	30	6	Bachelor's degree	3	Primary school	North of Jeddah
T4	43	16	Bachelor's degree	9	Primary school	West of Jeddah
T5	28	4	Bachelor's degree	4	Primary school	Centre of Jeddah
T6	29	5	Bachelor's degree	3	Primary school	East of Jeddah
T7	30	6	Bachelor's degree	5	Primary school	East of Jeddah
T8	31	7	Bachelor's degree	5	Primary school	West of Jeddah
T9	28	4	Bachelor's degree	4	Primary school	South of Jeddah

Teacher Identifier	Age	Overall years of experience	Special education qualification	Tenure in current school	Type of school	School Location
T10	29	5	Bachelor's degree	4	Primary school	Centre of Jeddah
T11	41	16	Bachelor's degree	11	Primary school	Centre of Jeddah
T12	35	10	Bachelor's degree	8	Primary school	South of Jeddah
T13	32	8	Bachelor's degree	6	Primary school	East of Jeddah
T14	37	12	Bachelor's degree	10	Primary school	West of Jeddah
T15	39	15	Bachelor's degree	12	Primary school	South of Jeddah

Overall, the majority of the interviewees were aged greater than 30 years and six of these had overall teaching experience of ten years or more. Moreover, seven of them had more than five years of experience in the present school. All the teachers possessed bachelor's degrees in special education and were teachers in primary schools for boys' in the Jeddah region.

Subsequent to the thematic analysis, a total of eight themes could be recognised from the responses from these interviews corresponding to the study's research questions. The research questions and the associated themes and sub-themes, if any, are summarised in Table 4.2.

Table 4.2: Themes and Sub-themes

Research questions	**Theme**	**Sub-theme**
What are the perceptions of Saudi teachers with regard to the use of ICT for students with intellectual disabilities?	Perceptions of the concept of ICT	None
	Advantages of ICT use	None
	Disadvantages of ICT use	None
What are the main barriers encountered by Saudi special education teachers in using ICT for students with intellectual disabilities?	Barriers to ICT use in the Work Environment	Lack of encouragement for teachers to use ICT effectively
		Lack of availability of ICT devices
		Lack of technical support and maintenance
	Teacher-related barriers to ICT use	Lack of continuous training about ICT
		Lack of awareness of ICT advantages
		Lack of educational software in Arabic
	Financial Barriers to ICT use	Cost of educational software
		Lack of schools' budget
What are the main factors that contribute to the utilisation of ICT for students with intellectual disabilities in the KSA?	Facilitating ICT use by teachers	Provision of adequate information about the importance of using ICT in the education of students with Intellectual Disabilities
		Provision of continuous training for teachers

Research questions	Theme	Sub-theme
		Inclusion of ICT in teachers' preparation programmes
		Provision of personal ICT devices for teachers within mainstream schools
	Facilitating ICT use in schools	Provision of sufficient educational resources, hardware and software suitable for teaching different skills to students with Intellectual Disabilities in Arabic.
		Provision of sufficient network and Internet access
		Provision of financial support to schools to obtain ICT devices
		Inclusion of ICT implementation in curriculum of students with Intellectual Disabilities

The views of the teachers, categorised by these themes, are presented in the following sections.

Research Q1: What are the perceptions of Saudi teachers with regard to the use of ICT for students with intellectual disabilities?

Three themes were recognised to correspond to the first research question. The perceptions of the teachers associated with the first theme are next discussed.

Theme 1: Perceptions of the concept of ICT

The first theme concerned teachers' perceptions of the concept of ICT, in general, and its use with students with intellectual disabilities, in particular. Overall, the teachers demonstrated that they had a reasonable understanding of the notion of ICT use in education. This could be seen in the comments of T2 who reported that in his opinion ICT "*simply means teaching and learning using ICT tools such as computers.*" Similarly, T7 reported that the concept of ICT "*involves using educational technological tools to teach students.*" Again, T8 observed that he believed that ICT related to the usage of "*information tools and techniques in teaching.*"

From T5's narrative it could be seen that his awareness of the scope of ICT was somewhat more enlarged as he reported that "*this is where a teacher is expected to use interactive boards, monitors, projectors and computers when teaching.*" On the other hand, T9 perceived ICT from an instructional viewpoint observing that "*ICT is a complex way of teaching since it requires a lot of time to gather or develop content.*" It must be noted that both T5 and T9 were aged less than 30 years and thus their greater awareness of ICT and its potential could be attributed to their maturing in a more technologically advanced generation.

The perceptions of T11 and T12 also revealed that they viewed ICT from an instructional perspective. For instance, as T11 stated "*my understanding is that ICT is where teachers and students apart from the normal teaching and learning they as well use technology.*" Also, T12 said that "*ICT seeks to integrate technology in teaching and learning to create a better experience.*" A different, or student, perspective was introduced by T13 who reported that "*ICT are tools meant to improve abilities of students in understanding different topics and subjects.*"

The perceptions of a few teachers were oriented towards students with disabilities as they believed that usage of ICT was related to improving the learning and skills of students with disabilities. For instance, T1 said that *"ICT is [a] tool that [is] use[d] in learning and teaching specific concepts and skills to support students with intellectual disabilities."* Similarly, T3 observed that ICT *"is the modern way of teaching where teachers use technological device and approaches in teaching particularly in relation to students with disabilities."* Moreover, T4's comment that the *"ICT concept is meant to create new interaction of the teachers and the students with disabilities"* indicated that he believed that ICT would improve the effectiveness of teachers who deal with students with disabilities. In contrast, T10's opinion demonstrates that he believed that ICT would help the students with disabilities as he said *"this is where software programmes are used to allow students with disabilities to understand the learning material better."*

It could be seen that while the awareness of the teachers regarding ICT was reasonable, they did not explicitly mention its use with students with intellectual disabilities except in the case of one teacher (T1) from the school in the northern region of Jeddah.

Theme 2: Advantages of ICT use

The second theme related to the first research question was associated with the teachers' perceptions of the advantages of ICT use.

A few of the teachers drew attention to the benefits of ICT in enhancing communication and literacy skills in students with disabilities. For example, T1 observed that "*the benefits of ICT in the classroom is founded on the possibilities of ICT offering an alternative way of communication and providing access to learning material in a very convenient manner and enhancing the motivation of students."* This opinion was echoed by T2 who also placed

emphasis on ICT's benefits as a teaching aid when he stated that the use of ICT made it easy for him to teach students with intellectual disabilities since it helps in promoting communication and literacy.

Other teachers highlighted the benefits of ICT assistive technology, such as alternative pencils, as could be seen, for instance, in the comments of T3 who reported that "*one big advantage of ICT is the many tools that can be used by students with disability. For example, a student who cannot use the normal pencil can use 'alternative pencil' and this enhances his writing skills.*" Again, T5 emphasised that *"assistive technology is good because they make it easier for children with vision and hearing impairment to socialise with each other."* This view was shared by T6 who reported that "*ICT particularly assistive technology has the ability of creating a more meaningful school life for students with disabilities."* T7 also placed emphasis on the assistive technologies saying that "*use of ICT for example screen keyboard increase the communication skills, and spelling performance of students with speech impairment"* The comments of these teachers indicate that they found that it was advantageous to use ICT not only to provide academic benefits for students with disabilities but also to support and enhance their overall existence in school.

T4, from the school in the western Jeddah region who has 16 years of teaching experience, reported that "*the use of ICT helps in overcoming barriers of time and enhances the necessary functioning and development of critical skills among students with disabilities, ICT contributes in increasing the effectiveness of learning processes by helping student with disabilities to actively take part in teaching and learning.*" Another teacher from the same school, T8, reported that "*ICT enhances the literacy skills and language of students with disabilities and at the same time increase their physical participation in classroom activities."*

Some teachers called attention to the software aspects of ICT. For instance, it was the experience of T11 that the use of special maths software aided not only "*students with visual impairment* but also *"those of[with] motor impairment to improve their writing."* Similarly, T12 drew attention to the use of special multimedia software to improve the mathematical skills of students. He said that *"ICT has many benefits, I use special multimedia software and I have seen it improving the learning of maths by student with hearing impairment."* ICT use was beneficial in enhancing the reading, learning and vocabulary skills of students with disabilities in the opinion of T13. Specifically, the benefits with regard to students with hearing impairments were reported by this teacher: *"ICT when used effectively can enhance reading, learning and vocabulary for communication among students with disabilities particularly those with hearing difficulties."* Another teacher, T14, drew attention to ICT's benefits with regard to students with mild motor impairments when he observed that *"the use of computer is beneficial to students with mild motor impairment by improving their handwriting for example by reducing spelling mistakes."*

Again, it could be seen that while the teachers reported benefits of the use of ICT in school, most of their narratives emphasised the benefits with students with different forms of disability, such as motor, visual or hearing impairments, rather than intellectual disabilities in particular. The benefits with regard to students with intellectual disabilities were mentioned only by one teacher (T2) from the northern Jeddah school.

Theme 3: Disadvantages of ICT use

The third theme recognised under the first research question was associated with the teachers' perceptions of the disadvantages of ICT use. The teachers' narratives revealed different areas in which they perceived that the use of ICT was not advantageous in their dealings with

students with disabilities. For instance, T1 drew attention to the probable unavailability of ICT technologies in the homes of students as he said *"when the students highly depend on technology, this can be a problem to these students particularly when they are at home."* In other words, it could be inferred that any progress made by students due to ICT use in the schools could be offset by the lack of ICT devices in their homes.

Another teacher, T2, contradicted the discussion of the second theme where the narratives highlighted the social and academic benefits of ICT use in school when he reported that "*sadly, for students with disabilities, use of ICT does not directly result in independence, competence and belonging.*" Again, with regard to students with disabilities, T3 observed that ICT use could result in unfavourable consequences for such students. As he stated "*the negative aspect of ICT is that it can result in public labelling of students with disabilities which is not good for these students.*" T13 also highlighted the negative effects of ICT use for students with disabilities. However, his narrative emphasised the adverse effects of excessive dependence of ICT use in students with disabilities. This could be seen from his comment that *"ICT when heavily used by students with disabilities limits their ability to improve on their own for example regarding communication or writing."*

From the narrative of T4, it could be seen that the choice of ICT technologies must be aligned to the needs of students with disabilities, failing which the consequences could be undesirable. He said that "*sometimes teachers are end up using assistive technology that does not match the needs of the students with the disabilities and this could have a negative outcome on the students."*

T5's narrative seemed to highlight the importance of training in ensuring the effective use of ICT, as he said "*use of ICT is demanding as it requires high skills from teachers and*

sometimes these skills are lacking. This means that the technology is not well used." This comment appears to indicate a lack of training with regard to ICT use, perhaps assistive devices in particular, for special education teachers.

A different perspective was presented by T6 who questioned the stability and reliability of ICT. From his narrative it would appear that he had experienced the adverse outcomes of repeated ICT failure as he reported that *"the disadvantage of ICT lies in the fact that they fail many times and their reliability could be compromised and this could impact the students."* This point of view was shared by T7 who observed that *"certainly ICT is good, but the negative side is that infrastructure that seems to be having problems with network and connectivity and therefore cannot be relied on."* Similarly, T8 reported ICT failures to be a disadvantage associated with their use. However, he also drew attention to a new notion the difficulties faced by students in ICT use as evident in his narrative: *"it's nearly difficult to depend on ICT to teach a lesson, this is because on many occasions, the ICT fails or the student has a problem using the ICT."*

Other teachers also highlighted disadvantages with regard to ICT use from the perspective of the difficulties faced by students. For example, T11 reported that *"some students with disability may suffer from anxiety and even suffer from self-esteem when they are not able to use the various devices, and this could easily discourage them."* Thus, while ICT use could be beneficial for some students with disabilities, it could prove otherwise with some other students specifically from the perspective of psychological well-being. On the other hand, T12 observed that a lack of stability of the ICT devices could also have an adverse consequence for students when he stated that *"technology is never perfect and the many technical hitches from the technological devices could negatively affect the students."*

Another interesting facet revealed by the narrative of T9 indicated that the needs of students with disabilities differ and hence providing the appropriate form of ICT for their use necessitated significant effort from the teachers. In his own words *"ICT requires a lot of time as the teacher has to attend to each student yet students have different disabilities thereby their needs differ."*

The costs of ICT were also revealed to be a disadvantage associated with their use. T10's narrative drew attention to the circumstance where, due to the costs of ICT equipment, students would either have to share equipment to gain access to it or sometimes have no access at all. This was a surprising insight as the Saudi government makes immense financial contributions to the field of education and this was perhaps an oversight which could be rectified by means of recommendations from this study.

Overall, it could be seen that the teachers could perceive disadvantages in the use of ICT devices and tools with students with disabilities. These varied from the lack of ICT infrastructure in schools and at the homes of such students to the cost of ICT provision in the schools. Other significant disadvantages reported drew attention to the circumstance where the use of ICT with students with disabilities is perhaps not advantageous for all students as their needs differ. Furthermore, the lack of success with ICT use could cause other undesirable social and psychological outcomes, such as low self-esteem and anxiety. Further areas highlighted by the teachers were the need for training for teachers to ensure effective use of ICT and the instability of ICT devices and tools.

The next section will explore the themes associated with the second research question.

Research Q2: What are the perceptions of Saudi teachers with regard to the main barriers encountered by special education teachers in using ICT for students with intellectual disabilities?

The second research question is associated with the barriers encountered by teachers concerning the use of ICT for students with intellectual disabilities. As with the first research question three themes were recognised to correspond to the second research question. These relate to the work environment of the teachers, the teachers' themselves, and financial aspects. The opinions of the teachers associated with the first theme are discussed next.

Theme 1: Barriers to ICT use in the work environment

The first theme associated with the second research question pertains to the work environment of the teachers. In other words, the barriers they encountered to ICT use in their workplaces. Three sub-themes emerged and will be discussed in the following sections.

Sub-theme 1: Lack of encouragement for teachers to use ICT effectively

The first barrier in the work environment was the lack of encouragement provided to teachers to use ICT effectively in their classrooms. The human sources of this lack of encouragement in the school environment were found to be other teachers and the school head. For instance, T1 reported that he was discouraged by the attitudes of other teachers whereas T2 reported being discouraged by the lack of support from the school head. Since T1 and T2 belong to the same school, it would merit further investigation to review the use of ICT in that school. T6 also reported being discouraged by a colleague, saying that *"I was discouraged by some teacher who said that ICT has a negative effect on children with disabilities since they heavily depend on ICT."* T3's grievance, on the other hand, was the lack of recompense for his efforts. This is evident from his narrative where he said that "*despite the extra efforts that I*

put in, and the extra time I use, am not compensated for these efforts and this discourages me."

Some of the teachers reported that lack of confidence or past misadventures with ICT worked as barriers to their ICT usage. For instance, T4 reported that *"some of us lack the self-confidence in using various ICT devices and this discourages us from using the devices."* In the case of T5, it was his past experiences that stood as a barrier to his ICT use. He stated that *"in the past I have had negative experiences with the use of the ICT and this makes plays in mind whenever I want to use ICT."* T8's issue appeared to be a lack of familiarity with ICT devices and his own fear of failure and subsequent embarrassment before his students.

Practical considerations such as the lack of time were also reported by teachers such as T7 who observed that *"the time allocated for class work is little and therefore at times I do not enough time to use the ICT."* Similarly, T9 drew attention to the lack of ICT infrastructure when he observed that *"one of the barriers I face is classroom management problem and difficulties when using ICT particularly where the devices are few."*

A sudden allusion to change management skills was made by T11 who reported that a *"lack of change management skills has contributed to my not embracing the use of ICT in my classroom."* It could be inferred then perhaps that the teachers in the Jeddah region, the central Jeddah at least, were not adequately prepared for the changes caused by ICT use to their classroom instruction schedule. An alternative that presents itself is that T11's age perhaps affected his agility in adapting to the changes caused or necessitated by ICT usage in schools.

Another teacher, T10, observed the lack of support from the school and said that "*the school does not motivate us in way on using ICT and this discourages me.*" His narrative revealed

that teachers were not adequately trained in ICT use and this discouraged their use of it. On the other hand, T12's narrative seemed to indicate that the teachers' themselves lacked the motivation to modify their methods of teaching to incorporate ICT use and this served to discourage their use of ICT. In T12's words, *"[the] lack of motivation to change the traditional teaching methods is a major setback in use of ICT."*

In general, the teachers reported that they did not receive adequate encouragement from various sources to use ICT. These sources or factors of discouragement included lack of support from school colleagues and leadership, lack of compensation, lack of confidence, lack of training, lack of time, and so on. Also, the narratives of the teachers under this theme drew attention to a probable lack of rigour in the mechanisms to equip of special education teachers in the KSA to use ICT in their classrooms as training in all aspects of ICT use (e.g., planning for ICT use, actual ICT use, etc.) was found to be woefully inadequate.

Sub-theme 2: Lack of availability of ICT devices

The second barrier in the work environment was the lack of availability of ICT devices in the schools. Common threads in the narrative were insufficient equipment, out-dated equipment, inadequate supporting infrastructure (e.g., classroom size), and poor maintenance of the equipment. The narratives were evenly distributed across teachers from the five participating schools.

The narratives of the three teachers from the northern Jeddah school revealed that the school had a lack of equipment and what was available was out-dated. For instance, T1 observed that *"lack of enough ICT equipment in school act as barrier."* This was supported by T2's statement that *"the school does not have enough machines."* T3 drew attention to the old equipment saying *"the school have old computers that are not effective."*

Similar complaints were also heard from teachers at the other schools. For instance, T4 from the school in western Jeddah and T11 from the central school drew attention to the inadequate supply of ICT equipment. On the other hand, T5 and T6 from the central and eastern schools respectively highlighted the use of obsolete equipment.

The size of the classrooms being a barrier to ICT use was pointed out by T7 who stated that *"the classrooms are small and there cannot accommodate enough machines."* Lack of adequate maintenance of equipment was the barrier highlighted by T8, T9, T10 and T12. For instance, T10 reported that *"the machines breakdown is regular and this is a big problem"* whereas T12 observed that *"ICT devices require regular maintenance and this interrupts their use."* The comments of T13 seemed to provide a rationale for the lack of equipment as he attributed this to the cost of the equipment when he said that "*It's costly to acquire enough devices and there is acute shortage."*

It must be noted that I was extremely surprised about the lack of equipment or out-dated equipment in the schools as revealed by the teachers' comments since it has always been my understanding that the government in the KSA spends considerable amounts on education and educational infrastructure. It appears now that there may be some gaps in the disbursement or distribution of funds for different school-related purposes which require intervention from the appropriate authorities. It could also be attributed to the fact that the use of ICT equipment for students with disabilities is still gaining popularity and hence the government has made only an initial outlay with the provision to extend this further based on information received from the schools.

Sub-theme 3: Lack of technical support and maintenance

The third barrier drew attention to the lack of technical assistance concerning the operation and maintenance of ICT equipment. The teachers highlighted the present situation in their schools in this regard. For instance, T1 observed that "*there is lack of institutional support regarding planning and use of ICT.*" Another teacher, T2, indicated that his school lacked the human resources for the technical support of ICT equipment when he said that "*the school does not have a well-resourced technical team.*"

From T3's comment it could be seen that the effectiveness of the use of ICT equipment was reduced due to breakdowns "*it was hard to effective[ly] use the ICT equipment yet[as] there are breakdowns.*" Thus, it could be inferred that his school also did not have adequate resources to maintain the ICT equipment. In contrast, T6's school reportedly had sufficient technical support resources but maintenance of the ICT equipment was not adequately supplied *"while we have decent machines technical support on how to use these machines and their daily maintenance is lacking."* Another teacher, T10, observed that *"technicians do not show interest in showing them basic tips of how to maintain ICT devices used in the classroom."*

The narrative of T4, one of the older interviewees, drew attention to the lack of even the simplest maintenance activity with regard to the ICT equipment in his school. He reported that *"simple stuff like blowing of the computers to remove dust or scanning of the computers to remove virus are not regularly done and this slows the machines."* T7 also highlighted a similar situation in his school when he observed that *"certainly enough attention is not given to the optimum operations of these computers and other devices."* Again, another teacher, T12 noted that *"the school does not regularly maintain simple device like speakers and*

writing pads which is a barrier in using them." T13 stated that *"once the devices have been bought and fixed or given to students little attention is given to their use and maintenance."* Thus, it could be seen that in most cases the schools did not adequately maintain the ICT equipment once they had been purchased and this lack of maintenance became a barrier to the teachers' use of ICT devices in their classrooms.

T5, on the other hand, highlighted the slow response time of technicians *"the technicians are slow in responding to our request to maintain things like display and power connections."* T8's narrative implied that the same situation existed in his school, however, he believed that this was due to overwork *"the technicians and support team is good, but I think they are overwhelmed by the amount of work they have to do."*

The lack of a clear policy on maintenance was highlighted by T9 who observed that *"there is no strict policy on maintenance, for example when the specific devices are to be serviced, most of time they wait until they have usage problems."* T11's concern was that certain common issues, such as *"electricity spikes and poor handling of the ICT devices by students"* were overlooked by the technical support team.

The narratives of the teachers under this sub-theme drew attention to the clear deficit in technical support and maintenance with regard to ICT tools and devices in the schools in the KSA. They highlighted the probable non-reliability of the ICT devices and an absence of a regulated schedule for even the routine maintenance of these devices. Moreover, the response time of technicians was highlighted leading one to believe that there could be a shortage of trained technicians in the country.

Theme 2: Teacher-related barriers to ICT use

The second theme associated with the second research question pertains to issues related to the teachers themselves. Again, three sub-themes were identified and will be discussed in the following sections.

Sub-theme 1: Lack of continuous training about ICT

The first barrier within the second theme was the lack of continuous training concerning ICT use for teachers. This sub-theme could be recognised in the narratives of almost all the teachers who were interviewed. For instance, T1 stated that "*ICT keeps on changing, but we hardly have regular training regarding the use of ICT in classroom.*" Similarly, T2 observed that "*the school has not organised any training this year, and this certainly is not good because we are behind of any new developments.*"

The teachers' recognition of the need for regular training on ICT could be seen in the comments of T3, who responded that, "*I think for effective use of ICT in this school, teachers should be continuously trained on new equipment, techniques and approaches, but this is not done on a regular basis.*" The narratives of T5 and T6 reflected similar thoughts. As T5 observed, "*continuous training is good because it gives you a chance to learn something new about ICT, but the school hardly plans for this.*" Again T6 reported that "*the last time I attended training on use of ICT for my students was last summer, I think the school should have such training on termly basis, it builds the skills of the teacher.*"

T4 was very frank when he observed that "*lack of constant training is surely a barrier to effective implementation of ICT in this school.*" T7 contributed his own understanding of how training facilitates ICT usage when he stated that "*training equips teachers with greater confidence and motivation to use ICT, but is not carried out regularly enough.*" His

comments also indicated that training was not regularly provided to the teachers. T8 also believed that regular training could overcome some of the challenges encountered by teachers such as "*limited ICT skills, anxiety and fear of failure.*"

T9 specifically drew attention to the benefits of training in encouraging teachers to embrace ICT when he stated that *"lack of ICT training for teachers particularly those who were not trained well in use of ICT makes them shy away from embracing ICT."* Moreover, T10's comments showed agreement in this vein, *"I strongly feel that for successful implementation of ICT in teaching and learning in this school, there is need for continuous training."*

Other teachers drew attention to the sporadic nature of training that was organised by the schools. Some of them, T11 for example, looked forward to the engagement with experts and other colleagues that took place during training "*…I love training because I get a chance to mix with experts and other teachers and to share my experiences which encourages me to use ICT.*" However, he reported that training, "*unfortunately … comes ones in a blue moon.*" T12 suggested setting up in-house training programmes to facilitate ICT use in teachers *"… the school lacks a training programme, we should have in-house training on continuous basis to improve our understanding of ICT equipment, but it is not there."*

The overall sentiment of the teachers was summarised in the narrative of T13, who observed that *"I know that most teachers have limited skills in using many of the ICT tools around, but the school has overlooked the need for continuous training.*"

It could be seen, from the narratives of the teachers, that they were agreed upon the need for regular training about ICT to keep them up-to-date with new developments in the area. Also, they believed that training would help in dispelling the fears of the teachers in the use of ICT and thus increase the use of ICT in the schools and also the teachers' effectiveness in making

use of the tools and devices. Another aspect that requires highlighting is that the lack of regular training prevented them from meeting other teachers and experts and receiving insights from the experiences of colleagues.

Sub-theme 2: Lack of awareness of ICT advantages

The second barrier within this theme was the lack of awareness in teachers concerning the advantages of ICT. It was evident that many teachers were not aware of the benefits of ICT use. In some cases, they believed that ICT could not replace the conventional approaches to instruction and their narratives demonstrated that they were resistant to change. For instance, T1, duly considering his experience, stated that he was "*too old and I do not see the need of using these devices or techniques like power point slides while I can teach using my usual methods.*" Similarly, T10 reported that *"I have been teaching for the last many years, and my manual techniques have worked perfectly, I see no need of these new machines."* These views were echoed by T3:*"I have been teaching for the last 20 years, and I know that the traditional techniques of teaching make the students to feel and touch and learn better."*

The responses of some other teachers, for instance, T8, were from a student benefit perspective. T8 observed that he preferred the traditional approaches to teaching since *"I read somewhere that ICT makes students lazy."* T9's opinion of ICT use appeared to be influenced by other teachers who informed him that "*ICT benefits are small and they can be covered by the usual teaching."* Consequently, he believed that there was no need to lay emphasis on the use of ICT in classrooms. Thus, it was clear that a number of external influences were also contributing to the teachers' lack of awareness about the advantages of ICT.

Other teachers were of the opinion that ICT was not necessary to enhance the quality or content of their sessions. It could be anticipated that teachers with experience of ten years or

more would have this opinion and this was the case with T2 who has ten years of experience. He observed that *"I can make an interactive lesson without necessary using ICT tools, I believe students concentrate more in classroom these ways."* However, T4 who has 16 years of experience, placed emphasis more on the inconvenience, in his perspective of using ICT when he stated that *"I feel inconvenienced whenever [I] am preparing lessons that require use of ICT because it is time consuming and its benefits are minimal."*

Again, T5 seemed unaware of the various benefits of ICT as he believed that ICT was limited to the use of "*music, colours and images to create an interactive classroom."* It would appear that he believed that such embellishments were "*not suitable for a 16 years old student even with disability.*" In other words, it could be inferred that he believed that ICT had limited scope and its use was limited to young students. Another teacher, T11, reflected a similar perception of limited usability when he observed that "*there is no problem in using ICT, but I think using it for English drawing is a waste of time, students can just draw on paper."* In a similar vein, the opinion of T13 demonstrated a lack of awareness, as he observed that "*I do not understand the hype now days regarding the use of ICT, I think it is meant for some students with severe disabilities but not minor disabilities."* Hence, it could be seen that the lack of awareness of ICT applicability and advantages was limiting its effective use with students with disabilities, in general, and intellectual disabilities, in particular.

T6's dislike of using ICT equipment could be associated with his lack of awareness. Moreover, his comments indicated that ICT use was time-consuming and cumbersome. He reported that "I *am poor at using the computer or laptops and besides it takes a lot of time, so I don't like using them."* On the other hand, T7 believed that "*the importance of ICT is exaggerated, so that we use this machine, but honestly I am not for them."* Thus, it could be seen that there some teachers were severely misinformed concerning the use of ICT with

students with disabilities and their views reflected this lack of information. Another gap that could be discerned was the lack of training. Some of the teachers were not comfortable using ICT tools and devices and it appeared that no attempt had been made to increase their skills in this regard. A final perspective was provided by T12 who drew attention to his excessive workload. Consequently, he seemed to be disinterested in whether or not ICT use had any benefits for students with disabilities: "*I have no interest of again preparing lesson through ICT tools.*"

Overall, it could be seen that the lack of awareness of ICT advantages was adversely affecting the use of ICT by teachers in the KSA. Hence, it is evident that this is a matter that requires the immediate attention of the appropriate stakeholders in the Saudi Ministry of Education as the failure to address this situation could result in students with intellectual disabilities not receiving the skills and independence that could be provided to them by the use of ICT tools and devices.

Sub-theme 3: Lack of educational software in Arabic

The third barrier recognised under this theme was the lack of educational software in the Arabic language that could be used with students with intellectual disabilities in the KSA. Overall, the present situation in the KSA in this matter could be summed up in the comments of T11 who observed that "*there is [in] general few learning [software] developed in Arabic languages and this at times hinders the effective use of ICT in classrooms.*"

As could be anticipated English was reported to be the dominant language of educational software in the market resulting in limited applicability in the Saudi context. This situation was highlighted by T1 who mentioned that *"most of the educational software on the market is English dominated and this causes a problem …particularly when teaching young students*

with language disability." T2 also drew attention to this situation, though he did not mention English specifically, when he observed that "*content is very critical in effective use of ICT but many software on the market are not in Arabic."*

The theme of the content of the software programmes was brought up again by T3 who commented on the lack of relevance of the content in the Arab context. In his opinion, *"though some content is in Arabic, they have little relevance to their teaching because the content was developed in foreign countries."*

Another perspective presented by the teachers was that the lack of software in Arabic hindered their teaching of specific skills (e.g., writing, language, etc.) to students with disabilities. As reported by T4, "*teaching students with motor impairment to assist them in writing requires Arabic software, but on many occasions, they are not availed."* Similarly, T7 drew attention to the lack of even simple programmes "*to teach language in[for the] upper[higher] classes"* as these *"are few on[in] the market for Arabic speakers."*
Other teachers proposed that the lack of Arabic software could be attributed to technical challenges and the lack of appropriate software expertise. This could be seen in the comments of T5 who observed that "*using Internet in ICT classroom with programmes that are written in Arabic requires resolving some technical problems and this has resulted in few Arabic computer programmes."* And, in the observations of T6 *"it seems that we have few software experts who are interested in developing software for children with disabilities in this country, because they are not many software available in Arabic."*

Some teachers preferred to blame the educational system in the KSA for the lack of software. For example, T8 directed the criticism to his school, when he reported that "*we were expected to teach using Arabic software, yet the school does not provide adequate software for this."*

Similarly, T10 stated that *"it would be easy if the school can provide enough Arabic software to use for all students in different disciplines for students with disabilities, but this is not the case."* On the other hand, T9 preferred to lay the blame at the feet of the school board and school management *"the school board and school management have failed to provide adequate software in Arabic, though it is basic for us."* T13 demonstrated some clemency for the schools as he seemed to have some faith in their efforts to procure Arabic software. However, he said, *"despite the efforts that the schools have put in, there is clearly lack of strategic acquisition of Arabic software that can be used to meet the objective of use of ICT in schools."* The Ministry of Education (MoE) was the recipient of T12's criticism as he believed that it *"has done little in providing teachers with enough computer programmes in Arabic that can be used in teaching of students with disabilities."* On the whole, it was evident that the lack of educational software in Arabic hindered the efforts of teachers to use ICT appropriately in their dealings with students with intellectual disabilities in their classrooms, and this was a situation that should be speedily remedied.

Theme 3: Financial barriers to ICT use

The third theme associated with the second research question pertains to financial issues. The two sub-themes identified will be discussed in the following sections. It could be seen that there were several overlapping responses from the teachers which seemed suitable for inclusion under both sub-themes. Consequently, the researcher has organised them for convenience.

Sub-theme 1: Cost of educational software

The first barrier identified was the cost of educational software. From the teachers' narratives it could be seen that prohibitive costs limited the availability of ICT tools and devices in the

schools and consequently their use of these. As observed by T13, *"the school administration is always complaining that the software is too expensive for the school."* T11's narrative also confirmed this situation, as he said that the costs made it "*difficult to have every software and learning programmes required for all students."*

Moreover, the teachers drew attention to the need for customised assistive devices for some students which were highly priced. For instance, T1 observed that "*the cost of ICT required to assist students with disabilities particularly those with severe disabilities is too high since they require tailor-made assistive technology."* T12 lamented on this circumstance observing that *"it is disappointing that student with severe disabilities particularly those with cognitive problems are not able to access software meant for this disability, because of the costs involved."*

On the other hand, T6's narrative indicated that he was forced to use out-dated or obsolete software for his students due to the high costs of some of the educational software. He said that this circumstance "*has forced me not to update my software for the two years, and I feel I am giving my students out-dated information.*" Other teachers, such as T10, stated that they had to use alternative approaches, *"sometimes I do not use motor-visual aids,"* as they were not provided with the necessary software "*since they are too expensive."*

One of the teachers, T8, attempted to provide a rationale for the high costs of the ICT software when he observed that *"It seems software developers are out to reap us clean, they have highly priced the software for students with disabilities, particularly for math."* Overall, it could be seen that the teachers in the KSA had experienced the downstream effects of the high costs of educational software. That is, the non-availability of up-to-date, suitable software for use with students with intellectual disabilities in their classrooms.

Sub-theme 2: Lack of provision in school budgets for ICT

The second sub-theme provided additional insight from the financial perspective as the teachers' narratives revealed that they believed that a lack of budgeting provision also contributed to the non-availability of suitable software and other ICT tools for use with students with intellectual disabilities in their classrooms. This was summed up by T2, when he observed that *"financial constraints are among the major barrier to the school in acquiring ICT devices to students."* Similarly, T13 reported that *"we need additional funds to equip our classrooms with modern ICT tools that can effectively be used in teaching and learning, but we are told the school has limited funds".* The comments of T12 seemed to indicate that this was a long-standing issue, *"I have been here for many years but each year we experience shortage of funds, and we have to work under tight budget to help these students."*

One area emphasised by the teachers was that they perceived that the schools understood the significance of ICT use for students with disabilities. However, in actual practice the schools did not *"spend enough to purchase specialised ICT for each of the students,"* as observed by T3. T10 also provided some supporting insight into this situation saying that, *"though the schools try to ensure that it gets ICT devices for each student even those with severe disabilities, it has not fully managed this because of the limited funds."*

Another area highlighted by the teachers was the specific ICT requirements of students with disabilities. They believed that their schools did not have sufficient financial provision to purchase these. For instance, T1 observed that *"some student with disabilities requires individualised programmes and special ICT tools and the school do not have such a budget."*

Teachers also drew attention to the implications encountered due to the tight budgets, such as limited number of devices and limited supporting amenities. T4, for example, stated that, *"using ICT is complicated by the fact that sometimes students are forced to share the few available devices."* T5, on the other hand, revealed that *"the school has limited ICT facilities and more limited physical support facilities such as special ICT rooms."* The lack of provision for machine breakdowns and repairs was highlighted by T6 who stated that *"additional costs such as maintenance of ICT are not fully budgeted for."* Also, T8 pointed out that *"there are many activities that entail ICT use for example, in-house training, workshops, maintenance, and these all requires money, but the school has no budget for all these."* Moreover, teachers drew attention to two further situations that arose because of the lack of budget. The first was that ICT tools need to be shared because inadequate quantities were procured. This could be seen in the comments of T7 who observed "*in my class of 30 students, we share some of the software because the schools have limited budget for them.*" The second issue related to the overall lack of tools, as could be seen in the narrative of T9, "*at times I am forced to teach some lessons without the use of required because they are not available in school.*"

The teachers' narratives revealed that some Saudi schools are supported by private benefactors. However, they did not always fulfil their promises to provide additional funds. Evidence for this could be seen in the narrative of T7 who reported that *"sometimes people pledge to assist in buying of more computers and other ICT equipment, but they do not fulfil their promise and this means that the school is strained in monetary terms."* T9 also called attention to this situation observing that, *"there are several occasions where donors pledge to bring in more computers, laptops and other ICT equipment and they fail."* In such situations, the financial burden on the school increases and they are often unable to accommodate this

additional expenditure… *"The school at times has to come in and yet it has little to spend."*(T9) However, T2 stated that these funds, if received, were not always adequate.

T11's comments demonstrated that bureaucratic red tape prevented speedy intervention from the government "*to respond to the financial needs of the schools.*" Then again, T3's narrative indicated that the government processes could not keep up with the ever increasing need for funds. He observed that "*the government has tried to provide enough funds, but the amounts required are always increasing and there not enough since ICT tools are costly."*

The lack of planning for ICT expenditure by both the schools and the Saudi government could be recognised as an issue in the provision of ICT tools for the schools. This could be seen in T4's comments as he stated "*that basically the school and ministry have not effectively planned for the costs involved in software yet we need these software updates or new versions, and this is not done.*" T5 further highlighted that in some cases educational software received lower priority in the budget provision. He reported that *"one reason why ICT use lacks behind in this school is because little budget is given to educational software and this means not using some programmes that are very important for class work."*

Overall, it could be seen that the lack of adequate budget provision was a longstanding issue in the Saudi schools. That is, while schools perceived the significance of ICT use for students with disabilities, they did not make adequate provision. Moreover, the government also did not appear to take adequate measures in this regard. Of course, it must be allowed that the budget requirements were complicated by the specific ICT needs of students with disabilities.

Repercussions of inadequate budget provisions included limited availability of devices and supporting amenities; and a lack of provision for the maintenance of the ICT equipment. Apart from the government, private benefactors were recognised as contributing to the school

funds for ICT equipment. However, these did not seem entirely reliable. Moreover, the lack of planning for ICT expenditure seemed to indicate that the procurement and maintenance of ICT equipment were accorded lower priority by the Saudi government and the schools themselves.

The next section will explore the themes associated with the third research question.

Research Q3: What are perceptions of Saudi teachers with regard to the main factors that contribute to the utilisation of ICT for students with intellectual disabilities in the KSA?

The third research question of the study relates to the main factors contributing to the development of the use of ICT for students with intellectual disabilities. Two themes were identified to correspond to this research question. The opinions of the teachers associated with these themes are discussed in the following sections.

Theme 1: Facilitating ICT use by teachers

The first theme associated with the third research question pertains to factors which facilitate teachers' use of ICT. The four sub-themes identified will be discussed in the following sections.

Sub-theme 1: Provision of adequate information about the importance of using ICT in the education of students with intellectual disabilities

The first sub-theme pertains to the provision of adequate information about the importance to teachers of using new technology in education of students with intellectual disabilities to teachers. It could be seen that the teachers believed that some of their colleagues held incorrect views about ICT use. Accordingly, as observed by T1, they were of the opinion that

"providing these teachers with the right information will enhance use of ICT." T11 was of a similar opinion and observed that *"the school should provide extensive information on why ICT is used to easily convince teachers."* Again, T12 reported that *"the right information on use of ICT can have a great influence on performance of teachers in classrooms."*

Further, the narratives of the teachers emphasised that appropriate information could transform their perspectives towards ICT use. Evidence of this could be seen in the narrative of T5 who reported that *"with right information teachers will have positive views towards the integration of ICT in their teaching."* T6 worded it differently but his intent was the same. That is, *"the key element towards use of ICT is instilling the right beliefs and attitudes, and this has to be done for those who have little knowledge on use of ICT."*

Other teachers drew attention to the factors that could hinder the use of ICT and which they believed could be overcome through the provision of adequate information. For instance, T2 reported that he was aware of the role of culture in obstructing ICT use. He stated *"that culture can hinder the use of ICT and therefore teachers need to be educated on need of adopting culture that promotes use of ICT."* T10 reported that religion could also obstruct the use of ICT. In his narrative, he observed that *"some teachers use religion to resist the use of ICT, and therefore the school should handle such cases to increase the success of ICT."*

Other factors highlighted were previous experiences and viewpoints. This could be seen in the narrative of T3 who said that *"past experiences and beliefs acts as barriers to ICT use and teachers have to be given new experiences and beliefs to embrace ICT."* Similarly, T4 also drew attention to the impedances caused by past beliefs when he observed that *"perceptions can significantly influence acceptance of ICT by teachers, there is need to have the right knowledge to form correct perceptions."*

Some instances of the inappropriate information colouring the opinions of teachers included misinformation about the outcomes of ICT use for students with disabilities. In this regard, T7 stated that *"some teachers believe that use of ICT has negative outcomes on students, such teachers have to be told clearly they is need to use ICT."* In some instances, the misinformation originated from other teachers as observed by T9: *"views from other teachers play an important role in shaping the views of others. The school have a way of providing the right information."*

Resistance to change could also hamper ICT use. Typically, teachers who are set in their ways may resist change to the modes and tools of teaching. However, the views of these teachers can also be converted through patience and appropriate information as evidenced in the comments of T8, who stated that "*teachers who have been teaching for many years take long to accept technology, and the school should be patient with them.*" Interestingly, T8 has only seven years of experience so it was not clear if he was referring to himself or more senior colleagues in the school.

In summary, it could be seen that the teachers agreed that the provision of right information regarding ICT use would help overcome the barriers of culture, religion, previous experiences, and viewpoints that could obstruct the use of ICT by teachers. Moreover, misinformation about the outcomes of ICT use from other teachers and other sources could be rectified. Additionally, resistance to change could be addressed through patient dispensing of accurate information.

Sub-Theme 2: Provision of continuous training for teachers

The second sub-theme pertains to the provision of regular training for teachers in ICT use. The narratives of the teachers revealed that they believed that continuous training would help

teachers remain abreast of new ICT techniques and skills; improve their teaching skills; and enhance their motivation and self-confidence with regard to the use of ICT tools and devices. The narrative of T1, for example, indicates that "*continuous training will equip teachers with new techniques and skills hence make them better ICT users.*" On the other hand, T2's emphasis was on pedagogy, T2 says that "*through continuous training will be able to enhance their pedagogy and thereby successful use ICT.*" T3's emphasis was directed inwards, drawing attention to the stimulus and confidence required by teachers for ICT use. He said, "*One way of improving the motivation and self-confidence was through regular training which will lead to better ICT implementation.*" T12 had a similar opinion. His narrative indicated that he believed that regular training would *"address anxiety and fear of failure thus helping in development of ICT."*

T4 and T5 further highlighted the benefits of regular training mentioning that "*when the schools organise for regular training such as workshops, teachers are able to understand better why they should use ICT"* (T4) and "*training is important since it sharpens the skills of teachers and give them first-hand experience"*(T5). T6 also placed emphasis on training as *"a simple way of promoting ICT in school"*. In his opinion, this would increase the success of ICT usage, *"since teachers will get a chance of knowing how to effectively use the different devices."*

Other teachers drew attention to the skills to be addressed by training. For instance, the narratives of T8 and T9 emphasised fundamental skills. As T8 stated "*it is important to have training each term of the school and which should focus on basics skills required in use of ICT applications.*" Similarly, T9, referring to his own lack of skills, reported that "*I lack fundamental ICT skills and I want the school to provide regular training to build by skills thus allow me to fully use these devices.*" T11 added the dimension of removing fears and offering

knowledge support. He said that *"apart from skills development, training is necessary to remove the fears teachers have and offer knowledge support."*

T10 added a further aspect when he reported that "*if the school wants teachers to be effective, it has to ensure that it brings regular experts for training on ICT.*" Thus, it could be seen that there was some awareness with regard to the qualification of the persons who would deliver the training.

The narratives under this theme drew attention to the various benefits of regular training for teachers. These ranged from awareness of new ICT techniques and skills; enhancement of teaching skills; and improved motivation and self-confidence concerning the usage of ICT tools and devices. Moreover, it could be seen that some teachers believed that regular training could facilitate the promotion of ICT use in the schools. Furthermore, this sub-theme called attention to the skills to be addressed by training and the persons who should deliver the training to teachers.

Sub-theme 3: Inclusion of ICT in teachers' preparation programmes

The third sub-theme placed emphasis on including ICT in the preparation programmes for teachers. Overall, the opinions of the teachers indicated that they believed that ICT should be included in teachers' training programmes. That is, teachers should receive some instruction in ICT use prior to their employment in the Saudi schools. Various reasons were provided by the participating teachers for this belief. For example, T1 pointed out that *"teachers remain main players in ICT programmes."* Consequently, including ICT in their preparation would *"enhance their contributions."* The rationale provided by T2 was that the training would "*enable these teachers to be equipped well for future use of ICT."* Moreover, these programmes should "*incorporate use of ICT."* T4 suggested that such training programmes

would "*increase the participation and acceptance of ICT*" whereas T5 was of the opinion that "*including ICT in preparation programmes will enhance ICT skills among teachers.*" T5's opinion was shared by T9 who observed that "*teachers will be better prepared when their preparations [for ICT use] start at[during] their training.*"

Similar opinions were shared by other teachers, such as T10, who stated that "*this will be a good strategy of improving the overall use of ICT in schools.*" Likewise, T11 observed that "*supposing ICT is included in preparedness program, then teachers will benefit a lot of improving their skills*" whereas T12 reported that "*this will help in motivating teachers to use ICT because they will be learn more on use of ICT and therefore ready to implement what they have learned.*" Again, T13 was also in favour of the idea when he responded that "*including ICT programmes will be a good way of preparing teachers in their future use of ICT in schools.*"

A further dimension was provided by T6 who said that "*including ICT ... reduces the negative perceptions teachers have about use of ICT.*" T7 believed that such training would "*will increase the preparedness of teachers when they start teaching, it will also increase their appreciation to use of ICT.*"

T8's response revealed that he had considered the skills and competencies required for ICT usage: "*technological skills and competences are key to use of ICT, and if ICT is included in teachers' preparedness, their skills and competences will be sharpened.*"

Finally, T3 advocated the benefits of early training and stated that "*when teachers are trained in ICT at their colleges and universities they will have a better understanding of teaching using ICT.*"

Overall, it could be seen that all the teachers were in favour of including ICT in the preparation programmes of teachers with some of them advocating early training. The general opinion was that such early programmes would help the teachers in acquiring the required skills for ICT usage and thus increase their preparedness to use ICT in their classrooms with students with intellectual disabilities.

Sub-theme 4: Provision of personal ICT devices for teachers within mainstream schools

The fourth sub-theme explored the perceptions of the teachers with regard to the provision of ICT devices for each teacher within the main schools. This concept was viewed positively by the teachers. For example, T1 reported that *"providing ICT devices to all teachers in mainstream will be contribute in a positive way towards."* Similarly, T2 reported that *"devices are important elements in teaching of ICT in mainstream schools and this will go a great way in improving ICT teaching in these schools."* Again, T3 observed that *"equipping each teacher will be a great way of assisting students with special needs and the normal ones in use of ICT."*

Other teachers, including T4 and T5 were of the same opinion. T4, for example, stated that "*teachers in mainstream schools will be in a good position to teacher ICT in their schools since they will have required devices*" whereas T5 said that he believed *"this is a good way of ensuring that ICT teaching and learning runs smoothly in mainstream schools."* A similar opinion was found in T13's narrative as he said that *"teachers in mainstream will embrace more use of ICT when they are each provided with devices."*

T6 believed that the provision of devices would overcome the hindrances caused by limited equipment in the effective usage of ICT in mainstream schools: *"lack of ICT devices hinders successful use of ICT in mainstream schools, providing these devices will solve these*

problems." On the other hand, T7 believed that such provision would enable teachers to *"address different needs of students in these schools."*

T8 believed that teachers in mainstream schools would have more time to focus on developing ICT lessons once enough devices were provided. T9's comments indicated that he also believed the same only his stated emphasis was that the teachers would be able to more effectively meet the needs of students. T10 added that *"with the right devices for each teacher, they will be encouraged to take in students with special needs."*

Similar opinions were expressed by T11 who observed that "*teachers have to forego some ICT lessons due to lack of devices, but when they are provided to each of them, they will teach all lessons that requires these devices*" and T12 who reported that "*when each teacher is provided with devices sharing will end and this means improved teaching using ICT devices.*"

Thus, it could be seen that overall the teachers believed that their effectiveness in using ICT devices could be enhanced if they were individually provided with ICT devices. The areas of effectiveness included better preparation for classes using ICT tools and better preparation for teaching students with special needs using ICT tools and devices.

Theme 2: Facilitating ICT use in schools

The second theme associated with the third research question pertains to factors which facilitate the development of schools from the perspective of ICT use. The four sub-themes identified will be discussed in the following sections.

Sub-theme 1: Provision of sufficient educational resources, hardware and software suitable for teaching different skills to students with intellectual disabilities in Arabic

The first sub-theme pertains to the provision of adequate resources suitable for teaching different skills to students with intellectual disabilities in the Arabic language. It was evident that some teachers believed that the lack of appropriate resources was a significant barrier. Accordingly, T4 observed that when "*enough resources are provided, then ICT learning will be carried out well.*" T5's response revealed a similar line of thought as he stated that "*Enough resources will see the school addressing many problems that hinder ICT learning and this is a sure way improving ICT in the school.*" T6 says that *"enough resources will help in teachers training and this will improve ICT use in the school."*

Some teachers weighed this matter from their own, or teaching, perspective. For example, T1 reported that "*provision of enough resources in Arabic will motivate teachers in using ICT devices.*" Similarly, T2 suggested that *"providing hardware and software devices that are adequate certainly will enhance ICT teaching and learning, particularly in Arabic."* T7 indicated that that the provision of adequate resources *"such as computers, enough space and support teams,"* would reduce the frustration of teacher and encourage them to use ICT more. T8 believed that the provision of *"many Arabic software"* would help him and his colleagues to address the individual needs of each student. Again, T9 emphasised the benefits to himself and his colleagues if adequate resources were provided, calling attention to the greater time teachers would have to prepare for their classes as *"with enough ICT learning resources, there will be no sharing."*

Others viewed this from a student perspective. For instance, it could be seen in the opinion of T3 that students would be able to learn better if such software was provided on personal devices. He observed that "*when each student is provided with his/her learning device, and Arabic software, they learn better and even teachers have an easy time.*" Likewise, T10 suggested that *"enough Arabic software will highly enhance language learning and among students."*

T11 and T12 viewed the situation a little differently with both placing emphasis on the enhanced use of ICT in Saudi schools as a benefit. T11, for example, stated that *"certainly when we have all the resources we need, there will be less complaints and high concentration to use of ICT."* On the other hand, T12 responded that *"providing adequate resources is the best way of enhancing ICT use in all areas."*

On the whole, it could be seen that the interviewed teachers from the Saudi schools believed that the provision of sufficient ICT resources in the Arabic language would be beneficial not only to themselves but also to their students. Furthermore, this would promote the use of ICT tools in the country.

Sub-theme 2: Provision of sufficient network and internet access

The focus of the second sub-theme is the provision of sufficient network and Internet access in Saudi schools. T3 suggested that sufficient network and Internet access was nowadays a basic provision nowadays, and this required attention from the school boards and school head teachers. Thus, the teachers were aware of the significance of the network infrastructure in their schools. For instance, T8 observed that "*when networking is effectively done, it will be easy to communicate with students and teachers and this will increase the effectiveness of ICT and even the confidence of teachers.*"

Some teachers drew attention to the benefits of good Internet connections. Evidence of this can be found in T9's narrative, for instance, where he stated that "*with good Internet connection, teacher can take their teaching lesson and other teaching resources with them and access them later from the school's server.*" Likewise, T11 observed that "*efficient Internet connection will reduce time and thereby motivate teachers to use ICT.*" T10 also emphasised the significance of a good Internet connection when he said that, "*mobile computing make a great change in the way ICT is integrated in lessons such as mathematics and therefore Internet connection should be stressed.*"

The comments of the teachers revealed that they had experienced some difficulties due to unreliable and low speed network and Internet connections in their schools. T1 observed that, *"there is need to have a reliable Internet connection with high speed for effective use of ICT particularly where online teaching is concerned."* T2 also responded that good connectivity was needed "*because the server is many times down. These interruptions lead at times to cancellation of teaching that involves live streaming.*" T4's comments indicated the need for high speed servers that could provide Internet connection with a higher bandwidth for better ICT use.

T5 suggested the provision of wireless Internet connections in schools since these are "*more effective for smaller devices such as web pads, note pads and digital assistants.*" T7 also advocated for wireless connections but it could be seen that his rationale was the lower cost of such connections. He stated "*I feel that since we need to cut on cost, we need wireless connection which is relatively cheaper but still very fast.*" On the other hand, T6 appeared to be satisfied with the speed of the Internet connection but suggested the provision of high speed computers and said that, "*I understand that we have fibre optic connection, but how*

comes the computer speeds are slow, I think we need high speed computers to improve the use of ICT in this school."

A final insight from T12 revealed the need for adequate technical support to "*ensure that networking and Internet connection works perfectly.*" In his opinion, this would help the teachers "*achieve much more in use of ICT.*"

The narratives under this sub-theme revealed that the teachers recognised the need for Internet connections of good speed and reliability and adequate technical support to maintain the networks in their schools. They believed that good quality network infrastructure was a fundamental need in the present day and this, in its turn, would facilitate enhanced use of ICT tools and devices.

Sub-theme 3: Provision of financial support to schools to obtain ICT devices

The third sub-theme drew attention to the provision of adequate financial support to schools to enable them to procure ICT devices. As seen under the third theme of the second research questions, financial issues were recognised to be a significant barrier to the use of ICT tools and devices in schools. In this regard, T10 stated that *"we have noted that lack of finance is a big barrier to use of ICT, so the solution is providing enough funds to buy what is required by the school."*

T1 suggested that the government play an active role in ensuring an appropriate strategy to provide adequate financing to the schools to purchase adequate and suitable ICT devices. He said that "*to develop ICT use in this school, the government should have a proper strategy of financing the school to get enough and decent ICT devices.*" T3's narrative indicated that he supported this thought process as he mentioned that "*proper framework towards equipping ICT in the school should be followed by enough funds from the government.*" T9 also stated

that *"I strongly understand that we need funds to sustain ICT in this school. Therefore, the government has to provide us with the enough funds."*

T2 believed that proper budgeting was the answer. He also was of the opinion that the budgeting should take into consideration popular ICT devices. He observed that, *"Though the school seems to get relatively some good amount for ICT, proper budgeting should be done to buy the most used ICT devices and not just big computer."* T4 added further insight when he proposed that *"integrating ICT into school teaching and learning demand a high budget and this calls for sufficient funding from the government and other players."* Again, T5 drew attention to the need for sufficient funds as these *"are important in ensuring that ICT is successfully implemented at school by purchasing required devices."*

In the opinion of some teachers, ICT implementation and use in the schools would be affected adversely without adequate funds. For instance, T6 observed that *"without enough funds to acquire technological resources the school needs it is hard to encourage the use of ICT."* Similarly, T7 indicated that *"for good implementation of ICT, there is need to have enough money to buy the hard ware and software required."* Again, T8 stressed that *"when the school lacks enough funds, it will not be able to acquire the ICT devices and this means that students will miss out, so funding is critical."* Moreover, T12 suggested that *"emphasises should be put on availing enough financial resource to have modern and latest ICT devices"*.

The motivation of teachers was a robust reason for sufficient funding in the opinion of T11 who stated that *"having enough funds motivates teachers since they can get the machines they want and this is great for them."*

The narratives under this sub-theme highlighted the teachers' angst with regard to the inadequate provision of ICT tools and devices in their schools due to lack of funding. In

general, they believed that ICT use could be improved if there was a sufficient outlay of funds to procure up-to-date and suitable equipment for the schools. Moreover, the morale of teachers would be improved by this provision. However, a lack of confidence in the government's provision of funds was evident, as also in the budgeting process of the schools.

Sub-theme 4: Inclusion of ICT implementation in curriculum of students with intellectual disabilities

The final sub-theme pertains to the inclusion of ICT implementation in the curriculum employed for students with intellectual disabilities. One aspect revealed by the interviews with the teachers was that including ICT in the curriculum would enhance its use in the classrooms. Another aspect was to increase the gravity with which ICT was considered by the teachers. These aspects are evident in the comments of T1 who stated that "*to enhance use of ICT in the classrooms it is important to include it in the curriculum to create enough time of teachers.*" T2's response drew attention to the involvement of the Saudi Ministry of Education in the matter. He observed that "*to increase the seriousness of which teachers treat ICT learning, the Ministry of Education has focus on strengthening ICT in special education curriculum.*"

T3 suggested that including ICT in the curriculum would ensure that the goals of ICT would be achieved as in his opinion "*curriculum comprises of all learning activities meant to encouraging schools to promote learning, accordingly, putting ICT in the curriculum will ensure that it achieves its objectives.*"

Other benefits suggested by the teachers that would accrue from the inclusion of ICT into the curriculum of students with intellectual disabilities included lesson planning as observed by T4; increasing the seriousness with which teachers would use ICT in their lessons, as

submitted by T6; increased provision of additional resources such as devices and funds, as mentioned by T7; and as highlighted by T9, individualised lessons could be developed to meet the individual needs of different students with intellectual disabilities.

T5 stated a benefit from the student perspective when he observed that including ICT in the curriculum would "*enhance ICT use among students.*" T12 also believed that students would be benefited by the inclusion of ICT lessons in the school curriculum as these would *"address the interests of students."* However, a warning was introduced by T8 who stated that the *"ICT curriculum should be reviewed on regularly to update the educational needs of students with disabilities.*

T10 indicated that the support of the Ministry of Education would be required to *"include ICT in the school curriculum at every level."* The significance of curriculum planning was stressed by T11 who observed that *"the important aspect of curriculum is planning, so ICT lessons will be well planned when in the curriculum."*

Thus, it could be seen that the teachers believed that including ICT usage in the curriculum would be beneficial to the students with intellectual disabilities with whom they worked and also for themselves in their classroom use of the tools. Moreover, they believed that the objectives of ICT use with students with intellectual disabilities could be achieved if the curriculum was modified to include ICT. However, adequate planning and support from the Saudi Ministry of Education would be required.

Reliability and Validity of the qualitative findings

As described in Chapter 3 (Research Methodology), the reliability of the qualitative phase was accomplished by assessing the standardised interview schedule before its actual usage to ensure that all interviewees would understand the questions in a similar manner. Also, the

responses obtained were scrutinised to ensure that they were not vague or unclear. Further verification of the study's reliability was accomplished by matching the researcher's evaluation of some sections of the interview transcripts with another researcher's evaluation of the same sections. The validity of the qualitative phase was ensured by means of the constant comparative method. Therefore, small portions of extracts from the interview transcripts were scrutinised to identify emerging themes. Subsequently, the remaining sections of the interview transcripts were examined to check the existence of more instances of the same theme (Hammersley, 2013; Silverman, 2006).

Summary of the Qualitative Findings

Overall, from the qualitative phase it could be seen that the awareness of the special education teachers regarding ICT was reasonable. Moreover, they were aware of the advantages and disadvantages of the use of ICT with students with intellectual disabilities.

The narratives of the participants revealed some disturbing details about the current provision of ICT tools for use in the schools in the KSA, such as inadequate ICT infrastructure in schools and lack of training for teachers in the use of ICT, in general, and for use with students with intellectual disabilities, in particular. Moreover, the narratives revealed that the use of ICT with students with intellectual disabilities required careful planning and implementation as the needs of such students vary and their responses to different ICT tools may also vary. Additionally, undesirable social and psychological outcomes, such as low self-esteem and anxiety could be caused by the lack of success of such students with ICT use.

The teachers also encountered several barriers with the use of ICT. For instance, they frequently did not receive adequate encouragement from their colleagues or school leadership

to use ICT. Moreover, they were hindered by the lack of adequate compensation, lack of confidence, lack of training, lack of time, and so on.

Another surprising barrier encountered by the teachers was the lack of equipment or out-dated equipment in the schools. Moreover, technical support and maintenance with regard to ICT tools and devices appeared to be very poor in the schools in the KSA, indicating among other things, a lack of a defined maintenance process and the probable lack of trained technicians in the country.

Furthermore, it could be seen that the lack of training in ICT use caused teachers to have low confidence in the use of ICT. Moreover, they lacked the collaboration and cooperation that could arise from the typical encounters with peers and experts which could be provided by regular training programmes. Also, the lack of training meant that teachers were not aware of the full extent to which ICT could be used with students with intellectual disabilities and thus they were not able to take full advantage of its capabilities.

Two significant issues were encountered with regard to educational software in the KSA. The first was the lack of educational software in Arabic while the second was the impact caused by the high costs of educational software. These two issues, in effect, caused the non-availability of up-to-date, suitable software for use with students with intellectual disabilities in classrooms.

The teachers' narratives also brought to light the lack of adequate budget provision for ICT tools and devices in the schools caused by improper planning in the schools and also at the broader government level. The downstream effect of such financial constraints included limited or no availability of devices and supporting amenities; and an inadequate maintenance of the ICT equipment.

The teachers also were in agreement that appropriate information about the use of ICT in the classroom could help overcome the barriers caused due to culture, religion, previous experiences, and viewpoints. It could also help overcome the resistance to change. Furthermore, such information could help the teachers from being misled by misrepresentation about the outcomes of ICT use from other teachers and other sources. Thus, the benefits of regular training were evident to the teachers and it was also evident to the researcher that training was woefully inadequate. Moreover, the teachers believed that they could use ICT devices more effectively, as their preparation for class and for use of the tools with students with intellectual disabilities could be enhanced if they were provided with ICT devices for individual use.

Other factors which could improve the use of ICT in schools as reported by the teachers included the availability of ICT resources in Arabic, reliable Internet connections, sufficient technical support, sufficient funding for procuring ICT devices, and including ICT not only in the curriculum of the students with intellectual disabilities but also in teachers' preparatory programmes.

The next section will describe the findings from the second or quantitative phase of the study.

Part 2: Quantitative findings

This chapter presents the research findings obtained from the quantitative phase of the study. Quantitative data were collected from 100 teachers working in different primary schools in Jeddah, Saudi Arabia, regarding their awareness and approach towards the use of ICT with students with intellectual disabilities. The raw data collected were coded and then subjected to statistical analysis using the Statistical Package for Social Sciences (SPSS v21) software program. Since the researcher is male and the KSA has two separate LEAs for men and women in all areas, the responses were collected only from male teachers working in inclusive mainstream boys' primary schools in Jeddah.

This chapter is organised into five sections. The demographic information of the respondents is first presented, followed by the evaluation of the perceptions of teachers towards using ICT for students with intellectual disabilities, and the advantages and disadvantages of ICT. The fourth section evaluates the main barriers encountered by teachers in using ICT for students with intellectual disabilities while the fifth section presents the main factors contributing to the development of ICT integration in schools.

Demographic information of respondents

This section offers a detailed description of the demographic information collected from the study participants. Generally, obtaining insights with regard to the demographic information of respondents aids a researcher in evaluating their fit to participate in the survey. Moreover, the demographic distribution of the respondents facilitates the establishment of the exactness with which the sample imitates the population of a study. Across various fields, studies have discovered that respondents' perceptions are influenced by their demographic features, such as age, qualification, experience, etc. In view of this, the current study collected and examined

the demographic data of the respondents. The demographic information collected included personal information regarding the teachers and their experience with using ICT for students with intellectual disabilities.

Respondents' age

The results showed that a majority of the respondents were aged between 26 and 30 years (61%). A similar number (17% each) were found to belong to the age groups of 21-25 years and 31-35 years (see Table 4.3, and Figure 4.1). From the history of special education in the KSA, it is evident that inclusive education for students with intellectual disabilities sponsored by the Ministry of Education commenced only in the later part of the twentieth century (in the 1980s). Accordingly, preparation programmes for special education teachers are also of recent origin (Aldabas, 2015). However, most of the participants of the present study were found to be aged <= 35 years. This could indicate that more persons in the KSA are aware of the special needs of students with intellectual disabilities and are entering directly into the field of special education.

Table 4.3: Age of the respondents

Age	**Percentage**
21-25 years	17
26-30 years	61
31-35 years	17
> 35 years	3

*2% of the participants did not respond to this question

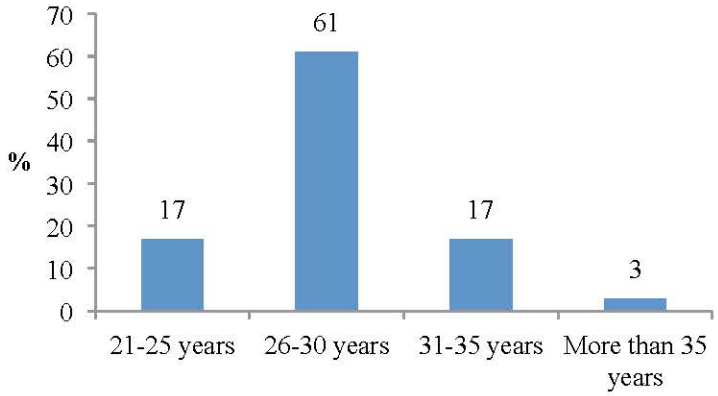


Figure 4.1: Age of the respondents

Respondents' Educational Qualification

The significant majority (83%) of participants were found to possess Bachelor of Arts degrees (Table 4.4, Figure 4.2). A few (4%) participants reported that they were in possession of Diplomas while the remainder (13%) reported that they had Post-graduate degrees. This suggests that a graduate degree is adequate qualification to obtain employment as special education teachers in the KSA.

Table 4.4: Educational qualification of the respondents

Educational Qualification	**Percentage**
Diploma	4
BA	83
MA	13

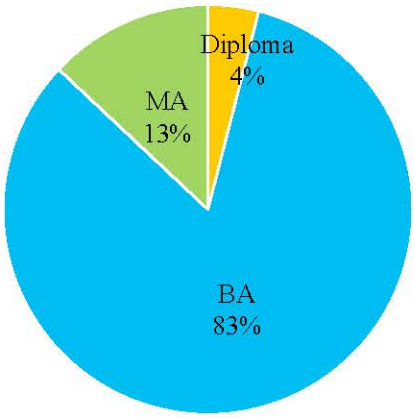


Figure 4.2: Educational qualification of the respondents

Respondents' Work Experience with students with intellectual disabilities

Data related to the work experience of the teachers were collected. It could be seen that the majority of the respondents (68%) had work experience of 6 years or greater. A fourth of the respondents reported work experience of 2-5 years. Overall, it could be seen that most of the respondents participating in the study had work experience of at least 2 years with students with intellectual disabilities (Table 4.5, Figure 4.3). A study by Gaines and Barnes (2017) suggests that the years of work experience of teachers is an important factor which governs their attitudes towards the educational needs of students with disabilities, which in turn might affect the success of ICT integration in schools.

Table 4.5: Years of experience with students with intellectual disabilities

Experience	**Percentage**
1 Year	6
2-5 Years	26
6-10 Years	43

Experience	Percentage
More than 10	25

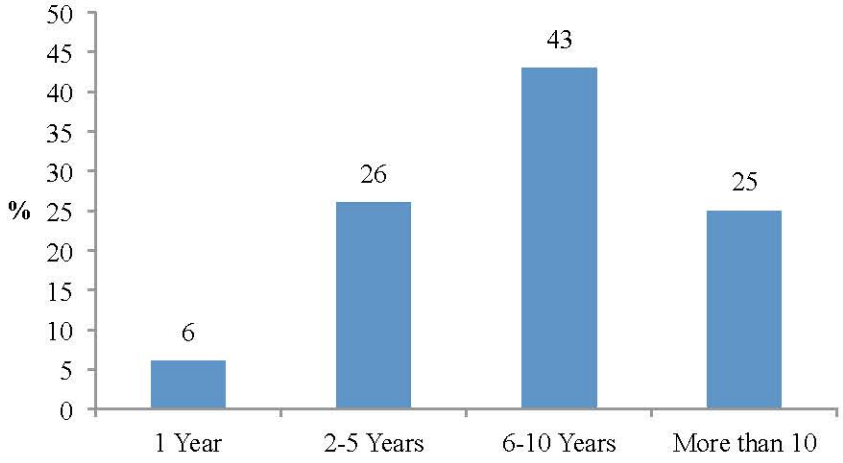


Figure 4.3: Years of experience with students with intellectual disabilities

Experience with ICT utilisation

It could be seen (Table 4.6) that precisely half of the respondents had experience with using ICT tools for a duration of 2-5 years. In contrast, only 11% of reported use for a longer duration of 6-10 years. However, a considerable portion of the respondents (39%) were found to have limited to no experience (i.e., of < 2 years) with ICT. This could be explained by the late introduction, in 2000, of the *Watani* programme for integrating ICT in class rooms by Saudi Arabia, suggesting that ICT devices were introduced in schools very recently (Alotaibi & Almalki, 2016). Overall, it could be seen that respondents with different levels of experience with ICT, varying from very low to very high, had participated in the survey. However, the majority of them possessed only moderate experience with ICT, owing to the recentness of ICT implementation in their schools (Figure 4.4).

Table 4.6: Years of experience with ICT utilisation

Experience with ICT utilisation	**Percentage**
< 2 years	39
2-5 years	50
6 -10 years	11

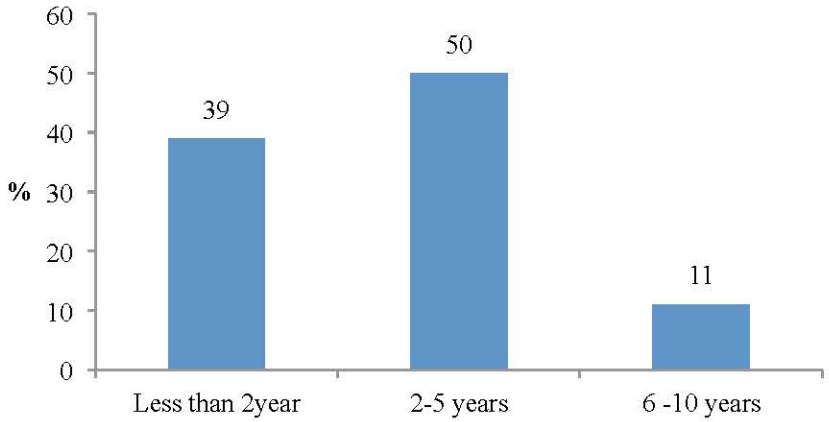


Figure 4.4: Years of experience with ICT utilisation

Training courses for effective integration of ICT in teaching

Training courses are crucial for the teachers in order to acquire proficiency with various digital techniques, such as developing multimedia, PowerPoint presentations, utilising the Internet for interactive teaching, etc. The results revealed that 71% of the respondents had not been offered training courses for effective utilisation of ICT tools while teaching. This implies that most of the skills acquired by most of the respondents of the survey were self-learned (Figure 4.5).

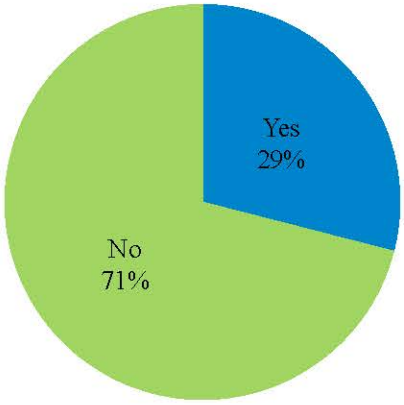


Figure 4.5: Availability of training courses for effective integration of ICT in teaching

Importance of ICT recognised by the schools

Most of the survey participants (80%) responded that the Individualised Education Programme (IEP) team of their schools were aware of the need for ICT assistive techniques while teaching students with intellectual disabilities (Figure 4.6). Therefore, it can be inferred from Figures 4.5 and 4.6, together, that while most of the educational institutions recognise the need for ICT they fail to offer training programmes to the teachers dealing with students with intellectual disabilities.

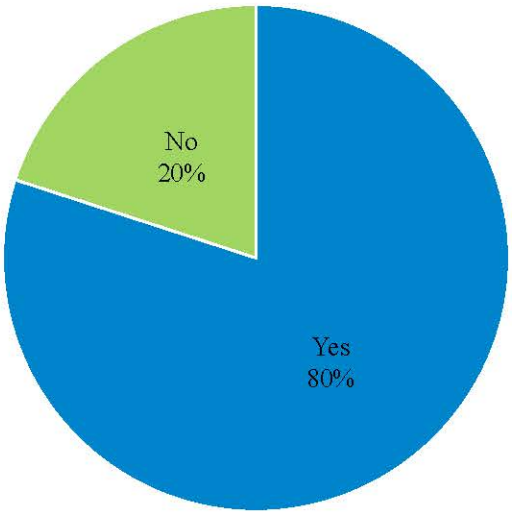


Figure 4.6: Importance of ICT recognised by the IEP team in school

Use of ICT tools with students with intellectual disabilities

The scenario prevalent in the KSA schools regarding the utilisation of ICT tools was assessed and it was found that 66% of the schools utilised ICT tools while handling students with intellectual disabilities (Figure 4.7). Hence, it can be inferred that nearly 34% of the schools in the KSA still adopt the traditional methods of teaching, suggesting that the students with special educational needs in these schools are not encouraged to develop learning competencies in a collective environment and that inclusive learning has not been embraced. However, a reason for many schools to neglect ICT integration may be that the predominant language used in ICT tools and devices is English or Spanish, rather than their native Arabic (Alquraini, 2010). Other barriers for ICT integration in schools are examined in section 4.4.



Figure 4.7: Use of ICT tools with students with intellectual disabilities

Access to ICT tools for students with intellectual disabilities

It could be seen from the results in general, the schools did not provide substantial access to ICT tools for students with disabilities as could be seen in the case of 72% of the respondents (Figure 4.8). An example of poor access to ICT tools for students with special needs is the Open Education Resources (OER) which is meant for all school students but is typically not available in customised formats for students with disabilities (UNESCO, 2011).



Figure 4.8: Access to ICT tools for students with intellectual disabilities

Respondents' perceptions of using ICT for students with Intellectual Disabilities

The respondents' perceptions of the concept of ICT as well as the advantages and disadvantages resulting from the use of ICT tools and equipment on students with intellectual disabilities is an important factor in the overall development of schools in embracing ICT. Therefore, relevant data were collected from the respondents using multiple close-ended questions that provided a Likert scale with rankings ranging from "Strongly disagree" to "Strongly agree" for the respondents to use. Accordingly, suitable statistical analyses were performed and are presented in this section.

Perceptions of the Concept of ICT

In general, the respondents were found to agree with all the statements regarding the concept of ICT with mean values ranging from 3.69 to 4.25. The majority of the respondents agreed that ICT implied the use of software programmes to facilitate the better understanding of learning material in students with disabilities (Mean=4.25 ± 0.74). However, the statement that ICT was a complex way of teaching as it requires much time to develop content, obtained neutral responses from the participants (Mean=3.49 ± 0.88). Therefore, it could be inferred that the teachers had a good understanding of the concept of ICT and they were using various ICT tools and devices in teaching students with intellectual disabilities (Table 4.7).

Table 4.7: Perceptions of the concept of ICT

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
ICT means teaching and learning using ICT tools such as	1.0	3.0	14.0	61.0	21.0	3.98 ± 0.75

Statement	*SDA	DA	N	A	SA	Mean ± SD
computers						
ICT is the modern way of teaching where teachers use technological devices and approaches in teaching particularly in relation to students with disabilities	1.0	6.0	10.0	49.0	34.0	4.09 ± 0.87
ICT implies tools that can be used in instruction and teaching specific concepts and skills to support students with Intellectual Disabilities	2.0	7.0	6.0	51.0	34.0	4.08 ± 0.92
The intent of ICT is to create new interaction of teachers and students with disabilities.	2.0	4.0	25.0	52.0	17.0	3.78 ± 0.84
ICT where a teacher is expected to use interactive boards, monitors, projectors and computers when teaching	2.0	3.0	32.0	50.0	13.0	3.69 ± 0.81
ICT involves using technological	0.0	2.0	23.0	43.0	32.0	4.05 ±

Statement	*SDA	DA	N	A	SA	Mean ± SD
tools to teach students						0.79
ICT is a complex way of teaching as a significant amount of time is required to gather or develop content	1.0	12.0	35.0	41.0	11.0	3.49 ± 0.88
ICT is where software programmes are used to allow students with disabilities to better understand the learning material.	0.0	3.0	9.0	48.0	40.0	4.25 ± 0.74
ICT is where teachers and students use technology in addition to conventional approaches to teaching and learning.	1.0	4.0	24.0	52.0	19.0	3.84 ± 0.81
ICT seeks to integrate technology in teaching and learning to create a better experience.	0.0	6.0	6.0	56.0	32.0	4.14 ± 0.77
ICT are tools meant to improve the capacities of students to	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79

Statement	*SDA	DA	N	A	SA	Mean ± SD
understand different topics and subjects.						

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between experience of teachers with ICT utilisation and perceived concept of ICT

The work experience of teachers with ICT devices did not have an effect on their perceptions of the concept of ICT (p=0.619). All the respondents with work experience ranging from <2 years to 10 years exhibited the perception that ICT is a software meant for students with disabilities for easy understanding of course material (Table 4.8).

Table 4.8: Cross-tabulation between experience of teachers with ICT utilisation and perceived concept of ICT

			Concept of ICT					Total
			*SDA	DA	N	SA	A	
Experience of teachers with ICT utilisation	Less than 2 year	Count	0	0	2	16	21	39
		% within experience	0	0	5.1%	41.0%	53.8%	100.0%
	2-5 years	Count	0	0	3	26	21	50
		% within experience	0	0	6.0%	52.0%	42.0%	100.0%

			Concept of ICT					Total
			*SDA	DA	N	SA	A	
	6 -10 years	Count	0	0	0	4	7	11
		% within experience	0	0	0.0%	36.4%	63.6%	100.0%
Total		Count	0	0	5	46	49	100
		% within experience	0	0	5.0%	46.0%	49.0%	100.0%
Chi square = 2.642, p = .619								

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Perceptions of the advantages of using ICT

The respondents agreed that ICT offered an alternate means of communication for students with disabilities and gave them a sense of meaningful existence in school (Table 4.9). The respondents also agreed that several skills of students with disabilities, such as critical skills, communication skills, literacy skills, writing skills, reading skills, spelling skills, vocabulary, quality of language and motivation to learn, improved as a result of integration of teaching practices with ICT tools. The students displayed enhanced social participation and physical participation in school as a result of using ICT techniques. It was agreed by the respondents that utilisation of ICT improved convenience of learning among students with disabilities, thereby improving their productivity in school as well as overall academic performance. The mean values ranged between 3.58 and 4.22. However, the functions of ICT in improving the motor skills of the students (Mean=3.25 ± 0.96) and their sense of independence obtained

neutral responses from the participants (Mean=3.41 ± 0.92). Therefore, it can be inferred that the respondents experienced a range of advantages as a result of ICT integration in teaching students with intellectual disabilities.

Table 4.9: Perceptions of the advantages of using ICT

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
ICT offers an alternative means of communication in the classroom	0.0	1.0	8.0	59.0	32.0	4.22 ± 0.62
ICT provides access to learning material in a very convenient manner	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.796
ICT use enhances the motivation of students.	2.0	6.0	23.0	49.0	20.0	3.79 ± 0.90
ICT use in the classroom can help students with Intellectual Disabilities in communication and literacy.	1.0	3.0	35.0	47.0	14.0	3.70 ± 0.78
Many ICT tools can be used by students with disabilities	1.0	4.0	19.0	53.0	23.0	3.93 ± 0.81
ICT use helps in overcoming barriers of time and enhances the necessary functioning and	2.0	9.0	25.0	47.0	17.0	3.68 ± 0.93

Statement	*SDA	DA	N	A	SA	Mean ± SD
development of critical skills among students with disabilities						
ICT contributes to increased effectiveness of the learning processes by helping students with disabilities to actively take part in teaching and learning	0.0	4.0	6.0	55.0	35.0	4.21 ± 0.72
Assistive tools facilitate the social participation of students with vision and hearing impairments.	0.0	5.0	18.0	48.0	29.0	4.01 ± 0.82
ICT tools, assistive technology in particular, have the capacity to create a more meaningful existence in school for students with disabilities	0.0	8.0	37.0	42.0	13.0	3.60 ± 0.85
The use of ICT tools, such as screen keyboards, enhance the communication skills and spelling performance of students with speech impairments	0.0	7.0	30.0	50.0	13.0	3.69 ± 0.78

Statement	*SDA	DA	N	A	SA	Mean ± SD
ICT enhances the literacy skills and language of students with disabilities	0.0	5.0	35.0	38.0	22.0	3.77 ± 0.85
The use of ICT tools increases the physical participation of students with disabilities in classroom activities	0.0	1.0	8.0	67.0	24.0	4.14 ± 0.58
Assistive tools, such as portable communication and writing aids, not only help in productivity and literacy of students with disabilities, but also in building social relationships	1.0	4.0	36.0	45.0	14.0	3.67 ± 0.80
The independence of students with disabilities is increased by the use of ICT in the classroom.	2.0	14.0	35.0	39.0	10.0	3.41 ± 0.92
ICT use has the potential to support and enhance the social and academic activities of student with disabilities	1.0	9.0	12.0	69.0	9.0	3.76 ± 0.78

Statement	*SDA	DA	N	A	SA	Mean ± SD
The use of special software can help students improve their writing skills.	0.0	12.0	27.0	52.0	9.0	3.58 ± 0.81
ICT can enhance reading, learning and vocabulary for communication among students with disabilities	0.0	2.0	42.0	39.0	17.0	3.71 ± 0.76
The use of computers is beneficial to students with mild motor impairment as it can improve their language skills by reducing errors in writing.	0.0	29.0	25.0	38.0	8.0	3.25 ± 0.96

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between experience of teachers with ICT utilisation and perceived advantages of ICT

The perceptions of respondents regarding the advantages of ICT utilisation were found to differ significantly among teachers with different levels of work experience with ICT ($p=0.004$). While 7.70% of the respondents below 2 years of experience with ICT disagreed to a few statements, 6.0% of disagreement was exhibited in respondents with 2 to 5 years' experience and no disagreement was recorded among respondents above 6 years of experience with ICT. Therefore, it is inferred that the respondents perceived more advantages of using ICT as their number of years with ICT utilisation increased (Table 4.10).

Table 4.10: Cross-tabulation between experience of teachers with ICT utilisation and perceived advantages of ICT

			Perceptions of the advantages of using ICT					
			***SDA**	**DA**	**N**	**A**	**SA**	**Total**
Experience of teachers with ICT utilisation	Less than 2year	Count	1	2	4	26	6	39
		% within experience	2.6%	5.1%	10.3%	66.7%	15.4%	100.0%
	2-5 years	Count	0	3	8	28	11	50
		% within experience	0.0%	6.0%	16.0%	56.0%	22.0%	100.0%
	6 -10 years	Count	0	0	2	3	6	11
		% within experience	0.0%	0.0%	18.2%	27.3%	54.5%	100.0%
Total		Count	1	5	14	57	23	100
		% within experience	1.0%	5.0%	14.0%	57.0%	23.0%	100.0%
Chi square = 11.004, p = .004								

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Perceptions of the disadvantages of using ICT

The respondents disagreed that implementation of ICT required the teachers to be highly skilled (Mean=2.50 ± 1.13). On the other hand, the respondents agreed to a large number of disadvantages associated with utilisation of ICT such as increased time consumption while using ICT as the needs vary with every student (Mean=4.04 ± 0.86), high cost of implementation (Mean=3.77 ± 0.86), onset of anxiety among students with disabilities (Mean=3.69 ± 0.81) and negative effects on students due to the possible technological hitches (Mean=4.05 ± 0.79). The respondents also agreed that too much dependence on technology makes it difficult for the students to cope with technology-free home environment (Mean=3.61 ± 0.82). Therefore, it is seen that technological hitches and time involved were the most commonly reported impediments in implementing ICT use (Table 4.11).

Table 4.11: Perceptions of the disadvantages of using ICT

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
High dependence on technology by students with disabilities can be a problem in different environments, such as at home	1.0	13.0	16.0	64.0	6.0	3.61 ± 0.82
Use of ICT does not directly result in independence, competence and social acceptance for students with	8.0	13.0	27.0	46.0	6.0	3.29 ± 1.03

Statement	*SDA	DA	N	A	SA	Mean ± SD
disabilities						
ICT use, specifically use of assistive devices, can result in public labelling of students with disabilities	11.0	44.0	19.0	18.0	8.0	2.68 ± 1.13
Using assistive technology that does not match the needs of students with disabilities could have adversely affect the students.	2.0	14.0	35.0	37.0	12.0	3.43 ± 0.94
ICT use demands highly-skilled teachers	19.0	39.0	20.0	17.0	5.0	2.50 ± 1.13
ICT tools are prone to failure and their reliability could be compromised	5.0	37.0	42.0	14.0	2.0	2.71 ± 0.84
Problems with network connectivity can affect the reliability of ICT devices	1.0	22.0	14.0	51.0	12.0	3.51 ± 0.99
ICT use is not dependable as the students have a problem using	1.0	28.0	9.0	41.0	21.0	3.53 ± 1.14

Statement	*SDA	DA	N	A	SA	Mean ± SD
ICT						
ICT requires a lot of time as the teacher has to attend to different students with varying needs	1.0	6.0	11.0	52.0	30.0	4.04 ± 0.86
The costs involved in ICT use are very high	2.0	5.0	24.0	52.0	17.0	3.77 ± 0.86
Inability to use ICT tools and devices may cause anxiety in students with disabilities	2.0	3.0	32.0	50.0	13.0	3.69 ± 0.81
Technological hitches negatively affect students with disabilities	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79
Heavy ICT use by students with disabilities can limit their capacity for self-improvement	1.0	12.0	35.0	41.0	11.0	3.49 ± 0.88

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between experience of teachers with ICT utilisation and perceived disadvantages of ICT

Unlike the perceived advantages of using ICT, the perceived disadvantages did not vary with experience of teachers with ICT utilisation ($p=0.738$). Therefore, it is understood that disadvantages associated with ICT utilisation such as excessive time consumption for

preparation of lessons and the technological hitches encountered while using ICT equipment did not improve with years of experience with the equipment (Table 4.12).

Table 4.12: Cross-tabulation between experience of teachers with ICT utilisation and perceived disadvantages of ICT

			Perceptions of the disadvantages of using ICT					
			***SDA**	**DA**	**N**	**A**	**SA**	**Total**
Experience of teachers with ICT utilisation	< 2 year	Count	0	2	11	21	5	39
		% within experience	0.0%	5.1%	28.2%	53.8%	12.8%	100.0%
	2-5 years	Count	1	1	18	27	3	50
		% within experience	2.0%	2.0%	36.0%	54.0%	6.0%	100.0%
	6 -10 years	Count	0	0	2	7	2	11
		% within experience	0.0%	0.0%	18.2%	63.6%	18.2%	100.0%
Total		Count	1	3	31	55	10	100
		% within experience	1.0%	3.0%	31.0%	55.0%	10.0%	100.0%
Chi square = 5.184, p = .738								

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Barriers in implementing ICT tools and devices for students with Intellectual Disabilities

With the aim of identifying the reasons that impede the schools in the KSA from embracing ICT tools and devices, the study evaluated the teacher's perceptions with regard to the nature and extent of the different barriers impeding the implementation of ICT for students with intellectual disabilities in the schools. Barriers explored included financial barriers, lack of technical support, lack of educational software, etc.

Barriers encountered in the work environment

An important barrier preventing implementation of ICT in the school work environment was found to be lack of support from head of the school (Mean=3.84 ± 0.81), lack of motivation from school (Mean=3.79 ± 0.90) and from colleagues (Mean=4.25 ± 0.74). Insecurity of the respondents such as lack of self-confidence in using ICT (Mean=3.93 ± 0.81), unfamiliarity of ICT tools (Mean=4.03 ± 0.79), lack of knowledge with ICT devices (Mean=3.60 ± 0.80), lack of change management skills (Mean=3.72 ± 0.76) and lack of motivation to deviate from traditional methods of teaching (Mean=3.91 ± 0.80) were also reported to be barriers encountered while implementing ICT. Further, practical concerns of implementation such as difficulty in managing classes as the devices are not available for all students (Mean=3.73 ± 0.76), too much expenditure of time and effort for preparing ICT based material which is inadequately compensated (Mean=4.14 ± 0.77), heavy work load during class hours leaving no time for ICT (Mean=4.18 ± 0.75) and inadequate time for preparation due to other lessons (Mean=3.71 ± 0.91) were also identified as barriers by the study. Therefore, the results draw attention to the different barriers associated with lack of support, insecurity and practical

implementation of ICT, with discouragement from colleagues being the most commonly reported barrier (Table 4.13).

Table 4.13: Barriers encountered in the work environment

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
I am discouraged from using ICT in my classroom due to the attitudes of other teachers	0.0	3.0	9.0	48.0	40.0	4.25 ± 0.74
I do not receive enough support from the school head concerning the use of ICT in the classroom	1.0	4.0	24.0	52.0	19.0	3.84 ± 0.81
I am not compensated for the additional effort and time I spend in using ICT	0.0	6.0	6.0	56.0	32.0	4.14 ± 0.77
I lack the self-confidence in using various ICT devices and this discourages me from their use	1.0	4.0	19.0	53.0	23.0	3.93 ± 0.81
Past adverse experiences with the use of the ICT restrict my use of ICT	1.0	14.0	33.0	40.0	12.0	3.48 ± 0.91
At times I do not enough time to use ICT due to my classwork.	0.0	4.0	9.0	52.0	35.0	4.18 ± 0.75
I fear that I will not be able use ICT effectively since some of the devices are	0.0	4.0	18.0	49.0	29.0	4.03 ± 0.79

Statement	*SDA	DA	N	A	SA	Mean ± SD
new to me						
I fear that my lack of knowledge with ICT devices will cause me to fail and be embarrassed in front of my students	0.0	8.0	36.0	44.0	12.0	3.60 ± 0.80
Classroom management is a barrier to ICT particularly where the devices are few	0.0	6.0	28.0	53.0	13.0	3.73 ± 0.76
The school does not motivate me to use ICT	2.0	6.0	23.0	49.0	20.0	3.79 ± 0.90
Lack of change management skills prevent me from using ICT	1.0	3.0	32.0	51.0	13.0	3.72 ± 0.76
The lack of motivation to change the traditional teaching methods is a major setback in use of ICT	1.0	4.0	19.0	55.0	21.0	3.91 ± 0.80
Inadequate time to prepare for ICT lessons hinders my use of ICT	2.0	8.0	24.0	49.0	17.0	3.71 ± 0.91

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between barriers encountered in the work environment by teachers and their work experience

A cross-tabulation was performed in order to assess if the perceived barriers encountered by the respondents in their work environment varied with their work experience (Table 4.14). The results exhibited the relationship between these two constructs to be statistically

insignificant (p=0.352). Therefore, it can be inferred that the lack of support from head of the school and colleagues, the practical limitations of ICT implementation in schools as well as the insecurity of respondents regarding utilisation of ICT devices were experienced by all the respondents in their work environment, regardless of their years of work experience.

Table 4.14: Cross-tabulation between barriers encountered in the work environment by teachers and their work experience

			Barriers encountered					
			***SDA**	**DA**	**N**	**A**	**SA**	**Total**
Experience	1 Year	Count	0	0	3	3	0	6
		% within experience	0	0.00%	50.00%	50.00 %	0.00%	100.00 %
	2-5 Years	Count	0	0	6	18	2	26
		% within experience	0	0.00%	23.10%	69.20 %	7.70%	100.00 %
	6-10 Years	Count	0	0	6	35	2	43
		% within experience	0	0.00%	14.00%	81.40 %	4.70%	100.00 %
	More than 10	Count	0	1	7	17	0	25
		% within experienc	0	4.00%	28.00%	68.00 %	0.00%	100.00 %

			Barriers encountered					
			*SDA	DA	N	A	SA	Total
		e						
Total		Count	0	1	22	73	4	100
		% within experience	0	1.00%	22.00%	73.00 %	4.00%	100.00 %
			Chi square= 9.98, p=.352					

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Barriers related to ICT equipment available in the schools

Table 4.15 presents the infrastructure related barriers recognised by the study such as insufficient numbers of equipment (Mean=3.60 ± 0.81), old and out-dated equipment (Mean=3.69 ± 0.78), obsolete technology (Mean=4.14 ± 0.58), poor class room infrastructure (Mean=3.98 ± 0.75), poor maintenance of equipment (Mean=4.09 ± 0.87) and regular break down of machines (Mean=3.78 ± 0.84), which impeded the integration of ICT in classrooms. Therefore, it can be inferred that schools should pay more attention towards maintaining the ICT equipment and updating them frequently in order to encourage ICT integration in class rooms.

Table 4.15: Barriers related to ICT equipment

Statement	*SDA	DA	N	A	SA	Mean ± SD
My school does not have enough ICT	0.0	8.0	37.0	42.0	13.0	3.60 ±

Statement	*SDA	DA	N	A	SA	Mean ± SD
equipment						0.81
My school has old and out-dated equipment	0.0	7.0	30.0	50.0	13.0	3.69 ± 0.78
There are very few ICT devices in my school.	0.0	5.0	35.0	38.0	22.0	3.77 ± 0.85
My school provides obsolete software and hardware	0.0	1.0	8.0	67.0	24.0	4.14 ± 0.58
The classroom infrastructure cannot accommodate enough ICT equipment for all students	1.0	3.0	14.0	61.0	21.0	3.98 ± 0.75
The machines are not well maintained, so they don't count	1.0	6.0	10.0	49.0	34.0	4.09 ± 0.87
The equipment needs constant checks and regular maintenance	2.0	7.0	6.0	51.0	34.0	4.08 ± 0.92
Machines regularly breakdown and are unavailable for use	2.0	4.0	25.0	52.0	17.0	3.78 ± 0.84
There are insufficient devices for the number of students in the school	1.0	22.0	14.0	51.0	12.0	3.51 ± 0.99
There is a shortage of equipment as	1.0	25.0	9.0	41.0	21.0	3.53 ±

Statement	*SDA	DA	N	A	SA	Mean ± SD
they are high-priced						1.14

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between unavailability of ICT equipment in schools and work experience of teachers

Barriers related to ICT equipment available in schools when assessed in relation with the work experience of teachers revealed the existence of a statistically significant relationship between them (p=0.02) (Table 4.16). The results revealed that as work experience of the respondents increased, the barriers related to ICT equipment also increased. Therefore, it can be inferred that the poor maintenance of ICT equipment, their unavailability to teachers and poor assistance provided to them regarding the equipment did not improve with their work experience.

Table 4.16: Cross-tabulation between unavailability of ICT equipment in schools and work experience of teachers

			Work experience				
			1 Year	2-5 Years	6-10 Years	More than 10	Total
Barriers related to ICT equipment	Strongly disagree	Count	0	0	0	0	0
		% within ICT equipment	0	0	0	0	0

			Work experience				
			1 Year	2-5 Years	6-10 Years	More than 10	Total
	Disagree	Count	1	0	0	0	1
		% within ICT equipment	100.0%	0.0%	0.0%	0.0%	100.0%
	Neutral	Count	2	7	10	10	29
		% within ICT equipment	6.9%	24.1%	34.5%	34.5%	100.0%
	Agree	Count	3	18	29	13	63
		% within ICT equipment	4.8%	28.6%	46.0%	20.6%	100.0%
	Strongly agree	Count	0	1	4	2	7
		% within ICT equipment	0.0%	14.3%	57.1%	28.6%	100.0%
Total		Count	6	26	43	25	100
		% within ICT equipment	6.0%	26.0%	43.0%	25.0%	100.0%
Chi square = 19.363, p = 0.02							

Lack of technical support for the ICT equipment

The lack of technical support for ICT equipment could be recognised to be a significant barrier in the integration and use of ICT in schools (Table 4.17). For example, the respondents indicated their agreement to several maintenance related issues, such as lack of maintenance (Mean=4.21 ± 0.72) and risks such as electricity spikes due to poor maintenance (Mean=3.71 ± 0.76). Assistance related issues were also uncovered by the study such as shortage of staff (Mean=3.68 ± 0.93), overworked staff (Mean=3.69 ± 0.78), insufficient planning by the institution for using the device (Mean=4.04 ± 0.86) and lack of technical support on the usage of devices (Mean=3.60 ± 0.81). In fact, the respondents agreed that their institutions forgot about the ICT devices after their installation (Mean=3.61 ± 0.82). Therefore, it can be seen that technical support for utilising the ICT devices as well as their maintenance needs to be improved by the schools for effective integration of ICT in classrooms.

Table 4.17: Lack of technical support for the ICT equipment

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
There is no institutional support regarding the planning and use of ICT	1.0	6.0	11.0	52.0	30.0	4.04 ± 0.86
My school does not have a well-staffed technical team	2.0	9.0	25.0	47.0	17.0	3.68 ± 0.93
Routine maintenance like dusting or scanning of the computers to remove virus are not regularly performed	0.0	4.0	6.0	55.0	35.0	4.21 ± 0.72

Statement	*SDA	DA	N	A	SA	Mean ± SD
The technicians are slow to respond to requests for assistance	0.0	5.0	18.0	48.0	29.0	4.01 ± 0.82
I do not receive adequate technical support on how to use the ICT devices	0.0	8.0	37.0	42.0	13.0	3.60 ± 0.81
The technical support staff are overworked	0.0	7.0	30.0	50.0	13.0	3.69 ± 0.78
There is no clear policy on maintenance of the ICT devices	0.0	12.0	27.0	52.0	9.0	3.58 ± 0.81
Technical support overlooks issues, such as electricity spikes and poor handling of the ICT devices by students	0.0	2.0	42.0	39.0	17.0	3.71 ± 0.76
The school does not regularly maintain even the simple assistive device, such as speakers and writing pads	0.0	29.0	25.0	38.0	8.0	3.25 ± 0.96
In my school, the devices are forgotten once they are purchased and installed.	1.0	13.0	16.0	64.0	6.0	3.61 ± 0.82

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between work experience of teachers and technical support offered to them

From Table 4.18 it is evident that the work experience of teachers possessed no statistically significant relationship with the technical support offered to them (p=0.508). Therefore it can

be inferred that respondents with low as well as high work experience experienced maintenance issues related to the ICT equipment and issues related to technical assistance for utilisation of the equipment while teaching students with intellectual disabilities.

Table 4.18: Cross-tabulation between work experience of teachers and technical support offered to them

			Adequate provision of technical support					**Total**
			***SDA**	**DA**	**N**	**A**	**SA**	
Experience	1 Year	Count	0	0	2	4	0	6
		% within experience	0	0.00%	33.30 %	66.70 %	0.00%	100.00 %
	2-5 Years	Count	0	0	8	17	1	26
		% within experience	0	0.00%	30.80 %	65.40 %	3.80%	100.00 %
	6-10 Years	Count	0	1	6	35	1	43
		% within experience	0	2.30%	14.00 %	81.40 %	2.30%	100.00 %
	More than 10	Count	0	0	10	15	0	25
		% within experience	0	0.00%	40.00 %	60.00 %	0.00%	100.00 %
Total		Count	0	1	26	71	2	100

		Adequate provision of technical support					Total
		*SDA	DA	N	A	SA	
	% within experience	0	1.00%	26.00 %	71.00 %	2.00%	100.00 %
	Chi square = 8.26, p=0.508						

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Barriers related to training needs of teachers

Results revealed that the respondents found training programmes to be crucial for effective use of ICT (Mean=4.25 ± 0.74), greater confidence (Mean=3.84 ± 0.81), better understanding of ICT equipment (Mean=3.69 ± 0.81) and for sharing their experiences with other teachers regarding utilisation of ICT in their classrooms (Mean=4.05 ± 0.79). The respondents also agreed that continuous training would help them to confront their anxiety and fear of using new equipment (Mean=3.84 ± 0.81) (Table 4.19). However, Figure 4.5 indicates that training was offered only to 29% of the respondents, thereby indicating that lack of training was a barrier for effective ICT integration.

Table 4.19: Barriers related to training needs of teachers

Statement	*SDA	DA	N	A	SA	Mean ± SD
ICT keeps on changing, but we hardly have regular training regarding the use of ICT in classroom	8.0	13.0	27.0	46.0	6.0	3.29 ± 1.03

Statement	*SDA	DA	N	A	SA	Mean ± SD
My school has not organised any training this year	1.0	12.0	35.0	41.0	11.0	3.49 ± 0.88
For effective use of ICT in school, teachers should be continuously trained on new equipment, techniques and approaches	0.0	3.0	9.0	48.0	40.0	4.25 ± 0.74
Training equips teachers with greater confidence and motivation to use ICT, but is not carried out regularly enough.	1.0	4.0	24.0	52.0	19.0	3.84 ± 0.81
Limited ICT skills, anxiety and fear of failure can be addressed by continuous training of teachers.	0.0	6.0	6.0	56.0	32.0	4.14 ± 0.77
Training offers the opportunity to mix with experts and other teachers and to share experiences which encourages me to use ICT	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79
Lack of ICT training for teachers can make them shy away from embracing ICT.	2.0	5.0	24.0	52.0	17.0	3.77 ± 0.86
In-house training on continuous basis	2.0	3.0	32.0	50.0	13.0	3.69 ±

Statement	*SDA	DA	N	A	SA	Mean ± SD
can improve my understanding of ICT equipment						0.81

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between work experience of teachers and their training needs

The need for ICT training programmes for teachers did not vary significantly among respondents of different work experience (p=0.164). That is, even respondents with a high work experience of >10 years felt the need for training in order to achieve greater efficiency, confidence and understanding of the ICT devices provided by the schools (Table 4.20). Hence, the importance of training for improving ICT integration in class rooms should be recognised by the schools.

Table 4.20: Cross-tabulation between work experience of teachers and their training needs

			Teacher related issues					Total
			*SDA	DA	N	A	SA	
Experience	1 Year	Count	0	1	2	3	0	6
		% within experience	0	16.70%	33.30%	50.00%	0.00%	100.00%
	2-5 Years	Count	0	0	6	18	2	26
		% within experience	0	0.00%	23.10%	69.20%	7.70%	100.00%

			Teacher related issues					Total
			*SDA	DA	N	A	SA	
	6-10 Years	Count	0	0	9	33	1	43
		% within experience	0	0.00%	20.90%	76.70 %	2.30%	100.0 0%
	More than 10	Count	0	1	8	16	0	25
		% within experience	0	4.00%	32.00%	64.00 %	0.00%	100.0 0%
Total		Count	0	2	25	70	3	100
		% within experience	0	2.00%	25.00%	70.00 %	3.00%	100.0 0%
		Chi square = 12.97, p=.164						

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Unwillingness of teachers to adopt ICT techniques

The study checked if the teachers were unwilling to adapt to the evolved teaching practices using ICT as unwillingness to adjust can form a barrier for ICT implementation in schools. However, the results revealed that the respondents appreciated the advantages of ICT integration as they disagreed that interactive teaching is not required for young students with disabilities (Mean=2.50 ± 1.12), that importance of ICT is being exaggerated (Mean=2.20 ± 1.08) and that ICT benefits can also be delivered by traditional teaching (Mean=2.25 ± 0.79). They exhibited willingness to incorporate the tools while teaching students with disabilities as they disagreed that they do not recognise the need for ICT tools (Mean=2.18 ± 1.18), that

traditional techniques allowed touch and feel learning which was better than ICT (Mean=2.40 ± 1.16) and that ICT was inconvenient as it consumed more preparation time (Mean=2.55 ± 0.97). The respondents also denied that they did not possess the skills for using computers and laptops (Mean=2.50 ± 1.07), that ICT makes students lazy (Mean=2.10 ± 0.81) and that ICT is needed only for those students with severe disabilities not for mild disabilities (Mean=2.25 ± 0.74). Therefore, it can be inferred that the unwillingness of teachers to adopt ICT techniques is not a barrier for implementation of ICT in the Saudi schools (Table 4.21).

Table 4.21: Unwillingness of teachers to adopt ICT techniques

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
I do not see the need of using these devices or techniques like PowerPoint slides while I can teach using my usual methods	32.0	43.0	5.0	15.0	5.0	2.18 ± 1.18
I can make an interactive lesson without necessary using ICT tools	20.0	40.0	10.0	20.0	10	2.60 ± 1.28
The traditional techniques of teaching make the students to feel and touch and learn better.	25.0	35.0	20.0	15.0	5.0	2.40 ± 1.16
I feel inconvenienced whenever am preparing lessons that require use of ICT because it is time consuming and	15.0	35.0	30.0	20.0	0.0	2.55 ± 0.97

Statement	*SDA	DA	N	A	SA	Mean ± SD
its benefits are minimal.						
I think using music, colours and images to create an interactive classroom is not suitable for a 16 years old student even with disability.	20.0	40.0	10.0	30.0	0.0	2.50 ± 1.12
I am poor at using the computer or laptops and besides it takes a lot of time, so I don't like using them.	15.0	45.0	20.0	15.0	5.0	2.50 ± 1.07
I believe that the importance of ICT is exaggerated	30.0	35.0	25.0	5.0	5.0	2.20 ± 1.08
ICT makes students lazy, therefore I like the traditional way.	40.0	30.0	10.0	20.0	0.0	2.10 ± 0.81
ICT benefits are small and they can be covered by the usual teaching, this means there is no need to stress the use of ICT in classrooms.	30.0	35.0	20.0	10.0	5.0	2.25 ± 0.79
The workload I have is already too much, I have no interest of again preparing lesson through ICT tools.	20.0	25.0	10.0	35.0	10.0	2.90 ± 0.88
I think ICT is meant for some students	30.0	35.0	20.0	10.0	5.0	2.25 ±

Statement	*SDA	DA	N	A	SA	Mean ± SD
with severe disabilities but not minor disabilities.						0.74

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between work experience of teachers and their unwillingness to adopt ICT techniques

From Table 4.22 it could be seen that the unwillingness of teachers to adopt ICT techniques while teaching varied significantly with their work experience (p=0.000). In the case of less experienced respondents (1 year), 16.7% exhibited unwillingness to adopt ICT practices while only 7.7% of the respondents with 2 to 5 years' experience exhibited unwillingness. This finding implies that with experience, teachers recognised the need for interactive teaching and its benefits when compared to traditional teaching while dealing with students with intellectual disabilities. However, teachers with 6 to 10 years of experience (27.9%) exhibited even more unwillingness than the less experienced respondents (16.7%), probably because they experienced difficulties in adapting to a new methodology of teaching, having spent several years teaching through traditional methods. The level of unwillingness however decreased among teachers with >10 years of experience (16%), thereby suggesting that the respondents accepted ICT techniques with time. In summary, the teachers exhibited more willingness to alter their pedagogy based on ICT devices as their years of experience with the students with intellectual disabilities increased.

Table 4.22: Cross-tabulation between work experience of teachers and their unwillingness to adopt ICT techniques

			Unwillingness to adopt ICT techniques					**Total**
			***SDA**	**DA**	**N**	**A**	**SA**	
Experience	1 Year	Count	5	0	0	1	0	6
		% within experience	83.3%	0.0%	0.0%	16.7%	0	100.0%
	2-5 Years	Count	1	21	2	2	0	26
		% within experience	3.8%	80.8%	7.7%	7.7%	0	100.0%
	6-10 Years	Count	23	1	7	12	0	43
		% within experience	53.5%	2.3%	16.3%	27.9%	0	100.0%
	More than 10	Count	1	8	12	4	0	25
		% within experience	4.0%	32.0%	48.0%	16.0%	0	100.0%
Total		Count	30	30	21	19	0	100
		% within experience	30.0%	30.0%	21.0%	19.0%	0	100.0%
		Chi square = 76.57, p=0.000						

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Non-availability of educational software in Arabic

The study assessed whether the non-availability of ICT tools in native Arabic language was a barrier towards the implementation of ICT tools and devices in the Saudi schools (Table 4.23). The respondents agreed that content was a critical aspect while utilising ICT tools (Mean = 4.22 ± 0.62) but most of the software operated in English, not Arabic (Mean=3.84 ± 0.81) due to the lack of software experts in the KSA (Mean=3.70 ± 0.90). According to the respondents, the schools expected them to teach the students in Arabic medium (Mean=3.70 ± 0.78), yet the Ministry of education failed to take measures to develop Arabic software (Mean=3.93 ± 0.81) and the schools lacked strategy in the acquisition of appropriate software for students with disabilities (Mean=3.98 ± 0.75). Even though a few tools were available in Arabic, the respondents were not satisfied as they were not relevant to their teaching content (Mean=4.05 ± 0.79) Overall, it can be inferred that the availability of educational software in Arabic should be improved in order to ease the process of ICT integration in teaching students with intellectual disabilities.

Table 4.23: Non-availability of educational software in Arabic

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
Most of the educational software on the market is English dominated and this causes a problem to them particularly when teaching young students with language disability	1.0	4.0	24.0	52.0	19	3.84 ± 0.81

Statement	*SDA	DA	N	A	SA	Mean ± SD
Content is very critical in effective use of ICT but many software on the market are not in Arabic	0.0	1.0	8.0	59.0	32.0	4.22 ± 0.62
Although some content is available in Arabic, it is of little relevance to my teaching because the content was developed in foreign countries	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79
It appears that we have few software experts who are interested in developing software for children with disabilities in this country, because they are not many software available in Arabic	2.0	6.0	23.0	49.0	20.0	3.70 ± 0.90
We are expected to teach using Arabic software, yet the school does not provide adequate software for this.	1.0	3.0	35.0	47.0	14.0	3.70 ± 0.78
The Ministry of Education has done little in providing teachers with enough computer programmes in Arabic that can be used in teaching of students	1.0	4.0	19.0	53.0	23.0	3.93 ± 0.81

Statement	*SDA	DA	N	A	SA	Mean ± SD
with disabilities.						
Despite the efforts that the schools have put in, there is clearly lack of strategic acquisition of Arabic software that can be used to meet the objective of use of ICT in schools	1.0	3.0	14.0	61.0	21.0	3.98 ± 0.75

*SDA: Strongly disagree; SD: disagree ; N: Neutral; A: Agree; SA: Strongly agree

Relationship between software unavailability and teachers' work experience

No statistically significant (p=0.301) differences were found among respondents with different years of work experience regarding their need for ICT software in native Arabic language (Table 4.24). That is, non-availability of relevant software in Arabic was perceived to be a barrier towards ICT integration in schools by respondents with low as well as high work experience.

Table 4.24: Cross-tabulation between software unavailability and teachers' work experience

			Software availability					Total
			*SDA	DA	N	A	SA	
Experience	1 Year	Count	0	1	2	3	0	6
		% within experience	0	16.7%	33.3%	50.0%	0.0%	100.0%

			Software availability					Total
			*SDA	DA	N	A	SA	
	2-5 Years	Count	0	0	7	14	5	26
		% within experience	0	0.0%	26.9%	53.8%	19.2%	100.0%
	6-10 Years	Count	0	1	5	31	6	43
		% within experience	0	2.3%	11.6%	72.1%	14.0%	100.0%
	More than 10	Count	0	1	6	16	2	25
		% within experience	0	4.0%	24.0%	64.0%	8.0%	100.0%
Total		Count	0	3	20	64	13	100
		% within experience	0	3.0%	20.0%	64.0%	13.0%	100.0%
		Chi square = 10.63, p= .301						

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Insufficient external funds for ICT implementation in schools

The study assessed if financial barriers existed in incorporating ICT techniques by schools (Table 4.25) and discovered that ICT tools developed for students with disabilities came at a very high cost (Mean=4.09 ± 0.87) and that the schools did not have sufficient funds to afford them (Mean=4.08 ± 0.92). Even though the government assisted the schools with funds, they

were found to be insufficient (Mean=3.78 ± 0.84), which in turn meant non-availability of the most relevant ICT programmes to the students as they were expensive (Mean=3.69 ± 0.81). Therefore, it could be seen that it was necessary for the government as well as the schools to allocate more funds towards ICT integration to promote enhanced learning for students with disabilities.

Table 4.25: Insufficient external funds for ICT implementation in schools

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
The cost of ICT required to assist students with disabilities particularly those with severe disabilities is too high since they require tailor-made assistive technology.	1.0	6.0	10.0	49.0	34.0	4.09 ± 0.87
Though funding of ICT can be obtained from other sources apart from the government, these funds are not adequate.	2.0	7.0	6.0	51.0	34.0	4.08 ± 0.92
The government has tried to provide enough funds, but the amounts required are always increasing and there not enough since ICT tools are costly	2.0	4.0	25.0	52.0	17.0	3.78 ± 0.84

Statement	*SDA	DA	N	A	SA	Mean ± SD
One reason why ICT use lacks behind in this school is because little budget is given to educational software and this means not using some programmes that are very important for class work.	2.0	3.0	32.0	50.0	13.0	3.69 ± 0.81

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between insufficient external funds and work experience of teachers

The results (Table 4.26) displayed the absence of a statistically significant relationship between insufficient external funds and work experience of teachers (p=0.241). The respondents with <1 year as well as >10 years of work experience reported of financial barriers towards ICT implementation in schools such as insufficient government funding, which made it impossible for the schools to be able to afford the expensive ICT devices.

Table 4.26: Cross-tabulation between insufficient external funds and work experience of teachers

				Insufficient external funds				Total
			*SDA	DA	N	A	SA	
Experience	1 Year	Count	0	1	1	4	0	6
		% within experience	0	16.7%	16.7%	66.7%	0.0%	100.0%

				Insufficient external funds				Total
			*SDA	DA	N	A	SA	
	2-5 Years	Count	0	0	7	16	3	26
		% within experience	0	0.0%	26.9%	61.5%	11.5%	100.0%
	6-10 Years	Count	0	1	8	29	5	43
		% within experience	0	2.3%	18.6%	67.4%	11.6%	100.0%
	More than 10	Count	0	0	9	15	1	25
		% within experience	0	0.0%	36.0%	60.0%	4.0%	100.0%
Total		Count	0	2	25	64	9	100
		% within experience	0	2.0%	25.0%	64.0%	9.0%	100.0%
		Chi square = 11.53, p = .241						

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Insufficient school budget as a barrier for ICT implementation

The study checked if the budget allocated by schools did not meet the requirements for implementation of ICT in classrooms (Table 4.27). It was found that individualised programmes for students with disabilities (Mean=4.05 ± 0.79), trainings, workshops and maintenance of ICT devices (Mean=3.84 ± 0.81) and provision of devices for every student

(Mean=3.71 ± 0.91) involved high cost of expenditure. The respondents agreed that even though the schools understood the need for ICT integration and tried to ensure availability of ICT devices for all students, even those with severe disabilities, they did not succeed due to insufficient school budget (Mean=3.84 ± 0.81).

Table 4.27: Insufficient school budget as a barrier for ICT implementation

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
Some student with disabilities requires individualised programmes and special ICT tools and the school do not have such a budget.	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79
Financial constraints are among the major barrier to the school in acquiring ICT devices to students	1.0	12.0	35.0	41.0	11.0	3.49 ± 0.88
Though the schools understand the importance of ICT use for student with disabilities, the school does not enough to purchase specialised ICT for each of the students.	0.0	3.0	9.0	48.0	40.0	4.25 ± 0.74
There are many activities that entail ICT use, for example, in-house training, workshops, maintenance, and	1.0	4.0	24.0	52.0	19.0	3.84 ± 0.81

Statement	*SDA	DA	N	A	SA	Mean ± SD
these all requires money, but the school has no budget for all these.						
Though the schools try to ensure that it gets ICT devices for each student even those with severe disabilities, it has not fully managed this because of the limited funds.	2.0	8.0	24.0	49.0	17.0	3.71 ± 0.91
The government is not quick to respond to the financial needs of the schools, due to the bureaucracy involved.	0.0	8.0	37.0	42.0	13.0	3.60 ± 0.81

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Relationship between insufficient school budget and work experience of teachers

The absence of statistically significant differences in this case implies that insufficient school budget affected all the respondents in spite of their work experience (p=0.354). Insufficient budget allocation by schools towards training and workshops for students with disabilities, maintenance of ICT device and provision of individual devices for all students had similar effects on all the teachers in spite of their work experience and acted as barriers towards successful ICT integration (Table 4.28).

Table 4.28: Cross-tabulation between insufficient school budget and work experience of teachers

			Insufficient school budget					Total
			*SDA	DA	N	A	SA	
Experience	1 Year	Count	0	1	3	2	0	6
		% within experience	0	16.7%	50.0%	33.3%	0.0%	100.0 %
	2-5 Years	Count	0	0	8	16	2	26
		% within experience	0	0.0%	30.8%	61.5%	7.7%	100.0 %
	6-10 Years	Count	0	1	9	29	4	43
		% within experience	0	2.3%	20.9%	67.4%	9.3%	100.0 %
	More than 10	Count	0	1	10	13	1	25
		% within experience	0	4.0%	40.0%	52.0%	4.0%	100.0 %
Total		Count	0	3	30	60	7	100
		% within experience	0	3.0%	30.0%	60.0%	7.0%	100.0 %
		Chi square = 9.951, p = .354						

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Development of ICT utilisation in schools

The study aimed to identify the most important factors contributing to the overall development of ICT utilisation in schools of Saudi Arabia. The assessment was carried out under eight major factors such as continuous training of teachers, need for educational resources, need for financial support, etc., that will help the schools in implementing successful ICT integration programmes.

Perspective of teachers on ICT practices

Providing the teachers with information on ICT (Mean=3.69 ± 0.78), educating them in culturally adapting to ICT utilisation (Mean=3.77 ± 0.85) and in using ICT in spite of constraints placed by their religion (Mean=3.93 ± 0.81) are important steps to be taken for improving the success of ICT integration. Redirecting their teaching practices from past methods (Mean=4.14 ± 0.58), helping them to form the right perceptions of ICT (Mean=3.98 ± 0.75), to develop positive views towards ICT integration (Mean=4.05± 0.79) and instilling the right beliefs in them (Mean=3.79 ± 0.90) should also be carried out for enhanced effectiveness of ICT utilisation in schools (Table 4.29).

Table 4.29: Perspective of teachers on ICT practices

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
Providing teachers with the right information regarding ICT will enhance use of ICT.	0.0	7.0	30.0	50.0	13.0	3.69 ± 0.78

Statement	*SDA	DA	N	A	SA	Mean ± SD
Culture can hinder the use of ICT and therefore teachers need to be educated on need of adopting culture that promotes use of ICT.	0.0	5.0	35.0	38.0	22.0	3.77 ± 0.85
Past experiences and beliefs acts as barriers to ICT use and teachers have to be given new experiences and beliefs to embrace ICT.	0.0	1.0	8.0	67.0	24.0	4.14 ± 0.58
Perceptions can significantly influence acceptance of ICT by teachers, there is need to have the right knowledge to form correct perceptions.	1.0	3.0	14.0	61.0	21.0	3.98 ± 0.75
With right information teachers will have positive views towards the integration of ICT in their teaching.	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79
The key element towards use of ICT is instilling the right beliefs and attitudes, and this has to be done for those who have little knowledge on use of ICT.	2.0	6.0	23.0	49.0	20.0	3.79 ± 0.90
Some teachers believe that use of ICT	1.0	3.0	35.0	47.0	14.0	3.70 ±

Statement	*SDA	DA	N	A	SA	Mean ± SD
has negative outcomes on students, such teachers have to be told clearly they is need to use ICT						0.78
Some teachers use religion to resist the use of ICT, and therefore the school should handle such cases to increase the success of ICT	1.0	4.0	19.0	53.0	23.0	3.93 ± 0.81

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Continuous training for teachers

Continuous training of teachers with the help of experts is crucial for equipping them with new techniques (Mean=3.68 ± 0.93) and to help them overcome the fear of teachers in adopting ICT techniques (Mean=4.14 ± 0.77). The respondents agreed that training will help them in enhancing their pedagogy (Mean=4.21 ± 0.72), motivation and self-confidence (Mean=4.01 ± 0.82) and sharpens their skills (Mean=4.25 ± 0.74), which in turn will improve their hold on ICT techniques (Table 4.30).

Table 4.30: Providing continuous training for teachers

Statement	*SDA	DA	N	A	SA	Mean ± SD
Continuous training will equip teachers with new techniques and skills, hence	2.0	9.0	25.0	47.0	17.0	3.68 ±

Statement	*SDA	DA	N	A	SA	Mean ± SD
make them better ICT users.						0.93
Through continuous training, teachers will be able to enhance their pedagogy and thereby successful use ICT	0.0	4.0	6.0	55.0	35.0	4.21 ± 0.72
One way of improving the motivation and self-confidence was through regular training which will lead to better ICT implementation.	0.0	5.0	18.0	48.0	29.0	4.01 ± 0.82
When the schools organises regular training such as workshops, teachers are able to understand better why they should use ICT	1.0	12.0	35.0	41.0	11.0	3.49 ± 0.88
Training is important since it sharpens the skills of teachers and give them first-hand experience	0.0	3.0	9.0	48.0	40.0	4.25 ± 0.74
If the school wants teachers to be effective, it has to ensure that it brings regular experts for training on ICT.	1.0	4.0	24.0	52.0	19.0	3.84 ± 0.81
Apart from skills development, training is necessary to remove the fears teach	0.0	6.0	6.0	56.0	32.0	4.14 ± 0.77

Statement	*SDA	DA	N	A	SA	Mean ± SD
have and offer knowledge support.						

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Providing ICT devices for each teacher

Table 4.31 summarises the perceptions of the teachers with regard to the provision of ICT devices for their use. The respondents expressed that provision of ICT devices for teachers was an important factor governing the success of ICT integration (Mean=4.22 ± 0.67). They agreed that every teacher should be equipped with devices (Mean=3.77 ± 0.86) for addressing the needs of students effectively (Mean=4.05 ± 0.79) and for addressing the special needs of students with intellectual disabilities (Mean=4.22 ± 0.62). The respondents felt that their quality of teaching would improve if they did not have to share the devices with their colleagues (Mean=4.10 ± 0.73) and that they would be able to embrace the use of ICT in a better manner if provided with their own devices (Mean=3.79 ± 0.90).

Table 4.31: Providing ICT devices for each teacher

Statement	*SDA	DA	N	A	SA	Mean ± SD
Devices are important elements in teaching of ICT in mainstream schools and this will go a great way in improving ICT teaching in these schools	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79

Statement	*SDA	DA	N	A	SA	Mean ± SD
Equipping each teacher will be a great way of assisting students with special needs and the normal ones in use of ICT.	2.0	5.0	24.0	52.0	17.0	3.77 ± 0.86
Lack of ICT devices hinders successful use of ICT in mainstream schools, providing these devices will solve these problems.	0.0	4.0	2.0	62.0	32.0	4.22 ± 0.67
The devices will allow teachers to address the needs of students in an effective manner.	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79
With the right devices for each teacher, they will be encouraged to take in students with special needs.	0.0	1.0	8.0	59.0	32.0	4.22 ± 0.62
When teachers are provided with devices sharing will end and this means improved teaching using ICT devices.	0.0	2.0	16.0	52.0	30.0	4.10 ± 0.73
Teachers in mainstream schools will embrace more use of ICT when they are each provided with devices.	2.0	6.0	23.0	49.0	20.0	3.79 ± 0.90

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Need for including ICT in preparation programmes for teachers

Preparedness programmes using ICT for teachers as they are the main players in enabling ICT integration (Mean=3.70 ± 0.78) and training with various tools of ICT (Mean=3.93 ± 0.81) will help to improve skills and competencies (Mean=4.21 ± 0.72) and to reduce their negative perceptions on ICT (Mean=3.68 ± 0.93). Therefore, it was emphasised by the respondents that training programmes for teachers should include ICT in order to improve the overall utilisation of ICT in schools. The perceptions of the teachers with regard to the need for including ICT in preparation programmes for teachers are summarised in Table 4.32.

Table 4.32: Need for including ICT in preparation programmes for teachers

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ±**
Teachers remain main players in ICT programmes should be included in their preparedness programmes to enhance their contributions	1.0	3.0	35.0	47.0	14.0	3.70 ± 0.78
The training of teachers should as well incorporate use of ICT to enable these teachers be equipped well for future use of ICT.	1.0	4.0	19.0	53.0	23.0	3.93 ± 0.81
when teachers are trained in ICT at their colleges and universities they will have a better understanding of teaching using ICT.	1.0	28.0	9.0	41.0	21.0	3.53 ± 1.14

Statement	*SDA	DA	N	A	SA	Mean ±
Training of teachers on ICT is necessary and very important; therefore, including ICT in preparation programmes will enhance ICT skills among teachers.	1.0	6.0	11.0	52.0	30.0	4.04 ± 0.86
Including ICT in teachers 'preparedness reduces the negative perceptions they have about use of ICT.	2.0	9.0	25.0	47.0	17.0	3.68 ± 0.93
Technological skills and competences are key to use of ICT, and if ICT is included in teachers' preparedness, their skills and competences will be sharpened.	0.0	4.0	6.0	55.0	35.0	4.21 ± 0.72
Teachers will be better prepared to use ICT when their preparations start at their training.	0.0	5.0	18.0	48.0	29.0	4.01 ± 0.82
This will be a good strategy of improving the overall use of ICT in schools.	0.0	8.0	37.0	42.0	13.0	3.60 ± 0.81

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Need for educational resources

The respondents agreed that ICT resources in Arabic language will motivate the teachers to use ICT (Mean= 3.91 ± 0.80), enhance the learning of students (Mean=3.71 ± 0.91), make it possible to address the individual needs of students (Mean=3.60 ± 0.81) and enhance language learning among students (Mean=3.69 ± 0.18). Table 4.33 summarises the perceptions of the teachers concerning the need for educational resources.

Table 4.33: Need for educational resources

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
Provision of enough resources in Arabic will motivate teachers in using ICT devices	1.0	4.0	19.0	55.0	21.0	3.91 ± 0.80
When each student is provided with his/her learning device, and Arabic software, they learn better and even teachers have an easy time.	2.0	8.0	24.0	49.0	17.0	3.71 ± 0.91
If we have many Arabic software, teachers will be able to address the individual needs of each student.	0.0	8.0	37.0	42.0	13.0	3.60 ± 0.81
Enough Arabic software will highly enhance language learning and among students.	0.0	7.0	30.0	50.0	13.0	3.69 ± 0.18

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Need for Internet access

The role of Internet access in developing the extent of ICT integration was assessed by the study. The respondents agreed that for effective use of ICT, Internet connection with high speed (Mean=3.77 ± 0.85) and 24/7 connectivity (Mean=4.14 ± 0.58) was required. It was also agreed that the Internet connection will help the teachers to reduce the time spent on preparing lessons (Mean=3.76 ± 0.78) as well as access their study resources from anywhere (Mean=4.14 ± 0.58). The perceptions of the teachers regarding the need for Internet access are summarised in Table 4.34.

Table 4.34: Need for Internet access

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
There is need to have a reliable Internet connection with high speed for effective use of ICT particularly where online teaching is concerned	0.0	5.0	35.0	38.0	22.0	3.77 ± 0.85
In modern days' Internet is required 24/7 and the school boards together with the head teacher has to ensure this for smooth running of ICT	0.0	1.0	8.0	67.0	24.0	4.14 ± 0.58
With good Internet connection, teacher can take their teaching	1.0	4.0	36.0	45.0	14.0	3.67 ± 0.80

Statement	*SDA	DA	N	A	SA	Mean ± SD
lesson and other teaching resources with them and access them later from the school's server.						
Mobile computing make a great change in the way ICT is integrated in lessons such as mathematics and therefore Internet connection should be stressed.	2.0	14.0	35.0	39.0	10.0	3.41 ± 0.92
Efficient Internet connection will reduce time and thereby motivate teachers to use ICT.	1.0	9.0	12.0	69.0	9.0	3.76 ± 0.78
If we have more technical support to ensure that networking and Internet connection works perfectly, we will achieve much more in use of ICT.	0.0	12.0	27.0	52.0	9.0	3.58 ± 0.81

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Financial support to schools for ICT integration

The study identified that proper strategies formed by the government to assist the schools (Mean=3.71 ± 0.76) and sufficient funds from the government (Mean=3.71 ± 0.91) are important to ensure the success of ICT integration in schools (Table 4.35).

Table 4.35: Financial support to schools for ICT integration

Statement	***SDA**	**DA**	**N**	**A**	**SA**	**Mean ± SD**
To develop ICT use in this school, the government should have a proper strategy of financing the school to get enough and decent ICT devices.	0.0	2.0	42.0	39.0	17.0	3.71 ± 0.76
Proper budgeting should be done to buy the most used ICT devices and not just big computer.	0.0	29.0	25.0	38.0	8.0	3.25 ± 0.96
Proper framework towards equipping ICT in the school should be followed by enough funds from the government.	2.0	8.0	24.0	49.0	17.0	3.71 ± 0.91
Integrating ICT into school teaching and learning demand a high budget and this calls for sufficient funding from the government and other players.	0.0	8.0	37.0	42.0	13.0	3.60 ± 0.81
Sufficient funds are important in ensuring that ICT is successfully	0.0	7.0	30.0	50.0	13.0	3.69 ± 0.78

Statement	*SDA	DA	N	A	SA	Mean ± SD
implemented at school by purchasing required devices.						

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Incorporation of ICT in the school curriculum

The respondents expressed that the inclusion of ICT in the mainstream curriculum of students should be ensured at every level in order to increase the seriousness of learning using ICT (Mean=4.14 ± 0.58), to ensure that the objectives of ICT have been achieved (Mean=4.08 ± 0.92). It was also revealed that the inclusion of ICT in the student curriculum will ease the planning of lessons by teachers (Mean=3.78 ± 0.84) and help in planning lessons according to the needs of the individual students (Mean=3.77 ± 0.86). The respondents also agreed that the ICT curriculum should be reviewed regularly to meet the needs of special students (Mean=4.25 ± 0.74). The perceptions of the teachers regarding the incorporation of ICT in the school curriculum are summarised in Table 4.36.

Table 4.36: Incorporation of ICT in the school curriculum

Statement	*SDA	DA	N	A	SA	Mean ± SD
To enhance use of ICT in the classrooms it is important to include it in the curriculum to create enough time of teachers.	0.0	5.0	35.0	38.0	22.0	3.77 ± 0.85

Statement	*SDA	DA	N	A	SA	Mean ± SD
To increase the seriousness of which teachers treat ICT learning, the ministry of education has focus on strengthening ICT in special education curriculum.	0.0	1.0	8.0	67.0	24.0	4.14 ± 0.58
Putting ICT in the curriculum will ensure that it achieves its objectives.	2.0	7.0	6.0	51.0	34.0	4.08 ± 0.92
Putting ICT lessons in curriculum will help teachers in lesson planning.	2.0	4.0	25.0	52.0	17.0	3.78 ± 0.84
It is necessary to treat ICT as part of mainstream lessons hence included in curriculum.	2.0	3.0	32.0	50.0	13.0	3.69 ± 0.81
Having specific lesson formally in the curriculum will help teachers to treat ICT lessons with more seriousness.	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79
Additional resources in forms of devices and funds will be	1.0	12.0	35.0	41.0	11.0	3.49 ± 0.88

Statement	*SDA	DA	N	A	SA	Mean ± SD
allocated more when the ICT lessons are integrated in school curriculum.						
ICT curriculum should be reviewed on regularly to update the educational needs of students with disabilities.	0.0	3.0	9.0	48.0	40.0	4.25 ± 0.74
By putting ICT in school curriculum it will be easy to develop suitable lessons that match individual needs of the students."	2.0	5.0	24.0	52.0	17.0	3.77 ± 0.86
The ministry has to support use of ICT by including it in school curriculum at every level.	2.0	3.0	32.0	50.0	13.0	3.69 ± 0.81
The importance aspect of curriculum is planning, so ICT lessons will be well planned when in the curriculum."	0.0	2.0	23.0	43.0	32.0	4.05 ± 0.79
Inclusion of ICT lessons in the	1.0	12.0	35.0	41.0	11.0	3.49 ±

Statement	*SDA	DA	N	A	SA	Mean ± SD
school curriculum will address the interests of students.						1.03

*SDA: Strongly disagree; SD: disagree; N: Neutral; A: Agree; SA: Strongly agree

Reliability Analysis

Reliability signifies the consistency of measurements or of a measuring questionnaire that is employed to describe a test. Reliability is inversely associated with random error, implying that random error is low where reliability is high. That is, it is the degree of homogeneity to generate comparable outcomes on recurring trials. In general, internal consistency is assessed by means of a reliability coefficient of Cronbach's alpha (Cronbach, 1951).

Reliability analysis using Cronbach's alpha was carried out in order to assess the internal consistency of the scale used in the questionnaire (Ritchie & Lewis, 2003). In general, it has been reported that when a large number of items used by the questionnaire exhibit covariance, the internal consistency of the questionnaire increases. Cronbach's alpha values close to 1 indicate good internal consistency of the scale used, i.e., the scope of replication of the study is high. With increasing values of Cronbach's alpha, the extent of correlation between the items included in the questionnaire also increases. In the present study, all the items that exhibited Cronbach's value of >0.5 were classified as acceptable (Hinton et al., 2014).

Reliability test for teachers' perceptions of using ICT

Reliability analysis was carried out with respect to the 42 items governing teachers' perceptions of ICT utilisation (Table 4.37). The items were grouped into three categories. The

analysis revealed Cronbach's alpha value to be > 0.6 with respect to all the items, indicating that all the items were worthy of retention (Hinton et al., 2014).

Table 4.37: Reliability test for teachers' perceptions of using ICT for students with Intellectual Disabilities

	Cronbach's Alpha	**Number of Items**
Perception of the concept of ICT	.830	11
Perceptions of advantages of ICT	.844	18
Perception of disadvantages of ICT	.663	13

Reliability test for barriers encountered by teachers in using ICT

The reliability test carried out for the barriers encountered by teachers in using ICT in the work environment displayed high Cronbach's value ranging from 0.705 to 0.941 with respect to the 67 items, grouped under 7 constructs, thereby indicating the high reliability of the scale used in the study (Table 4.38).

Table 4.38: Reliability test for barriers encountered by teachers in using ICT

	Cronbach's Alpha	**Number of Items**
Barriers encountered in work environment	.824	13
Lack of ICT equipment	.719	10
Lack of technical support	.606	10
Barriers related to training needs of teachers	.941	19

	Cronbach's Alpha	Number of Items
Unwillingness of teachers to adopt ICT techniques	.835	7
Non-availability of educational software in Arabic	.705	2
Insufficient school budget	.752	6

Reliability test for factors contributing to the development of ICT utilisation

The Cronbach's alpha value of the need for continuous training was 0.581, thereby suggesting lower covariance of the construct when compared to the other three constructs which exhibited Cronbach's alpha values >0.8. However, based on Hinton et al. (2014), all the constructs with Cronbach's alpha value of >0.5 were retained by the study (Table 4.39).

Table 4.39: Reliability test for factors contributing to the development of ICT utilisation

	Cronbach's Alpha	Number of Items
Perspective of teachers on ICT practices	.814	8
Continuous training for teachers	.581	7
Providing ICT devices for each teacher	.835	7
Need for including ICT in preparation programmes for teachers	.929	35

Correlation between determinants of ICT utilisation

The relationship between factors contributing to the development of ICT integration in schools was assessed using Pearson's correlation. The 'r' value obtained from Pearson's correlation indicated strength as well as the direction of relationship between variables. While r=0 indicates the absence of linear relationship between variables, values ranging from 0.1 to 0.3 indicate minimal correlation, 0.3 to 0.5 indicate medium level of correlation, and r values >0.5 indicate the presence of strong correlation between the variables (Cohen, 1998).

Pearson's correlation of barriers encountered by teachers in using ICT

The barriers encountered by teachers in work environment exhibited strong positive correlations (r>0.5) with all the other barriers analysed by the study except for teacher training related issues (r=0.428**). Among them, insufficient school budget for the provision of ICT devices exhibited the strongest correlation (r=0.919**) followed by need for software in native Arabic language (r=0.913**), suggesting that shortage of devices and unavailability of specialised ICT devices for students due to insufficient school budget as well as lack of ICT assistive devices in Arabic language were the biggest barriers faced by the teachers in their work environment.

The strong correlations exhibited by lack of software available in schools with high cost of software (r=0.820**) and insufficient school budget (r=0.923**) suggest that the reason for the inability of schools to procure ICT software in Arabic is chiefly financial.

The teacher training related barriers exhibited a strong positive correlation only with lack of ICT equipment in schools (r=0.524**) while it exhibited medium level of correlation with the other barriers included in the study (r=0.3 to 0.5). This suggests that the presence of obsolete ICT instruments in schools, poor maintenance of instruments and their inadequacy in number

affects the quality of training programmes for teachers regarding ICT utilisation. Results also suggest that lack of software in Arabic (r=0.457**), high cost of relevant software (r=0.466**), insufficient school budget (r=0.465**), inadequate provision of technical support (r=0.426**) and other barriers encountered in work environment (r=0.428**) also affect the effectiveness of training programmes for teachers.

Table 4.40 presents the findings from the Pearson's correlation test conducted on the barriers encountered by teachers in using ICT.

Table 4.40: Pearson's correlation of barriers encountered by teachers in using ICT

	Work environment barriers	**Barriers related to ICT equipment**	**Lack of technical support**	**Training needs of teachers**	**Non-availability of educational software in Arabic**	**Insufficient external funds**	**Insufficient school budget**
Work environment barriers	1						
Barriers related to ICT equipment	.798***	1					
Lack of technical	.831***	.745***	1				

	Work environment barriers	**Barriers related to ICT equipment**	**Lack of technical support**	**Training needs of teachers**	**Non-availability of educational software in Arabic**	**Insufficient external funds**	**Insufficient school budget**
support							
Training needs of teachers	.428**	.524**	.426**	1			
Non-availability of educational software in Arabic	.913**	.830**	.738**	.457**	1		
Insufficient external funds	.780**	.890**	.712**	.466**	.820**	1	
Insufficient school budget	.919**	.840**	.782**	.465**	.923**	.827**	1
**. Correlation is significant at the 0.01 level (2-tailed).							

Pearson's correlation of factors contributing to the development of ICT use in schools

The factors contributing to development of teaching practices using ICT in schools were found to exhibit strong positive correlations with each other (Table 4.41). Providing the teachers individually with ICT devices (r=0.874**), including ICT in teacher training programmes (0.941**) and offering them continuous training on ICT practices (r=0.778**) influence the perspective of teachers in a strong positive way, i.e., these three factors help the teachers in developing the right beliefs, knowledge, perspective and attitude towards the usage of ICT devices for students with intellectual disabilities. Provision of ICT devices to the teachers was found to be strongly and positively correlated with continuous training (r=0.761**). That is, provision of individual ICT devices is important for the teachers to equip themselves with new ICT techniques, to enhance their pedagogy, motivation, self-confidence and skillsets through training programmes.

Table 4.41: Pearson's correlation of factors contributing to the development of ICT integration

	Perspective of teachers	**Continuous training**	**ICT devices**	**Preparation programmes**
Perspective of teachers on ICT practices	1			
Continuous training for teachers	.778**	1		
Providing ICT devices for each teacher	.874**	.761**	1	

Including ICT in teacher preparation programmes	.941**	.857**	.837**	1
**. Correlation is significant at the 0.01 level (2-tailed).				

Summary of Quantitative Results

The quantitative results showed that a majority of the respondents belonged to the age group of 26 to 30 years, possessed a Bachelor of Arts degree, had a minimum work experience of 2 years with students with intellectual disabilities and possessed moderate experience with ICT utilisation. Also, it was found that most of the schools recognised the need for ICT, yet failed to offer training programmes to the respondents regarding ICT utilisation. It was also revealed that the schools in the KSA still adopted the traditional methods of teaching and did not provide substantial access to ICT tools for students with disabilities.

The perceptions of respondents regarding the concept of ICT, its advantages and disadvantages were analysed. It was found that the respondents perceived ICT to be a software intended to facilitate easy understanding of course material for students with disabilities. It was inferred that the respondents experienced a range of advantages as a result of ICT integration in teaching students with intellectual disabilities and also reported disadvantages such as technological hitches and excessive time involved for preparation of lessons.

The barriers encountered by the teachers and schools for successful implementation of ICT were studied. All the barriers except for unavailability of ICT equipment and unwillingness of teachers to adopt ICT techniques in schools were encountered by respondents with all levels of work experience. It was also found that the respondents perceived more advantages of

using ICT as their number of years with ICT utilisation increased. The discussion of the findings is presented in the next chapter.

CHAPTER 5: DISCUSSION

The previous chapter presented the findings from the data gathered during the course of the two phases of the study. A total of fifteen teachers were interviewed and 100 teachers completed the questionnaire. The data gathered from teachers provided a clear picture of the current status of ICT use in Saudi primary schools with students with intellectual disabilities. The purpose of this chapter is to discuss the findings from the qualitative and quantitative phases of the study in the light of extant literature, as applicable.

The results of the qualitative phase are discussed in the following section.

5.1 Phase 1 – Discussion of Qualitative Results

The qualitative phase of the study entailed interviews with fifteen special education teachers who work with students with intellectual disabilities in mainstream primary schools in Jeddah, Saudi Arabia. The purpose of the interviews was to gain insights into their perceptions and awareness with regard to the use of ICT with such students.

The aim of this section is to gain an in-depth understanding of the experiences of special education teachers with regard to the use of ICT with students with intellectual disabilities in the KSA by comparing the findings of the present study with extant literature. The discussion of the perceptions of the teachers associated with the first research question is presented in the next section.

5.1.1 Teachers' perceptions in using ICT for students with Intellectual Disabilities

This subsection addresses the areas explored in relation to the research question: What the participating teachers perceived with regard to the use of ICT for students with intellectual disabilities. Overall, it could be seen that the special education teachers understood the notion

of ICT and were aware of the advantages and disadvantages of its use in education, in general, and with students with intellectual disabilities, in particular. The following section discusses the perceptions of the teachers associated with the first theme.

5.1.1.1 Theme 1: Perceptions of ICT Concept

In general, awareness of what is signified by ICT and its uses from the perspective of education are necessary to facilitate its successful integration into the education of students with or without disabilities. Moreover, if teachers have negative or unfavourable perceptions of ICT then they can obstruct the implementation and utilisation of ICT in their schools. Furthermore, teachers' unfavourable perceptions may impact the beneficial learning outcomes which are anticapated due to the use of ICT in education (Demetriadis et al., 2003).

The present study found that the interviewed teachers sufficiently understood the notion of ICT use in education. Moreover, this awareness of ICT could be seen across the participating schools in the Jeddah region. Furthermore, some of the younger teachers (that is, aged less than 30 years) displayed a more comprehensive understanding of ICT and its uses in teaching. This is in agreement with studies by Perrotta (2013) and Hammami (2016) who drew attention to the influence of age in the use of ICT in classrooms by teachers.

The study found that some teachers viewed ICT from a teaching or instructional perspective whereas some others viewed it from the perspective of the benefits to students with disabilities as they believed that ICT use could improve the learning and capabilities of students. Also, some teachers believed that ICT use could enhance their success in dealing with students with disabilities. Parallels to these findings could be found in the prior studies of Wehmeyer et al. (2011) who reported that the learning outcomes for students with intelelctual disabilities were improved by the use of technology supports; and the studies of Abbott and

Cribb (2001), Lewis and Ogilvie (2002) who reported numerous advantages to teachers that could be accrued through the use of ICT. However, no specific reference was made with regard to the perceptions of ICT use students with intellectual disabilities, which indicates that the teachers were still lagging in the use of ICT with such students. The discussion of the perceptions of the teachers associated with the second theme is presented in the next section.

5.1.1.2 Theme 2: Advantages of using ICT

The study found that the participating teachers had experienced various benefits of the use of ICT. For example, they reported that ICT use enhanced communication and literacy capabilities in students with disabilities. Another benefit uncovered by the study was ICT as a teaching aid which assisted teachers in the teaching of students with intellectual disabilities due to the assistance provided in encouraging communication and literacy. These findings were in agreement with earlier studies by Stetter and Hughes (2011) who reported on the benefit to reading comprehension skills due to ICT use; Bouck et al. (2009) who reported on the benefit to maths skills; Coyne et al. (2012) and Lin et al. (2008) who reported on the benefits to literacy; and Chen et al. (2009) who reported benefits with reading comprehension.

Moreover, the study found that the teachers were aware of the benefits of the use of assistive technology with their students. In general, assistive technologies provide support to students with disabilities and improve their participation in school activities. The study also found that the teachers perceived that ICT use helped in saving time in imparting certain skills and helped students with disabilities to acquire critical skills and facilitated their active (physical) participation in school and classroom activities. Luckasson and Schalock (2012) submitted that the goal of assistive technologies was to reduce the gap between a person's skills and the

necessities of the environment thereby improving the individual's performance and helping him/her achieve the outcomes related to education. Thus, it could be seen that the schools in the KSA were utilising assistive ICT technologies to improve the physical participation of students with disabilities in the school. Correspondingly, it could be inferred that teachers in the KSA believed that ICT use was advantageous not only from an academic perspective for students with disabilities but also from a more comprehensive perspective of life in school.

Specific benefits to students as uncovered by the study were the benefits provided to students with visual impairments and motor impairments by software. The improvement to mathematical skills through the use of multimedia software was also reported. Moreover, the study found that the reading, learning and vocabulary skills of students with disabilities could be improved by the use of ICT (Stetter & Hughes, 2011; Bouck et al., 2009; Coyne et al., 2012; Lin et al., 2008; Chen et al., 2009). It was evident that the teachers in the KSA were aware of the benefits to students with visual, hearing or mild motor impairments, a finding in line with the study of Lidström and Hemmingsson (2014) who reported that regardless of the type of ICT used among persons with disabilities, students received benefits particularly with spelling, writing, and interaction. However, again specific benefits to students with intellectual disabilities were not evident in the teachers' narratives. Thus, it appears that the use of ICT with students with intellectual disabilities was still a matter under development in the schools in the KSA. The discussion of the perceptions of the teachers associated with the third theme is presented in the next section.

5.1.1.3 Theme 3: Disadvantages of using ICT

The study found that the participating teachers were aware that the use of ICT in school could have some disadvantages. For instance, non-availability of ICT technologies in students'

homes could offset any progress made by the students due to ICT use in the schools. However, this may not be a significant cause for concern for families in the KSA where facilities for persons with disabilities are given priority by the government. Nevertheless, this is a matter for teachers to take into consideration when using ICT tools with students with intellectual disabilities.

Another disadvantage found by the study was that the use of ICT did not necessarily imply increase in the autonomy, capability and social acceptance of students with intellectual disabilities in school. This is perhaps not surprising as each student with intellectual disability is unique with distinct needs and distinct responsiveness to the use of ICT. Teachers and other stakeholders in the education of such students therefore need to take specific requirements and responses into consideration when developing the IEPs of students with intellectual disabilities. On the other hand, teachers must also be trained to be able to respond appropriately to such students and take necessary action to help the students achieve social and academic outcomes in school.

A further aspect identified by the study was that the use of ICT could result in unfavourable consequences for such students, such as public labelling of students of disabilities. The use of assistive technologies for students with intellectual disabilities, such as elementary supports (e.g., picture communication systems) or handheld devices and computers (Beukelman & Mirenda, 2005), could draw the attention of other students to such students in the inclusive classrooms and serve to socially isolate the students with intellectual disabilities. Thus, teachers must have sufficient awareness of the possibilities of such situations arising and be provided with methods to deal with these. Moreover, the teachers were aware that the perspectives of disability in the country could serve to unfavourably impact the students with

intellectual disabilities due to the use of ICT in their education (Al-Gain & Al-Abdulwahab, 2002).

An additional disadvantage recognised by the study was the potential adverse effects of excessive dependence of ICT use in students with disabilities. This was an outcome that could offset the whole purpose of the use of assistive technology for students with disabilities that is, to increase their independence in learning (e.g., Maguire & Zhang, 2007) and participation in the school (e.g., Bishop, 2003). Thus, it could be seen that ICT use in the KSA could perhaps be a disservice to students with intellectual disabilities if they became overly dependent on assistive technology and continued to be viewed as non-productive members of Saudi society (Al-Gain & Al-Abdulwahab, 2002).

The study also found that failure to match the needs of a student with disability with appropriate assistive technology could lead to adverse outcomes for the student. A 2004 report by BECTA (2004) emphasised that the focus of ICT use with students with disabilities should be on appropriate use, not just increased use. It could be seen that in their enthusiasm to use ICT with students with disabilities, teachers sometimes tried to use certain ICT tools with all students without evaluating their fitness for use for a specific student. A related aspect that could be detected due to this was the apparent lack of training for teachers with regard to ICT use as it appeared that the teachers were not aware of the uses of the different kinds of ICT tools and their suitability for different circumstances.

The tendency of ICT to fail or to have fluctuations in performance was also detected to be a disadvantage. From the teachers' perspective, this tendency caused the stability and reliability of ICT to be questionable and also impacted their success in the classroom. On the other hand, students also had problems if the ICT equipment they were using failed or had issues with

performance or operation. Another issue from the perspective of students was that they could be discouraged if they were not able to understand how to use a specific device or if they experienced some manner of failure while using the device. Thus, it could be seen that the fear of equipment failure was a significant disadvantage of ICT as also reported by the study of Al-Ammari (2004). Moreover, as also reported by Mirchandani (2003) and Wehmeyer et al. (2008), the study found that the design features of ICT devices could serve to impede their use by persons with intellectual disabilities.

ICT use with students with disabilities could be time-consuming as needs varied across students and the teacher would have to accommodate these needs by providing suitable ICT devices for each. Franklin et al. (2001) reported that lack of time is reported by several teachers to be a major impediment in ICT implementation. Thus, teachers could have negative attitudes towards ICT due to the constraints of time caused by this additional workload (Grover, 2012).

Cost of ICT was also found to be a disadvantage as this could result in students needing to share equipment or sometimes have no access at all. Studies by James (2002) and Vajargah et al. (2010) also drew attention to the costs associated with the use of ICT in education.

The discussion of the perceptions of the teachers associated with the second research question is presented in the next section.

5.1.2 Main barriers facing teachers in using ICT for students with Intellectual Disabilities

This subsection addresses the areas explored in relation to the research question: What were the main barriers encountered by special education teachers in using ICT for students with intellectual disabilities. Waichigo (2013) submitted that knowledge of the factors that could

serve as barriers to obstruct extensive and appropriate usage of ICT is essential to make sure that feasible and wide-ranging solutions are provided to policy makers.

Three classes of barriers to the use of ICT in education were reported by Scheuermann & Pedro (2009) namely, school level, teacher-level and system level. The current study also categorised the barriers into three categories: barriers encountered in the work environment, barriers posed by teachers-related issues, and barriers due to financial issues. Interestingly, the culture of the KSA was not revealed to be a distinct barrier although its influence could be perceived in the narratives. The discussion of the perceptions of the teachers associated with the first theme is presented in the next section.

5.1.2.1 Theme 1: Work environment

Barriers encountered in the work environment were again of three kinds. These were lack of encouragement for teachers to use ICT effectively; lack of availability of ICT devices; and lack of technical support and maintenance.

Lack of encouragement for teachers to use ICT effectively

Studies (e.g., Preston, 1999; Norton et al., 2000; Mulkeen, 2003) have demonstrated that support from peers, senior faculty members and head teachers can encourage teachers to use ICT. However, the current study found that special education teachers in the KSA lacked the encouragement or motivation to use ICT effectively in their classrooms. This lack of encouragement in the school environment was found to originate from other teachers and the school head. Thus, it could be inferred that the environment in the schools was not always conducive to the use of ICT for students with intellectual disabilities.

Another issue in the work environment was that teachers felt that they were inadequately recompensed for their efforts in using ICT in their classrooms as this requires additional effort and additional time. A study by Downes et al. (2001) also reported that a principal inducement for teachers to acquire ICT skills were internal incentives that were focused on personal rewards, such as adequate remuneration. Thus, it appears that some special education teachers in the KSA believed that ICT use in the classroom was an extension to their responsibilities and thus required a financial reward.

The study found that teachers' lack of confidence or past misadventures with ICT worked as barriers to their ICT usage. Moreover, their lack of familiarity with ICT devices and fear of failure and hence embarrassment before students caused them to shy away from ICT use in their classrooms. Hasselbring et al. (2000), Cantero (2000), and Blackmore et al. (2003) previously drew attention to the dependence on the successful integration and usage of ICT in education upon the copmetence of teachers. Furthermore, teachers required in the use of ICT tools to be able to use them effectively.

The lack of time to put ICT to use was another barrier discovered by the study. It is possible that special education teachers have very tight schedules and hence have limited time to make adequate preparations to use ICT in their sessions with students with intellectual disabilities. Thus, as observed by Grover (2012), teachers could have negative attitudes towards ICT due to the constraints of time caused by this additional workload. The study also found that the lack of ICT infrastructure in the schools was a barrier to ICT use, an issue found to be commonly encountered by several other studies (e.g., Al-Ammari, 2004; Al-Asmari, 2005; Waichigo, 2013; etc.).

Inadequate preparation for the changes caused by ICT use to the classroom instruction schedule was another barrier uncovered by the study. Thus, it appears that the teachers were not adequately trained in the manner in which they could incorporate ICT into their classrooms; a matter pointed out by Blackmore et al. (2003) who suggested that teacher training should come before the assimilation of ICT into the classroom.

The study also found that teachers' themselves lacked the motivation to modify their methods of teaching to incorporate ICT use and this served to discourage their use of ICT. Thus, it was evident that several teachers were not aware of the different advantages of ICT use in the classroom, such as to stimulate student understanding, to inculcate 21st century skills in the students, to remain informed, to experience practical mutual learning and to use various methods of teaching, to conduct research (Hakverdi-Can & Thomas, 2012; Hechter et al., 2012).

Lack of availability of ICT devices

The second barrier identified by the teachers was the lack of availability of ICT devices. Insufficient equipment, out-dated equipment, inadequate supporting infrastructure (e.g., classroom size), and poor maintenance of the equipment were the specific concerns reported in this regard. The lack of equipment, in the opinions of the teachers, could be attributed to the cost of the equipment. Researchers from the early part of the 21st century (e.g., Smerdon et al., 2000; Williams et al., 2000; Downes et al., 2001) and in the first decade of the century (e.g., Al-Khateeb, 2007) had reported lack of instructional software and inadequate quantity of computers to be issues that served as barriers to ICT use. It was surprising to find that this condition persisted in 2017 and in my country where funding for education could be expected to be substantial.

A related issue discerned was the lack of adequate maintenance of equipment. This was found to be a common occurrence according to various studies on the use of ICT in schools (e.g., Al-Ghamdi, 2001; Al-Khateeb, 2007; Waichigo, 2013). Thus, it could be inferred that the lack of maintenance of the ICT equipment contributed to the non-availability of equipment for the teachers to use. From the perspective of the study's sociocultural framework, it was evident that the educational infrastructure in Saudi Araba was not sufficiently robust so as to support the ICT needs of special education teachers in the schools.

Lack of technical support and maintenance

The third barrier was the lack of technical assistance concerning the operation and maintenance of ICT equipment. This is a common school-level obstacle reported by many studies (e.g., Al-Ammari, 2004; Al Mulhim, 2014; Granger et al., 2002; Jones, 2004; Scrimshaw, 2004, etc.). The present study found that the effectiveness of the use of ICT equipment available for use was reduced due to breakdowns. Thus, it could be inferred that the schools did not have adequate resources to maintain the ICT equipment or they had sufficient resources for technical support but maintenance of the ICT equipment was not adequately supplied. This could be due to the lack of interest of the technicians in showing the teachers simple tips to maintain the ICT devices used in the classroom. Alternately, even the simplest maintenance of the ICT equipment was not performed in some of the schools. For instance, the study also found that the schools did not adequately maintain the ICT equipment once they had been purchased. A few conclusions can be drawn from these findings. First, provision for technical support of ICT equipment in schools in the KSA was poor. Moreover, the support personnel appeared to lack interest in maintaining the equipment as they did not provide simple maintenance tips to the teachers, neither did they expend much effort in maintaining the ICT equipment after its procurement.

Another significant barrier as could be determined from the conversations with the teachers was the slow response time of technicians which could lead one to infer that either the technicians were overworked or there was a no clear policy on maintenance, such as which defined turnaround times for different problems of different complexity.

It was also found that common issues, such as spikes in electricity were overlooked by the technical support team and no precautions were taken to teach students to correctly handle the ICT devices. Again, multiple conclusions can be derived from these findings. First, no measures were taken to ensure consistent power supply to the ICT devices. Furthermore, neither the technical support staff nor the teachers seemed to be equipped (or interested) to teach the students with disabilities the appropriate manner in which to handle the ICT devices. The discussion of the perceptions of the teachers associated with the second theme is presented in the next section.

5.1.2.2 Theme 2: Teacher-related issues

Barriers due to teacher-related issues were again of three kinds and were related to training, teachers' awareness of ICT advantages, and availability of educational software in Arabic.

Lack of Continuous Training about ICT

The importance of training for teachers regarding ICT use, prior to use and during use, has been emphasised by various studies (e.g., Alfaraj & Kuyini, 2014; Al-Saif, 2006; Blackmore et al., 2003; Granić et al., 2009; Pan, 1999; etc.). However, the present study found that the teachers in the KSA were hindered by a lack of training about ICT although they recognised the need for regular training on ICT. The benefits of continuous training as recognised by the study include the following: training equips teachers with greater confidence and motivation to use ICT and thus facilitates ICT usage; regular training could overcome some of the

challenges encountered by teachers, such as limited ICT skills, anxiety and fear of failure; and engagement with experts and other colleagues can take place during training. Drawbacks of the lack of continuous training detected include: lack of appropriate training in ICT makes teachers reluctant to use ICT; they remain unaware of the different advantages of ICT use with their students with intellectual disabilities; and they are not up-to-date with the changes in ICT.

Essentially, the present study found that regular training programmes were not organised by the schools suggesting that the educational infrastructure in the KSA required further development with regard to the use of ICT in schools. Further investigation is required into the reasons for this shortfall in training and whether this is due to a lack of governmental support; lack of training infrastructure; lack of qualified instructors; and other factors.

Lack of Awareness of ICT advantages

Al Mulhim (2014) observed that one of the most frequent and significant barriers at the teacher level is their resistance to change. Similarly, this study found that the special education teachers in the KSA still believed that ICT could not replace the conventional approaches to instruction. Moreover, they believed that ICT was not necessary to enhance the quality or content of their classroom sessions. Hence, they resisted the use of ICT in their classrooms.

Factors which influenced this resistance include misinformation from colleagues and other external influences which contributed to the teachers' lack of awareness about the advantages of ICT; their own limited understanding of ICT scope and use; and lack of ICT-related training. The study found that some of the teachers were not comfortable using ICT tools and devices and it appeared that no attempt had been made to address this situation through

training. Consequently, they lacked awareness of the benefits of ICT use and either resisted attempts to make them use ICT or used ICT to the minimum extent possible.

Another area of that contributed to resistance was the excessive workload of teachers. This could be intensified by the dilution of teachers' role by assigning unrelated tasks to them, a tendency that seems common in the KSA as seen in the study of Al-Showaye (2002). Consequently, the teachers seemed to be disinterested in whether or not ICT use had any benefits for students with disabilities. Again, this situation seemed to indicate a lack of robust educational infrastructure in the country with regard to the use of ICT in schools.

Lack of educational software in Arabic

Earlier studies by Alfaraj and Kuyini (2014) and Al-Saif (2006) reported that the lack of ICT resources in Arabic could limit the use of ICT in the Middle East. This study also found that there was a lack of educational software in the Arabic language that could be used with students with intellectual disabilities in the KSA. Most software was available in English and thus had limited applicability in the Saudi context as the theme of such software programmes lacked relevance in the Arab context. The study found that teachers were also possibly hindered by the lack of software in Arabic with regard to their teaching of specific skills (e.g., writing, language, etc.) to students with disabilities. It is evident that some measures need to be undertaken to address this situation and would possibly require the concerted efforts of the Ministry of Education in the KSA, such as the provision of incentives to local software and educational firms to develop expertise to develop appropriate software in Arabic for use in the country. Once again, it could be inferred that the educational infrastructure of the country required attention with regard to the use of ICT in schools. The discussion of the perceptions of the teachers associated with the third theme is presented in the next section.

5.1.2.3 Theme 3: Financial Issues

Barriers due to financial issues were of two kinds and were related to the cost of educational software and school budgets.

Cost of Educational Software

As mentioned previously, the cost of ICT equipment (software, etc.) is a recognised (e.g., James, 2002; Vajargah et al., 2010; etc.) issue that can impede their use in schools. This study also found that educational software and some customised assistive devices were highly priced in the KSA. Accordingly, the availability and use of ICT tools and devices in the schools was affected by the pricing. For instance, the schools sometimes purchased out-dated or obsolete software due to the high costs of some of the educational software. In other cases, the study found that teachers used alternative approaches when software they desired could not be procured due to the high costs.

It is evident that the Ministry of Education needs to take some decisive measures to provide educational software at subsidised prices to the schools so as to facilitate their availability and promote their use with students with intellectual disabilities. Again, as previously mentioned, it could be inferred that the educational infrastructure of the country required attention with regard to the use of ICT in schools.

Lack of schools' budgets

Biagi and Loi (2013) observed that official circumstances influence the quantum of resources available in schools and the budget allocation for various expenditure. The present study found that the lack of budgeting provision in the schools contributed to the non-availability of suitable software and other ICT tools for use with students with intellectual disabilities in

classrooms. Other implications due to tight budgets included, limited number of ICT tools and devices; sharing of ICT tools and devices in the classrooms; limited supporting amenities; the lack of provision for machine breakdowns and repairs; lack of resources for in-house training, workshops, and routine maintenance.

It was evident that while the schools understood the significance of ICT use for students with disabilities, they did not spend enough to purchase the required tools because of limited funds. Thus, students with intellectual disabilities were not provided with the appropriate tools to match their specific needs. Conversely, this issue could be viewed from the perspective of the specific ICT requirements of students with intellectual disabilities as the schools did not have sufficient financial provision to cater to these.

The study also found that some Saudi schools were supported by private benefactors. However, these benefactors did not always fulfil their promises to provide additional funds or provided only limited funds which did not significantly boost the schools' ICT budget.

Another factor recognised by the study was the time taken to respond to the schools' requests for additional funding by the government. Thus, the lack of planning for ICT expenditure by both the schools and the Saudi government was as an issue in the provision of ICT tools for the schools. Also, in some cases, the study found that educational software received lower priority in the schools' budget planning exercise.

It is evident, therefore, that there are significant shortcomings in the budgeting for ICT spend starting from the governmental level and progressing down to the level of the schools. Moreover, a lack of awareness of the different and distinct needs of students with intellectual disabilities could also be perceived. Thus, it could be inferred that the educational system in the KSA could be strengthened by the facilitation of greater awareness of the needs of

students with intellectual disabilities in school across the country and by more informed and robust budgeting practices. The discussion of the perceptions of the teachers associated with the third research question is presented in the next section.

5.1.3 Main factors contributing to developing the usage of ICT for students with Intellectual Disabilities

This subsection addresses the areas explored in relation to the research question: What were the main factors that contribute to the utilisation of ICT for students with intellectual disabilities. Two perspectives were examined namely, requirements from the perspective of developing the use of ICT by teachers and by schools. The discussion of the perceptions of the teachers associated with the first theme is presented in the next section.

5.1.3.1 Theme 1: Facilitating ICT use by teachers

The first theme associated with the third research question pertained to factors which facilitate the use of ICT by teachers. The principal finding in this theme require to be provided with appropriate and regular training with regard to ICT use.

The study found that teachers need to be provided with adequate information about the importance of using new technology in education of students with intellectual disabilities. In fact, the teachers believed that appropriate information could transform their perspectives towards ICT use. However, the teachers also believed that some of their colleagues held incorrect views about ICT use. Thus, they believed that the provision of adequate and appropriate information about the use of ICT to teachers through training could help them to overcome issues due to culture and religion in using ICT. Moreover, they could overcome the lack of confidence caused by previous experiences or incorrect perceptions of ICT use which they had obtained through misinformation. Also, appropriate training could overcome the

resistance to change which could also hamper ICT use. The study by Alfaraj & Kuyini (2014) also drew attention to the need for teachers to receive appropriate training. Alqahtani (2016) drew attention to the possibility that teachers were not receiving appropriate special education training. On the other hand, Almalki and Williams (2012) pointed out that the utilisation of ICT in Saudi schools was affected by the religious and cultural beliefs of KSA.

The second significant finding under this theme is that teachers require to be provided with regular training in ICT use. Studies have found that the the attitudes of teachers towards technology are influenced by the amount of ICT training experience (Chen & Chang, 2006; Sadik, 2006; Tsitouridou & Vryzas, 2004) as this contributes to a favourable association between the teachers' outlooks toward educational technology and the training received (Abu Samak, 2006; Cavas et al., 2009; Gobbo & Girardi, 2001; Jegede et al., 2007; Kahveci et al., 2011; Lau & Sim, 2008; Sa'ari et al., 2005). The study found that the teachers believed that continuous training would help them remain abreast of new ICT techniques and skills; improve their teaching skills; support them with appropriate knowledge; and enhance their motivation and self-confidence with regard to the use of ICT tools and devices. However, it must be noted that qualified personnel are required to deliver training.

A third significant finding was that ICT should be included in the preparation programmes for teachers, perhaps during their university teachers' training courses or through special orientation programmes. That is, the teachers should receive training in ICT use before they are employed in the Saudi schools. Benefits that could accrue to teachers from this are that training could improve the teachers' contributions to students with intellectual disabilities; and enable teachers to be well-equipped for their future use of ICT. Moreover, training could facilitate the overall use of ICT in schools; improve teachers' skills and knowledge of ICT;

motivate teachers to use ICT; reduce negative perceptions about ICT; and improve their confidence in ICT use.

A fourth significant finding was that the use of ICT in the classroom could be improved by the provision of personal ICT devices for each teacher in the schools. For instance, the teachers would be able to develop lessons which incorporated ICT use and also deal with the different needs of their students. This was in agreement with the BECTA report (2004) which mentioned that personal access to ICT could influence the teachers' confidence in use of ICT. It must be noted that all the findings under this theme draw attention to the need for change in the educational infrastructure in the KSA with regard to the use of ICT in schools. The discussion of the perceptions of the teachers associated with the second theme is presented in the next section.

5.1.3.2 Theme 2: Facilitating ICT use in schools

The second theme associated with the third research question pertains to factors which facilitate the development of schools from the perspective of ICT use. The principal findings in this theme were that schools required sufficient ICT resources and the financial provision with which to procure these resources. Moreover, incorporating ICT into the curriculum of students with intellectual disabilities was believed to be beneficial.

The first significant finding was that schools need to be provided with sufficient educational resources, hardware and software, suitable for teaching different skills to students with intellectual disabilities in Arabic language as it was evident that some of the teachers believed that the lack of appropriate resources in Arabic restricted the use of ICT in their schools. Moreover, sufficient numbers of tools and devices, enough space and support teams, were other resources that would help schools to support ICT use. The studies of Alfaraj and Kuyini

(2014) and Al-Saif (2006) also drew attention to impact caused by the lack of Arabic resources.

Another finding was the requirement to prepare schools with sufficient network and Internet infrastructure. The comments of the teachers revealed that they had experienced some difficulties due to unreliable and low speed network and Internet connections in their schools. An accompanying finding was the need for adequate network and technical support in the schools. The material and non-material barriers to ICT implementation specified in Pelgrum's (2001) study also drew attention to, among other items, inadequate quantity of computers; insufficient copies of software; inadequate peripherals; inadequate quantity of computers; lack of technical staff; and lack of supervisory staff.

The third finding was that adequate financial support must be provided to schools to enable them to procure ICT devices. This requires governmental support and proper budgeting. Studies by Biagi and Loi (2013) and Vajargah et al. (2010) also drew attention to the need for adequate financial outlay for ICT through appropriate budgeting.

The final finding was with regard to the inclusion of ICT implementation in the curriculum employed for students with intellectual disabilities. This could help promote the use of ICT in classrooms and to make teachers regard it more seriously. Other benefits determined by the study due to the inclusion of ICT into the curriculum of students with intellectual disabilities included lesson planning; increasing the seriousness with which teachers would use ICT in their lessons; increased provision of additional resources such as devices and funds; and individualised lessons could be developed to meet the individual needs of different students with intellectual disabilities. The study also found that including ICT in the curriculum could also enhance ICT use among students. Nevertheless, it must be noted that the ICT curriculum

should be reviewed regularly to be consistent with the changing educational needs of students with disabilities. Prior studies by Gustafson (2006), Waichigo (2013) and UNESCO (2006) also drew attention to the benefits of including ICT in the curriculum of students with special needs. In the KSA, the intervention of the Ministry of Education would be required in this matter as they are responsible for curriculum development in the country. It can be again noted that all the findings under this theme draw attention to the need for change in the educational infrastructure in the KSA with regard to the use of ICT in schools.

The results of the quantitative phase are discussed in the following section.

5.2 Phase 2 – Discussion of Quantitative Results

As mentioned earlier in the thesis, the aim of the quantitative phase of the current study was to obtain information from teachers in the KSA regarding the current uses of ICT with students with intellectual disabilities in the KSA; the main barriers encountered by them in terms of using ICT in the teaching of students with intellectual disabilities; and their viewpoints and attitudes about the possible steps to be considered for the development of ICT use in the future with students with intellectual disabilities in the KSA.

Accordingly, the questionnaire was used to gather crucial data in terms of the following: demographics, teachers' perceptions towards using ICT for students with Intellectual Disabilities, and the advantages and disadvantages of ICT, the main barriers encountered by teachers in using ICT for students with Intellectual Disabilities, and the main factors contributing to the development of ICT integration in schools.

5.2.1 Teachers' Background Data

Background details gathered about the teachers included social details, such as age and educational qualification. Additionally, detail was obtained with regard to their experience and work environment in the context of teaching students with intellectual disabilities. These details included the teachers' work experience with students with intellectual disabilities; their experience with ICT utilisation; availability of training courses for effective integration of ICT in teaching; recognition of the importance of ICT usage by the schools; use of ICT tools with students with intellectual disabilities; and access to ICT tools for students with intellectual disabilities.

5.2.1.1 Respondents' Age

The majority of the teachers who participated in the quantitative study were aged <=35 years. From the perspective of the current study this statistic can lead to various conclusions. For instance, persons in this age group, in general, across the globe are familiar with ICT use. Consequently, it can be concluded that they do not require ICT training except for the purposes of specific usage with students with intellectual disability. Moreover, as mentioned earlier, it appears that persons in the KSA are becoming increasingly aware of the special needs of students with intellectual disabilities and are entering early, and perhaps, directly into the field of special education which is a promising indication for this line of career. Earlier studies by Perrotta (2014) and Hammami (2016) draw attention to the influence of age on ICT usage by teachers indicating that older persons (e.g., >40) may demonstrate greater resistance to ICT usage as they are not from the "digital native" era.

5.2.1.2 Respondents' Educational Qualification

Bachelor of Arts degrees were the most commonly reported educational qualification of the participating teachers. Earlier studies (e.g., Al-Sulaimani, 2010; Alotaibi, 2015; Oyaid, 2009) performed in the KSA of various aspects of educational provision in the country also report that the majority of teachers possess the basic university qualification, i.e., Bachelor-level qualifications.

5.2.1.3 Respondents' Work Experience with students with intellectual disabilities

Most of the respondents had worked with students with intellectual disabilities for at least 2 years with the majority reporting having worked with such students for >=6 years. This finding indicates that there is acceptance among teachers in the KSA of working both in inclusive educational settings, in general, and of working with students with intellectual disabilities, in particular. This is in contrast to the findings of de Boer et al. (2011) who found that students with intellectual disabilities were more frequently rejected by their teachers.

5.2.1.4 Experience with ICT utilisation

The majority of the teachers had experience with the use of ICT for 2 or more years which closely corresponds to their experience with students with intellectual disabilities. Thus, it could be inferred that the teachers experience with the use of ICT in teaching could be traced to the commencement of their working with students with intellectual disabilities.

5.2.1.5 Training courses for effective integration of ICT in teaching

The majority of the participating teachers had not been offered training courses for effective utilisation of ICT tools while teaching. This is in contradiction to the suggestions of

Blackmore et al. (2003) who submitted that teacher training should precede the integration ICT into the classroom.

5.2.1.6 Recognition of the importance of ICT by the IEP teams in schools

Al-kahtani (2015) observed that the IEP is one of the most significant means to fulfil the educational requirements of students with SEN, including students with intellectual disabilities. IEPs are developed individually for every student with special needs and identify the special education services, manner of disability, objectives and aims, and the accompanying appraisals and assessments required for the student. Moreover, IEPs are recorded as formal documents (Al-kahtani, 2015). Thus, it can be inferred that the IEP teams (composed typically of the teacher, school administrators, student with special needs and his/her parents) would incorporate ICT use into the student's IEP if it is supported or made mandatory by government initiatives. Accordingly, most of the survey participants responded that the IEP teams in their schools were aware of the need for ICT assistive techniques while teaching students with intellectual disabilities. Thus, it appears that IEP teams in the KSA understand the manner in which AT can influence academic outcomes for students with learning disabilities (Williamson-Henriques, 2013), such as students with intellectual disabilities.

5.2.1.7 Use of ICT tools with students with intellectual disabilities

The study found that 66% of the teachers worked in schools that utilised ICT tools with students with intellectual disabilities. This finding indicates that some schools in the KSA are still reluctant to utilise ICT tools with students with intellectual disabilities or have not yet identified appropriate tools for use. It cannot, therefore, be inferred that the remaining 34% the schools do not use ICT tools in any form. Al-Maini (2013) provided some insights into

this situation when he observed that despite governmental support and initiatives, such as the Watani and Tawteer projects, to improve education and instruction using ICT in Saudi schools, the use of ICT in Saudi schools has not been very successful. Several reasons were provided for this lack of success including insufficient funds, opposition from teachers, and insufficient training in ICT skills for teachers (Al-Maini, 2013). It must be noted that although the emphasis of Al-Maini's study was the use of ICT tools in teaching or learning English as a foreign language (EFL), his insights are of merit for the current study as it is among the first, to the extent of the researcher's awareness, to study ICT use for students with intellectual disabilities in the KSA.

5.2.1.8 Access to ICT tools for students with intellectual disabilities

This study found that students with disabilities did not have access to ICT tools in the schools. This could again be due to the various reasons mentioned in the preceding section that is, insufficient funds, opposition from teachers, and insufficient training in ICT skills for teachers (Al-Maini, 2013). Several researchers (e.g., Du Toit, 2015; Eady & Lockyer, 2013) have observed that both teachers and students benefit from the use of ICT as it can provide enhanced access to additional educational resources. However, it appears that students with intellectual disabilities currently have limited access to ICT tools in the KSA.

5.2.2 Teacher's perceptions of using ICT for students with Intellectual Disabilities

The study found that the participating teachers had a good overall understanding of the concept of ICT. Thus, the majority of the teachers agreed or strongly agreed with the 10 statements provided for consideration. In other words, they agreed or strongly agreed that ICT means teaching and learning using ICT tools such as computers; is the modern way of teaching where teachers use technological devices and approaches in teaching particularly in

relation to students with disabilities; implies tools that can be used in instruction and teaching specific concepts and skills to support students with Intellectual Disabilities; has the intent to create new interaction of teachers and students with disabilities; is where a teacher is expected to use interactive boards, monitors, projectors and computers when teaching; and involves using technological tools to teach students. Moreover, they agreed or strongly agreed that ICT is where software programmes are used to allow students with disabilities to better understand the learning material; where teachers and students use technology in addition to conventional approaches to teaching and learning; seeks to integrate technology in teaching and learning to create a better experience; and are tools meant to improve the capacities of students to understand different topics and subjects. However, a significant proportion indicated that they had a neutral opinion towards the statement that ICT is a complex way of teaching as a significant amount of time is required to gather or develop content. The teachers' understanding of the concept of ICT is significant as the perceptions of ICT by teachers not only reflects in their prospective view of how ICT should be utilised in education but also serves to inform future policy related to ICT use in education of students with intellectual disabilities.

The teachers also demonstrated a good understanding of the advantages of the use of ICT for students with intellectual disabilities as they agreed or strongly agreed with the 18 statements provided for consideration. In other words, they agreed or strongly agreed that ICT offered an alternative means of communication in the classroom; provided access to learning material in a very convenient manner; enhanced the motivation of their students; helped students with Intellectual Disabilities in communication and literacy; can be used by students with disabilities; helped in overcoming barriers of time and enhances the necessary functioning and development of critical skills among students with disabilities; contributed to increased

effectiveness of the learning processes by helping students with disabilities to actively take part in teaching and learning; facilitated the social participation of students with vision and hearing impairments; has the capacity to create a more meaningful existence in school for students with disabilities; enhanced the communication skills and spelling performance of students with speech impairments; enhanced the literacy skills and language of students with disabilities; increased the physical participation of students with disabilities in classroom activities; helped not only in productivity and literacy of students with disabilities, but also in building social relationships; increased the independence of students with disabilities; has the potential to support and enhance the social and academic activities of student with disabilities; can help students improve their writing skills; can enhance reading, learning and vocabulary for communication among students with disabilities; can improve language skills by reducing errors in writing.

That is, they agreed or strongly agreed that ICT offered an alternate means of communication for students with disabilities and gave them a sense of meaningful existence in school. This finding is in agreement with the findings of earlier researchers, such as Douglas (2001) who suggested that the use of ICT can provide opportunities to persons with disabilities to improve performance and/or participation in activities. Moreover, skills, such as critical skills, communication skills, literacy skills, writing skills, reading skills, spelling skills, vocabulary, quality of language and motivation to learn, improved as a result of integration of teaching practices with ICT tools. This finding agreed with the findings of researchers, such as Drigas and Ioannidou (2013), Wehmeyer et al. (2011), Stetter and Hughes (2011), Bouck et al. (2009), Coyne et al. (2012), Lin et al. (2008), Chen et al. (2009), and Chang et al. (2011) who submitted that ICT use in educational settings offered diverse benefits to students. Moreover, the teachers agreed that the students displayed enhanced social participation and physical

participation in school as a result of using ICT techniques in line with Bishop (2003). Moreover, the teachers agreed that ICT usage enhanced learning convenience among their students with disabilities, thus enhancing their productivity in school and academic performance, in general. Again, this finding was in line with the work of Ahmad et al. (2012) who observed that one of the favourable consequences of ICT use was mastery of their academic tasks. However, it must be noted that some of the teachers had neutral opinions with regard to the function of ICT in improving the motor skills of the students and their sense of independence. This could be due to the fact that students with intellectual disabilities are not typically hindered by low motor skills and their independence in the classroom could be determined by the degree of their disability.

The teachers also demonstrated that they were aware that ICT use could have its own disadvantages. Thus, they agreed or strongly agreed, in general, that high dependence on technology by students with disabilities could be a problem in different environments, such as at home; the use of ICT did not directly result in independence, competence and social acceptance for students with disabilities; use of assistive technology that does not match the needs of students with disabilities could adversely affect the students; Problems with network connectivity can affect the reliability of ICT devices; ICT use is not dependable as the students have a problem using ICT; ICT requires a lot of time as teachers have to attend to different students with varying needs; costs involved in ICT use are very high; inability to use ICT tools and devices may cause anxiety in students with disabilities; technological hitches negatively affect students with disabilities; and heavy ICT use by students with disabilities can limit their capacity for self-improvement. However, they disagreed or strongly disagreed that ICT use, specifically use of assistive devices, could result in public labelling of students with disabilities; ICT use demands highly-skilled teachers; and ICT tools are prone to failure

and their reliability could be compromised. Other studies (e.g., James, 2002; Vajargah et al., 2010) also draw attention to the two most probable disadvantages associated with ICT use: high costs of the tools and need for teacher training. However, the current study also drew attention to technological hitches and time involved in the use of ICT in the classroom due to the varying needs of the students with disabilities.

5.2.3 Barriers in implementing ICT tools and devices for students with Intellectual Disabilities

Scheuermann and Pedro (2009) drew attention to three classes of barriers with regard to the use of ICT in education: school level, teacher-level and system level barriers. Accordingly, the current study also explored the different barriers encountered by the teachers when they attempted to use ICT tools and devices with their students with intellectual disabilities.

5.2.3.1 Barriers in the work environment

Barriers at the school or systemic level explored by the present study included barriers with regard to the work environment, the availability of ICT equipment and technical support for the same. Barriers encountered by the teachers in the school work environment included lack of support from the school head, the school and from their colleagues. Moreover, the teachers' lack of self-confidence in using ICT, unfamiliarity or lack of knowledge with ICT tools, absence of change management skills, and lack of motivation to depart from conventional teaching methods were also reported to be barriers to their ICT usage. Additional barriers identified by the study included practical concerns, such as lack of ICT devices for all students, significant expenditure of time and effort in preparing ICT-based material while being inadequately compensated, heavy work load during class hours leaving no time for ICT and inadequate time for preparation due to other lessons. Therefore, the present study drew

attention to the different barriers associated with lack of support, insecurity and practical implementation of ICT, with discouragement from colleagues being the most commonly reported barrier. On the other hand, infrastructure-related barriers recognised by the study included insufficient equipment, old and out-dated equipment, obsolete technology, poor class room infrastructure, poor maintenance of equipment and regular break down of machines. Therefore, it can be inferred that schools should pay more attention towards maintaining the ICT equipment and updating them frequently in order to encourage ICT integration in class rooms. The lack of technical support for ICT equipment could also be recognised to be a significant barrier in the integration and use of ICT in the participants' schools. Issues reported by the teachers included maintenance-related issues (e.g., lack of maintenance of equipment, electricity spikes due to poor maintenance, etc.). The lack of technology assistance was also revealed by the study including such items as shortage of technical staff, overworked staff, insufficient planning by the schools for use of ICT devices and absence of adequate technical support related to the usage of ICT devices. Moreover, it would appear from the teachers' responses that the schools forgot about the ICT devices once they were installed. Thus, the present study revealed a significant shortcoming in the Saudi schools with regard to technical support for ICT users and the maintenance of ICT equipment.

A study by Waichigo (2013) also drew attention to the dearth or inferior quality of ICT infrastructure, limited availability of ICT equipment, insufficient experience in ICT projects and badly maintained computers. Al Mulhim (2014) reported that barriers frequently encountered at the school-level include: inadequate access to technology, dearth of useful training, lack of technical support, hardware and software costs, and so on. It is obvious that the promotion of ICT use with students with intellectual disabilities in the inclusive

mainstream schools in the KSA would require stringent management or removal of these various systemic barriers.

5.2.3.2 Teacher-related barriers

Al Mulhim (2014) reported that the most frequent and significant barriers at the teacher level are: attitudes of teachers towards technology, their resistance to change, time constraints, their lack of confidence with regard to the use of technology, and absence of awareness and competence in making use of technology.

In the current study, barriers related to teachers were examined from the perspective of their training needs, their unwillingness to adopt ICT, and the non-availability of educational software in Arabic. The study found that the teachers believed in the criticality of training programmes for the effective use of ICT, their greater confidence and better understanding of ICT equipment, and for sharing their experiences with other teachers regarding ICT use in their classrooms. Moreover, the teachers seemed to believe that on-going training would help them to confront their anxiety and fear of using new equipment. Thus, this study also confirmed that teachers do need training to increase their confidence with the use of ICT tools and devices in their classrooms with students with intellectual disabilities.

The current study also found that the teachers appreciated the advantages of ICT integration into education as they disagreed that interactive teaching is not required for young students with disabilities, that importance of ICT is being exaggerated and that ICT benefits can also be delivered by traditional teaching. Moreover, they exhibited willingness to incorporate ICT tools while teaching students with disabilities as they disagreed that they do not recognise the need for ICT tools, that traditional techniques allowed touch and feel learning which was better than ICT, and that ICT was inconvenient as it consumed more preparation time. The

respondents also disagreed that they did not possess the skills for using computers and laptops, that ICT makes students lazy, and that ICT is needed only for those students with severe disabilities (i.e., not for mild disabilities). Therefore, the findings of current study could be interpreted to believe that the teachers in Saudi schools are not unwilling to adopt ICT for use with students with intellectual disabilities.

Another facet explored by the present study was whether the non-availability of ICT tools in Arabic was a barrier towards the implementation of ICT tools and devices in the Saudi schools. The responses of the participating teachers revealed that this was indeed a significant barrier to the use of ICT in their classrooms. For instance, the teachers agreed that the content of educational ICT programmes was a critical aspect but most of the software was not available in Arabic. Moreover, the teachers reported that while the schools expected them to use Arabic as the medium of instruction, the Ministry of Education did not take adequate measures to develop software in Arabic and the schools did not plan appropriately to obtain suitable software in Arabic for students with disabilities. Furthermore, the few tools available in Arabic were not found to be relevant or applicable for their classrooms by the teachers. On a side note, the lack of software in Arabic was construed by the teachers as an indication that Saudi Arabia lacked software experts who were interested in developing software for children with disabilities. Alfaraj and Kuyini (2014) reported that the lack of software using Arabic was a barrier to the use of ICT in the KSA. However, their study was in the context of children with Down syndrome. Nevertheless, it can be inferred that measures should be taken to improve the availability of educational software in Arabic to facilitate the process of ICT integration in the teaching students with intellectual disabilities in the KSA.

5.2.3.3 Financial barriers

Several studies (e.g., Bonnah Nkansah & Unwin, 2010; James, 2002; Vajargah et al., 2010; Wehmeyer, 1998, etc.) have drawn attention to the costs associated with ICT use in teaching. The present study also found that financial barriers were a significant factor in influencing the use of ICT with students with intellectual disabilities in the schools in the KSA. Participants in the current study revealed that the costs of ICT tools developed for students with disabilities were very high and that the schools frequently could not afford them. Moreover, the financial assistance provided by the government to the schools for ICT-related spending was also found to be inadequate. In other words, the most relevant ICT programmes for students with disabilities could not frequently be provided as they could not be afforded by the schools. Consequently, it is evident that it is necessary for the government as well as the schools to allocate more funds towards ICT expenditure.

Another aspect revealed by the participants of the current study was that the budget allocated by schools did not meet the requirements for implementation of ICT in classrooms as individualised programmes for students with disabilities, trainings, workshops and maintenance of ICT devices and provision of devices for every student came at high costs. Thus, it is evident that the budget planning exercise of schools in the KSA requires review and revision in order to incorporate sufficient funding for the provision of ICT tools and devices to suit the specific needs of the various students with intellectual disabilities studying in the schools.

5.2.4 Development of ICT utilisation in schools

Several factors have been reported to encourage the use of ICT in schools. These can be examined from the perspective of teachers and from the perspective of the schools.

5.2.4.1 Teacher Perspective

Favourable opinions towards ICT; and the capacity of ICT to make lessons more stimulating and entertaining, to enhance students' achievements, to enhance presentations, to make lessons more varied, and to conserve time and energy (Abu Samak, 2006; Albirini, 2004; Aldossry, 2011; Alshumaimeri, 2008; Baytak et al., 2011; Cox et al., 1999b; Cox et al., 2003; Cunningham et al., 2003; Jones, 2004; Priest et al., 2004; Punie et al., 2006; Selwood & Pilkington, 2005; Serin, 2011) are some of the factors that can encourage teachers to use ICT in schools. Correspondingly, the present study found that providing the teachers with information on ICT, educating them in culturally adapting to ICT utilisation and in using ICT in spite of constraints placed by their religion are important steps to be taken for improving the success of ICT integration. Moreover, the study found that consistent training of teachers with the help of experts is crucial for equipping them with new techniques and to help them overcome their fear in adopting ICT techniques. Furthermore, the teachers were of the opinion that providing separate ICT equipment for the teachers was an important factor governing the success of ICT integration. The teachers also believed that preparation programmes for using ICT would be of benefit as they are the main players in enabling ICT integration. Overall, it could be seen that helping teachers to move away from past teaching practices, to form the right perceptions of ICT, to develop positive views towards ICT integration, and instilling the right beliefs in them are necessary actions to be undertaken to improve the effectiveness of ICT usage in schools. Moreover, training would help the teachers in enhancing their pedagogy, motivation and self-confidence and sharpen their skills, which in turn will improve their grasp of ICT techniques. Furthermore, providing individual devices for the teachers would help improve their quality of teaching and they would be able to embrace the use of

ICT in a better manner. Finally, training programmes for teachers should include ICT in order to improve the overall usage of ICT in schools.

5.2.4.2 School Perspective

Most studies have placed emphasis on the role of teachers in enhancing ICT usage in schools. However, the current study also examined this facet from the perspective of the school or the surrounding educational system. Again, one aspect that was highlighted by the teachers was the requirement for ICT resources in Arabic indicating the severe constraints they were experiencing due to this lack. They indicated that the availability of such resources would motivate them to use ICT thus enhancing the learning of students, and making it possible for the teachers to address the individual needs of students and enhance language learning among students. Another aspect was the role of reliable Internet access. The participating teachers agreed that Internet connection with high speed and 24/7 connectivity was required for effective use of ICT in the school. Moreover, the Internet connection could reduce the time spent on preparing lessons by the teachers and permit them to access their study resources from anywhere.

Another factor recognised by the present study was the need for proper strategies and sufficient funds by the government to assist the schools and hence aid the success of ICT integration in schools.

Waichigo (2013) drew attention to obstacle to ICT integration posed by the content of the curriculum. The participants in the current study also indicated that ensuring the inclusion of ICT in the mainstream curriculum of students would help increase the seriousness of learning using ICT and to ensure that the objectives of ICT have been achieved. Moreover, the inclusion of ICT in the student curriculum could ease the planning of lessons by teachers and

help in planning lessons according to the needs of the individual students. It is evident that the curriculum, in the KSA, for students with intellectual disabilities requires deeper investigation and the provision for regular review and customisation to meet the needs of such students.

5.2.5 Correlation studies

Overall, with regard to barriers encountered by teachers in using ICT, *Work environment barriers* were found to be very strongly correlated to *Non-availability of educational software in Arabic* and *Insufficient school budget*; strongly correlated to *Barriers related to ICT equipment, Lack of technical support,* and *Insufficient external funds,* and weakly correlated to *Training needs of teachers.* Similarly, *Barriers related to ICT equipment* were found to be strongly correlated to *Lack of technical support, Non-availability of educational software in Arabic, Lack of technical support,* and *Insufficient school budget*; and moderately correlated to *Training needs of teachers. Training needs of teachers* were found to be highly correlated to *Non-availability of educational software in Arabic, Lack of technical support,* and *Insufficient school budget. Insufficient external funds* were found to be highly correlated to *Insufficient school budget.* To the extent of the researcher's knowledge, this is the first study which has examined the correlation between the barriers encountered by teachers in using ICT. For example, a study by Hatlevik and Arnseth (2012) did utilise Pearson's correlation to examine the factors of teachers' experiences. However, these were in the context of ICT-supportive leaders, experiences with supportive colleagues, teachers' perceived usefulness of computers and teachers' use of computers at school. On the other hand, a study by Tong & Trinidad (2005) provided that there was a correlation between investment in ICT and school improvement. Other studies have also explored the correlation between different facets of ICT

use in classrooms but not from the perspective of the barriers encountered by teachers. For example, the National Centre for Education Statistics in the USA, in its statistical analysis report, found a positive correlation between the availability of ICT in the classroom and the probability of teachers assigning work that required the use of ICT by students at home (Smerdon et al., 2000). Isleem (2003) reported a strong positive correlation between teachers' usage of technology and their attitudes. Several other researchers (e.g., Smerdon et al., 2000; Alev, 2003; Mumtaz, 2000; Cunningham et al., 2003; Cox et al., 2003) have drawn attention to the correlation between access to technology and the rate of using it in teaching. In other words, the greater the access to technology of teachers, the greater is the probability that they would incorporate it into their teaching.

With regard to factors contributing to the development of ICT integration, the *Perspective of teachers on ICT practices* were found to be very highly correlated to *Including ICT in teacher preparation programmes;* and highly correlated to *Continuous training for teachers* and *Providing ICT devices for each teacher. Continuous training for teachers* was found to be highly correlated to *Providing ICT devices for each teacher* and *Including ICT in teacher preparation programmes. Providing ICT devices for each teacher* was found to be highly correlated to *Including ICT in teacher preparation programmes.* Again, to the extent of the researcher's knowledge, this is the first study which has examined the correlation between the factors contributing to the development of ICT integration.

5.3 Summary

This chapter discussed the findings from the qualitative and quantitative phases of the study in the light of extant literature, as applicable. The next chapter will present the Conclusions and recommendations arising from the study.

CHAPTER 6: SUMMARY AND CONCLUSIONS

6.1 Summary of the Research

As mentioned in the Introduction to this thesis, the objective of this study was to investigate the current use of ICT by special education teachers in primary schools in the KSA who work with students with intellectual disabilities in their teaching practice. Accordingly, the study proposed to investigate the perceptions of special education teachers in primary schools in the KSA concerning the concept of ICT and its advantages and disadvantages and to understand the influences supporting or hindering the use of ICT with students with intellectual disabilities in primary schools in the KSA.

The aims of the present study were the following:

1. To identify the current scenario with regard to the utilisation of ICT in classrooms for students with intellectual disabilities students in the KSA, and the teachers' perceptions on the topic.

2. To recognise the teachers' perceptions on the factors that impede the utilisation of ICT in the education of students with intellectual disabilities in the KSA.

3. To recognise the potential factors considered by teachers in the viable implementation of ICT for educating students with intellectual disabilities.

The following research questions were devised to pursue these aims.

Q1: What are the perceptions of Saudi teachers with regard to the use of ICT for students with intellectual disabilities?

Q2: What are the perceptions of Saudi teachers with regard to the main barriers encountered by special education teachers in using ICT for students with intellectual disabilities?

Q3: What are perceptions of Saudi teachers with regard to the main factors that contribute to the utilisation of ICT for students with intellectual disabilities in the KSA?

The study utilised a research design composed of two phases to answer the research questions. The first or qualitative phase consisted of interviews which were analysed using thematic analysis. The resulting themes were used to design the questionnaire for the second or quantitative phase of the study. A total of fifteen boys' primary schools participated in this study. Fifteen interviews were conducted in the qualitative phase with special education teachers who worked with students with intellectual disabilities in the schools. The participants in the quantitative phase were 100 special education teachers from the participating schools.

Overall, the study was able to obtain answers for the three research questions and thus fulfil its aims and objectives. Thus, the study was able to acquire an understanding of the perceptions of special education teachers in the KSA concerning the use of ICT for students with intellectual disabilities. Moreover, insights could be obtained regarding the barriers encountered by the teachers and the factors they believed could contribute to the enhancement of the use of ICT in the education of students with intellectual disabilities in the KSA.

The next section provides the researcher's reflections on the study.

6.2 Researcher's Personal Reflections on the study

During the course of this study I had opportunity to thoroughly study, appreciate and grasp the manner in which special institutes operate. That is, the manner in which they offer services to students with intellectual disabilities. Moreover, I could examine, discover,

recognise and understand such institutes as I could visit many centres and institutes for students with intellectual disabilities on many occasions. For instance, I could visit many of the Institutes for the Mentally Retarded as well as the Prince Salaman Centres for Disability, Research (H.R.H. Prince Salaman Bin Abdulaziz, Founder and Honorary Chairman) and observed the support they provide for persons with intellectual disabilities and their families. Furthermore, I utilised every opportunity to become acquainted with and converse with persons in my country who have been significant and persuasive influences in increasing governmental and public understanding of the inclusive education of persons with SEN, in general, and with intellectual disabilities, in particular. This, especially, was both motivating and commendable.

My PhD journey equipped me to determine and acquire the skills required through the various stages of the process of research. I had many experiences, some pleasant, some otherwise. I also revelled in discovering the cultural viewpoints of teachers and receiving the opportunity to perform fieldwork for the study, establishing contacts with other researchers, going to various types of institutes and participating in associated symposia, conventions, seminars, lectures, and so on. Moreover, I was able to interact with a few parents of students with intellectual disabilities.

At the University of Birmingham, UK, I worked with colleagues, both in my own department and in others, and participated in lectures, workshops, seminars, and so on. I also finished modules associated with my own research interests and gained the right to use literature connected to my study and to educational systems, in general, which facilitated my critical thinking. Moreover, consultations with lecturers and authorities and practitioners in SEN offered me the occasion to deliberate more deeply about the cultural considerations associated with the usage of ICT with students with intellectual disabilities.

My reasoning skills and the resultant achievements can be attributed to my exposure to and use of theoretical models during my tenure as PhD researcher in the University of Birmingham between mid-2013 and 2017. In the context of the present study, the exercise of my reasoning skills facilitated my understanding of the manner in which the outlooks and perspectives of teachers could influence the use of ICT with students with intellectual disabilities and their own teaching skills.

All through my PhD journey, the knowledge I have developed has changed the way I think and enhanced my confidence making me better equipped for my field, that is, special education, and for professional commitments in the future. Every day I had the opportunity to absorb new content and acquire a deeper awareness of what it entails to be a researcher in the area of ICT usage with students with intellectual disabilities.

Along with the many advantages, there were undoubtedly some peaks and valleys: days where I despaired, felt drained, bewildered, perturbed, in part due to my desire to have a well-conceived, beneficial study and also since I had to leave my family behind in KSA. However, it has all been worth it in the end and I believe that I can a difference in improving the existence of students with SEN, in general, and with intellectual disabilities, in particular, and their families in KSA.

The next section summarises the contributions of the study.

6.3 Contributions of the study

The unique contributions of the study are summarised in this section.

First, to the best of our knowledge, this is the first study which focuses on the perceptions of special education teachers on using ICT tools and devices for students with intellectual

disabilities in primary schools in the Arab world, in general, and in the KSA, in particular. As could be seen in Chapter 2, research and awareness on students with intellectual disabilities in inclusive educational settings is at nascent stage chiefly because the inclusion of such students is a fairly recent phenomenon. Therefore, this study contributes to the international discussions on using ICT with students with SEN in the school environment by highlighting the perceptions of special education teachers in this matter. Also, this study provides insights regarding the barriers affecting the use of ICT in schools, in general, and the continued lack of infrastructure and equipping for teachers to deal with students with SEN.

Second, this study serves to draw global attention to the current status of educational reform and measures existing in the KSA with regard to the inclusive education of students with intellectual disabilities. As a significant member of the Arab Council, initiatives undertaken it would appear to seem that the KSA can serve to influence and inform its neighbours in the Persian Gulf particularly with regard to ICT usage. However, the findings of the study indicate otherwise, that is, the country has a long way to go in implementing ICT-related educational reforms. Furthermore, awareness is also provided with regard to the progress of ICT usage in the country with particular emphasis on mainstream boys' primary schools. This will aid social commentators, who care to investigate more deeply, to understand if there is disparity in the facilities and services provided in boys' and girls' schools across the globe.

The next section summarises the recommendations arising from the study.

6.4 Recommendations

The present study has scrutinised the perceptions of a small samples of special education teachers with regard to the use of ICT in the education of students with intellectual disabilities in the KSA. Some recommendations have evolved consequent to the findings of the study

which can be utilised in further research with a broader sample of special education teachers across the regions of Saudi Arabia and perhaps with regard to students with different forms of disability. Such endeavours may be able to, following consideration of meticulously gathered and examined data, generate findings which are more generalisable. It is my desire that these recommendations will result in the advancement of more robust practices for the utilisation of ICT in the education of students with intellectual disabilities in inclusive mainstream schools in the KSA. The key recommendations arising from the present study fall into two categories namely, recommendations directed to the Ministry of Education and recommendations directed to teachers. These are described in the following sections.

6.4.1 Recommendations directed to the Ministry of Education (policy)

As could be seen from the findings and accompanying discussion, several gaps could be recognised in the educational infrastructure in the country with regard to the matter under consideration. As the Ministry of Education is a significant and influential participant in all matters concerning education in the KSA, the Ministry's participation in the facilitation of the use of ICT with students with intellectual disabilities is critical to make sure that such students are provided every opportunity to receive education in school that incorporates the use of ICT. It is the desire of this researcher that ICT be regarded as an inclusive teaching method that can be employed to support students with intellectual disabilities. Accordingly, the following recommendations are set forth for policy makers in the Ministry.

- Establishment of standard training programmes in ICT for teachers. Although some manner of training exists for teachers there is no mechanism currently available to ensure that all special education teachers undergo a certain level of training prior to their taking assignments with students with intellectual disabilities. Consequently, the extent of ICT

usage differs across schools and between individual teachers. Moreover, follow up workshops can be organised where teachers can meet their peers from other schools and experts from the Ministry and obtain up-to-date information about the present trends in ICT use.

- Include ICT in the curriculum for students with intellectual disabilities. A strategic objective of the MoE is to develop a curriculum for students with intellectual disabilities that utilises best practices from successful programmes implemented across the globe. Moreover, the MoE intends to put high-quality approaches for teaching into operation (Almasoud, 2013). It is recommended that ICT be included in the curriculum by the MoE due to the advantages of its use with students with intellectual disabilities.

- Creation of ICT resources in Arabic. This study found that a significant barrier to the use of ICT resources in the education of students with intellectual disabilities was the lack of resources developed in Arabic. The availability of resources in Arabic will increase their use by teachers as the terms and phrases utilised in the resources will be familiar to the students and will also improve the outcomes of their use. Incentives could be provided to local software and educational firms to develop expertise to develop appropriate software in Arabic for use in the country.

- Provision of adequate funding for ICT-related educational initiatives. Another significant barrier found by the present study was the lack of funding for ICT resources. Thus, it is recommended that the MoE allocate sufficient funds for the procurement of ICT resources and to support other ICT-related educational initiatives.

- Provision of sufficient ICT resources for teachers. It is recommended that the MoE ensure that teachers are provided with adequate personal ICT resources as this will facilitate their

preparation for their classes and also help them to devise new approaches for dealing with their students with intellectual disabilities.

6.4.2 Recommendations for teachers

- Awareness of the specific needs of a student. Teachers must be aware that the needs of every student with intellectual disability is likely to be unique and hence they must take sufficient care to ensure that they understand the specific needs of a student before determining the kind of ICT resource to be utilised with them. In other words, teachers must spend adequate time in understanding the needs of the students so that they can determine the manner of ICT resource which will be most beneficial for the student.

Table 6.1 presents the findings from the study and the corresponding recommendations.

Table 6.1: Findings and Corresponding Recommendations

Findings	**Recommendation(s)**
Lack of training for teachers in the use of ICT, in general, and for use with students with intellectual disabilities, in particular	Establishment of standard training programmes in ICT for teachers
Including ICT in the curriculum of the students with intellectual disabilities could improve the use of ICT in schools	Include ICT in the curriculum for students with intellectual disabilities
Lack of educational software in Arabic	Creation of ICT resources in Arabic
High costs of educational software Lack of adequate budget provision for ICT	Provision of adequate funding for ICT-related educational initiatives

Findings	Recommendation(s)
tools and devices in the schools	
Inadequate ICT infrastructure in schools	Provision of sufficient ICT resources for teachers
The use of ICT with students with intellectual disabilities required careful planning and implementation as the needs of such students vary and their responses to different ICT tools may also vary	Teachers' Awareness of the specific needs of a student

The next section lists the strengths of the study.

6.5 Strengths of the study

One of the chief strengths of this study was the use of a mixed methods approach to obtain data for consideration. Data collection was achieved by using semi-structured interviews and a custom questionnaire. The mixed methods offered an intensity and width of information and also the opportunity to cross verify the data obtained from the two tools. That is, the analysis of both sets of data permitted the researcher to compare the qualitative and quantitative data to recognise whether one set of data confirmed or countered the findings of the other. Correlations obtained in this manner increased the validity of the collected data. By using semi-structured interviews, the teachers were able to narrate their experiences with regard to ICT usage in the mainstream schools and the salient barriers which hindered this use. Thus, they were able to describe their experiences in their own words rather than being limited to a questionnaire. On the other hand, teachers who did not want to participate in face-to-face interactions with the interviewer could still provide some insights by filling up the questionnaire. Therefore, the researcher could accommodate not only teachers who preferred

to establish a rapport him and enter into a discussion through the interviews but also teachers who preferred the anonymity of the questionnaire. Furthermore, the researcher undertook the necessary measures to avoid issues related to validity and reliability in both the qualitative and quantitative phases of the study.

The next section lists the limitations of the study.

6.6 Limitations of the study

A few limitations can be observed in the study. These are described below.

1. The study was undertaken in fifteen mainstream schools in one city. Consequently, the perspectives of teachers were obtained from a limited population who have apparent privileges including access to inclusive education settings and not much difficulty in obtaining ICT or related resources. As Jeddah is one of the biggest cities in the KSA, schools typically have greater facilities and resources and the same are available to the teachers and students with intellectual disabilities in the city. Thus, this study did not include the perspectives of teachers from mainstream schools in other cities, which restricts the merits and value of the findings.

2. The sample for the study was limited with 15 teachers participating in the interviews and only 100 participating in the quantitative phase of the study.

3. The researcher was able to spend only a period about three months in data collection, a relatively short period. A more protracted period of data collection exercise might have offered a deeper understanding and superior insights.

4. Any attempt to generalise the findings of this study must take into account the limitations of the study. Thus, this study implemented an approach that aspired to

achieve more profound insights of the issue under consideration, but largely overlooked generalised outcomes over bigger populations. The chief emphasis of the current study was to understand the actual usage of ICT with students with intellectual disabilities in fifteen mainstream schools of Jeddah city. However, the insights obtained from the current study may be used for comparable contexts, notwithstanding the fact that generalisation was not an objective of the study (Cohen et al., 2013).

5. As a male researcher, I could only interact with male teachers due to the cultural restrictions customary in the KSA and the preventive guidelines for social communication between the genders, even in working environments. As a result, this study lacks the perceptions of female teachers. Thus, this could be believed to limit the applicability of the study's findings to male-dominated settings.

6. Another limitation of the study is associated with the translation of data. As mentioned earlier, the interviews were conducted in Arabic and the data gathered from these were then translated into English. This translation could have adversely impacted the tones or the implications of the teachers' responses. Nevertheless, I made every attempt to ensure that the translation was exact. Moreover, I sought the assistance of numerous colleagues fluent in English and Arabic, and who were also PhD students, with the translation and validation. However, it must be noted that I did employ the process of double translation to confirm the accuracy of the translations.

7. Only a single source of data was utilised for the study, namely teacher attitudes. A more in-depth investigation could have been achieved if observation of teacher practice had been included or if a greater variety of participants could have participated in the study, for instance, other stakeholders in the education of students

with intellectual disabilities, such as their peers, principals, social workers, special education teachers and teacher assistants.

8. The views of parents could have offered insights into how the use of ICT helped students with intellectual disabilities in the family environment. However, the present study did not consider the perspectives of parents.

The next section provides suggestions for further research.

6.7 Suggestions for Further Research

The current study's findings and limitations reveal some avenues for future research. For example, a future study could investigate the perceptions of female teachers in mainstream girls' schools in the KSA to obtain a feminine perspective on the situation. Another area for further research could be the perceptions of teachers across the different regions of Saudi Arabia. A third opportunity for future research is a comparison of the perceptions between teachers in urban areas in the KSA and teachers in the rural schools to understand the regional impacts of ICT availability and use for students with intellectual disabilities. The socio-cultural environment of the KSA offers a further direction for research wherein the same situation, that is, the use of ICT with students with intellectual disabilities, could be examined from a socio-cultural lens. Moreover, the influence of religion on ICT usage in schools could be investigated.

6.8 Concluding remarks

The objective of the current study was to determine the perceptions of special education teachers with regard to the use of ICT for students with intellectual disabilities and to ascertain the barriers and factors respectively impeding and supporting the use of ICT with

such students in mainstream schools in the KSA. Accordingly, this study examined the opinions of teachers with respect to the use of ICT in mainstream boys' primary schools in the Jeddah region of Saudi Arabia.

The study's findings revealed that while special education teachers may be aware of the various facets of ICT use with students with intellectual disabilities, several gaps could be detected in the encompassing educational infrastructure in the Kingdom of Saudi Arabia. It is hoped that the recommendations forthcoming from this study would be implemented by the Ministry of Education to fill these gaps, in addition to all their on-going initiatives, and facilitate the provision of effective inclusive educational services, with particular emphasis on the use of ICT tools and resources, to students with intellectual disabilities in the country.

APPENDIX A

INTERVIEW SCHEDULE

The duration of the interview is approximately 30 to 35 minutes. There are three major sections, with each lasting about 10 minutes to 12 minutes. The three key sections that will be covered by the researcher in the interview will be explained to the interviewees. In the first few minutes of the interview process, the researcher will focus on:

1. Presenting the aims and objectives of the research and the person conducting the research.

2. Highlighting confidentiality, privacy and data protection guidelines. As specified in the ethical policies of the University of Birmingham, the researcher and all other major contributors to this research will ensure confidentiality of the information provided by all participants, which also includes utmost protection of any information collected, with all data being used for research-related purposes only. A letter clarifying the significance of this research to the educational field in the KSA will be sent to each interviewee, who will also be introduced to the topics to be addressed during the interview process. This is to give interviewees ample time to contemplate over them in order to provide well thought-out responses. While participation is on a voluntary basis, informants will also be ensured anonymity.

Receiving the participant's consent to take part in the research.

Researcher (interviewer):

Participant (interviewee): No:

Place:

Date:

Time:

Some basic information about the participant:

Educational qualification:

1. Teacher College Degree
2. University Degree (BA)
3. Higher degree (M.Sc., Med, PhD).
4. Other……

Section One: Present utilisation of ICT

1- Describe how you would use ICT in your teaching these days?

2- Where do you classify your use of ICT?

- Utilising ICT to complement the curriculum

- Utilising ICT to consolidate the curriculum

- Utilising ICT to facilitate the introduction of a curriculum

3- What are the reasons for (or not) using ICT in the classroom?

4- What makes you want to use ICT in the classroom?

5- Are you motivated to use ICT in the classroom? If yes, where has that motivation come from?

6- As a result of the introduction of ICT, how have you changed your teaching methods?

7- Are there any obstacles impeding your use of ICT in teaching? What are they?

- Are there any problems in terms of hardware?

- Is there a problem with regards to time?

- Is there a problem in terms of gaining access or organisation of computers?

- Is there any personal access to ICT whether at school or at home?

- Are there any problems in terms of ICT resources?

8- Are there any other aspects that might come from outside the classroom that affect your work as a teacher?

- Is there a problem with regards to supervisors of teachers?

- Is there a problem with regards to the school administration?

- Is there a problem with regards to the duties of the teacher outside the classroom?

- Others?

Section Two: Teachers perceptions of ICT

9- What are your views regarding the introduction of ICT in educational institutions in the KSA?

10- How useful do you think using ICT in teaching is?

11- In your opinion, what are benefits in respect to utilising ICT in teaching?

12- Please list any positive impacts of using ICT?

13- Do you believe in training as an important motivator driving ICT use? How?

Part Three: Future of ICT

14- Are there any other aspects you would you like to study further in relation to:

a) Management skills?

b) ICT skills?

c) Technical skills?

d) Use of ICT in the classroom?

15- Based on your own personal experience, can you suggest any other solutions to enhance ICT usage in the future?

16- Are there any changes you would you like to be introduced into your classroom environment both in the short and long term?

17- In your opinion, will teaching practices be affected in the light of these changes? If so, how?

APPENDIX B

QUESTIONNAIRE

Hi,

I have undertaken a PhD research study on "*Teachers' Perceptions of Using ICT with Students with Intellectual Disabilities in Primary Schools in Kingdom of Saudi Arabia.*" I would be grateful if you could spare your valuable time to contribute to my study by filling up the questionnaire. The data collected through this questionnaire shall be kept confidential and will be used for academic purpose only.

Regards,

Hani Alamri

Section I: Demographic Information

1. Age:

   □ 21-25 years □ 26-30 years □ 31-35 years □ >35 years

2. Educational Qualification:

   □ Graduate □ Post-Graduate □ Doctorate □ Diploma

3. How many years have you worked with students with intellectual disabilities?

   □ ≤1 year □ 2-5 years □ 6-10 years □ >11 years

4. How many years have you used ICT tools in school?

   □ ≤1 year □ 2-5 years □ 6-10 years □ >11 years

5. Does the Individualised Education Programme (IEP) team in your school recognise the need for ICT tools to be used with students with disabilities?

□ Yes □ No

6. Have you been offered training courses for effective utilisation of ICT tools while teaching?

□ Yes □ No

7. How many years have you used ICT tools in school with students with intellectual disabilities?

□ ≤1 year □ 2-5 years □ 6-10 years □ >11 years

8. Do students with disabilities at your school have access to ICT tools?

□ Yes □ No

Section II: Teachers' perceptions of using ICT for students with Intellectual Disabilities

9. What are your perceptions of the concept of ICT? Please provide your response by indicating your level of acceptance of the following statements.

Sl #	**Statement**	**Strongly Disagree**	**Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
1	ICT means teaching and learning using ICT tools such as computers					
2	ICT is the modern way of teaching where teachers use technological devices and approaches in teaching					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	particularly in relation to students with disabilities					
3	ICT implies tools that can be used in instruction and teaching specific concepts and skills to support students with Intellectual Disabilities					
4	The intent of ICT is to create new interaction of teachers and students with disabilities.					
5	ICT where a teacher is expected to use interactive boards, monitors, projectors and computers when teaching					
6	ICT involves using technological tools to teach students					
7	ICT is a complex way of teaching as a significant amount of time is required to					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	gather or develop content					
8	ICT is where software programmes are used to allow students with disabilities to better understand the learning material.					
9	ICT is where teachers and students use technology in addition to conventional approaches to teaching and learning.					
10	ICT seeks to integrate technology in teaching and learning to create a better experience.					
11	ICT are tools meant to improve the capacities of students to understand different topics and subjects.					

10. ICT use has the following advantages. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	ICT offers an alternative means of communication in the classroom					
2	ICT provides access to learning material in a very convenient manner					
3	ICT use enhances the motivation of students.					
4	ICT use in the classroom can help students with Intellectual Disabilities in communication and literacy.					
5	Many ICT tools can be used by students with disabilities					
6	ICT use helps in overcoming barriers of time and enhances the necessary functioning and development of critical skills among students with disabilities					
7	ICT contributes to increased					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	effectiveness of the learning processes by helping students with disabilities to actively take part in teaching and learning					
8	Assistive tools facilitate the social participation of students with vision and hearing impairments.					
9	ICT tools, assistive technology in particular, have the capacity to create a more meaningful existence in school for students with disabilities					
10	The use of ICT tools, such as screen keyboards, enhance the communication skills and spelling performance of students with speech impairments					
11	ICT enhances the literacy skills and language of students with					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	disabilities					
12	The use of ICT tools increases the physical participation of students with disabilities in classroom activities					
13	Assistive tools, such as portable communication and writing aids, not only help in productivity and literacy of students with disabilities, but also in building social relationships					
14	The independence of students with disabilities is increased by the use of ICT in the classroom.					
15	ICT use has the potential to support and enhance the social and academic activities of student with disabilities					
16	The use of special software can					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	help students improve their writing skills.					
17	ICT can enhance reading, learning and vocabulary for communication among students with disabilities					
18	The use of computers is beneficial to students with mild motor impairment as it can improve their language skills by reducing errors in writing.					

11. There are disadvantages to the use of ICT. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	High dependence on technology by students with disabilities can be a problem in different environments, such as					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	at home					
2	Use of ICT does not directly result in independence, competence and social acceptance for students with disabilities					
3	ICT use, specifically use of assistive devices, can result in public labelling of students with disabilities					
4	Using assistive technology that does not match the needs of students with disabilities could have adversely affect the students.					
5	ICT use demands highly-skilled teachers					
6	ICT tools are prone to failure and their reliability could be compromised					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
7	Problems with network connectivity can affect the reliability of ICT devices					
8	ICT use is not dependable as the students have a problem using ICT					
9	ICT requires a lot of time as the teacher has to attend to different students with varying needs					
10	The costs involved in ICT use are very high					
11	Inability to use ICT tools and devices may cause anxiety in students with disabilities					
12	Technological hitches negatively affect students with disabilities					
13	Heavy ICT use by students with disabilities can limit their					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	capacity for self-improvement					

Section III: Main barriers encountered by teachers in using ICT for students with Intellectual Disabilities

Barriers encountered in the work environment

12. Do you lack the encouragement to use ICT in your classroom? Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	I am discouraged from using ICT in my classroom due to the attitudes of other teachers					
2	I do not receive enough support from the school head concerning the use of ICT in the classroom					
3	I am not compensated for the additional effort and time I spend in using ICT					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
4	I lack the self-confidence in using various ICT devices and this discourages me from their use					
5	Past adverse experiences with the use of the ICT restrict my use of ICT					
6	At times I do not enough time to use ICT due to my classwork.					
7	I fear that I will not be able use ICT effectively since some of the devices are new to me					
8	I fear that my lack of knowledge with ICT devices will cause me to fail and be embarrassed in front of my students					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
9	Classroom management is a barrier to ICT particularly where the devices are few					
10	The school does not motivate me to use ICT					
11	Lack of change management skills prevent me from using ICT					
12	The lack of motivation to change the traditional teaching methods is a major setback in use of ICT					
13	Inadequate time to prepare for ICT lessons hinders my use of ICT					

13. Is there a lack of ICT equipment in your school? please provide more details by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	My school does not have enough ICT equipment					
2	My school has old and outdated equipment					
3	There are very few ICT devices in my school.					
4	My school provides obsolete software and hardware					
5	The classroom infrastructure cannot accommodate enough ICT equipment for all students					
6	The machines are not well maintained, so they don't count					
7	The equipment needs constant checks and regular maintenance					
8	Machines regularly breakdown and are					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	unavailable for use					
9	There are insufficient devices for the number of students in the school					
10	There is a shortage of equipment as they are high-priced					

14. Is there adequate provision for technical support and maintenance for the ICT equipment in your school? Please provide more details by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	There is no institutional support regarding the planning and use of ICT					
2	My school does not have a well-staffed technical team					
3	Routine maintenance like dusting or scanning of the computers to remove virus are					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	not regularly performed					
4	The technicians are slow to respond to requests for assistance					
5	I do not receive adequate technical support on how to use the ICT devices					
6	The technical support staff are overworked					
7	There is no clear policy on maintenance of the ICT devices					
8	Technical support overlooks issues, such as electricity spikes and poor handling of the ICT devices by students					
9	The school does not regularly maintain even the simple assistive device, such as speakers and writing pads					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
10	In my school, the devices are forgotten once they are purchased and installed.					

Teacher-related issues

15. Is there a lack of continuous training about ICT? Please provide more details by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	ICT keeps on changing, but we hardly have regular training regarding the use of ICT in classroom					
2	My school has not organised any training this year					
3	For effective use of ICT in school, teachers should be continuously trained on new equipment, techniques and approaches					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
4	Training equips teachers with greater confidence and motivation to use ICT, but is not carried out regularly enough.					
5	Limited ICT skills, anxiety and fear of failure can be addressed by continuous training of teachers.					
6	Training offers the opportunity to mix with experts and other teachers and to share experiences which encourages me to use ICT					
7	Lack of ICT training for teachers can make them shy away from embracing ICT.					
8	In-house training on continuous basis can improve my understanding of ICT					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	equipment					

16. Are you willing to adopt ICT tools and devices? Please provide more details by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	I do not see the need of using these devices or techniques like PowerPoint slides while I can teach using my usual methods					
2	I can make an interactive lesson without necessary using ICT tools					
3	The traditional techniques of teaching make the students to feel and touch and learn better.					
4	I feel inconvenienced whenever am preparing lessons that require use of ICT because it is time consuming and its					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	benefits are minimal.					
5	I think using music, colours and images to create an interactive classroom is not suitable for a 16 years old student even with disability.					
6	I am poor at using the computer or laptops and besides it takes a lot of time, so I don't like using them.					
7	I believe that the importance of ICT is exaggerated					
8	ICT makes students lazy, therefore I like the traditional way.					
9	ICT benefits are small and they can be covered by the usual teaching, this means there is no need to stress the use of ICT in classrooms.					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
10	The workload I have is already too much, I have no interest of again preparing lesson through ICT tools.					
11	I think ICT is meant for some students with severe disabilities but not minor disabilities.					

17. Non-availability of educational software in Arabic is a barrier to the use of ICT. Please respond by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	Most of the educational software on the market is English dominated and this causes a problem to them particularly when teaching young students with language disability					
2	Content is very critical in effective use of ICT but many					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	software on the market are not in Arabic					
3	Although some content is available in Arabic, it is of little relevance to my teaching because the content was developed in foreign countries					
4	It appears that we have few software experts who are interested in developing software for children with disabilities in this country, because they are not many software available in Arabic					
5	We are expected to teach using Arabic software, yet the school does not provide adequate software for this.					
6	The Ministry of Education has done little in providing teachers with enough computer					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	programmes in Arabic that can be used in teaching of students with disabilities.					
7	Despite the efforts that the schools have put in, there is clearly lack of strategic acquisition of Arabic software that can be used to meet the objective of use of ICT in schools					

Financial Issues

18. Insufficient external funds for ICT implementation in schools is a barrier to the use of ICT. Please respond by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	The cost of ICT required to assist students with disabilities particularly those with severe disabilities is too high since					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	they require tailor-made assistive technology.					
2	Though funding of ICT can be obtained from other sources apart from the government, these funds are not adequate.					
3	The government has tried to provide enough funds, but the amounts required are always increasing and there not enough since ICT tools are costly					
4	One reason why ICT use lacks behind in this school is because little budget is given to educational software and this means not using some programmes that are very important for class work.					

19. Insufficient school budgets is a barrier to the use of ICT. Please respond by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	Some student with disabilities requires individualised programmes and special ICT tools and the school do not have such a budget.					
2	Financial constraints are among the major barrier to the school in acquiring ICT devices to students					
3	Though the schools understand the importance of ICT use for student with disabilities, the school does not enough to purchase specialised ICT for each of the students.					
4	There are many activities that entail ICT use for example, in-house training, workshops, maintenance, and these all requires money, but the school has no budget for all these.					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
5	Though the schools try to ensure that it gets ICT devices for each student even those with severe disabilities, it has not fully managed this because of the limited funds.					
6	The government is not quick to respond to the financial needs of the schools, due to the bureaucracy involved.					

Section IV: Main factors contributing to the development of the use of ICT for students with Intellectual Disabilities

Requirements factors for teachers' development of using ICT

20. Providing teachers with adequate information about the importance of using new technology in education of students with Intellectual Disabilities will contribute to the development of the use of ICT for such students. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	Providing teachers with the right information regarding ICT will enhance use of ICT.					
2	Culture can hinder the use of ICT and therefore teachers need to be educated on need of adopting culture that promotes use of ICT.					
3	Past experiences and beliefs acts as barriers to ICT use and teachers have to be given new experiences and beliefs to embrace ICT.					
4	Perceptions can significantly influence acceptance of ICT by teachers, there is need to have the right knowledge to form correct perceptions.					
5	With right information teachers will have positive views towards the integration of ICT					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	in their teaching.					
6	The key element towards use of ICT is instilling the right beliefs and attitudes, and this has to be done for those who have little knowledge on use of ICT.					
7	Some teachers believe that use of ICT has negative outcomes on students, such teachers have to be told clearly they is need to use ICT					
8	Some teachers use religion to resist the use of ICT, and therefore the school should handle such cases to increase the success of ICT					

21. Providing continuous training for teachers will contribute to the development of the use of ICT for students with Intellectual Disabilities. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	Continuous training will equip teachers with new techniques and skills hence make them better ICT users.					
2	Through continuous training, teachers will be able to enhance their pedagogy and thereby successful use ICT					
3	One way of improving the motivation and self-confidence was through regular training which will lead to better ICT implementation.					
4	When the schools organise for regular training such as workshops, teachers are able to understand better why they should use ICT					
5	Training is important since it sharpens the skills of teachers and give them first-hand					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	experience					
6	If the school wants teachers to be effective, it has to ensure that it brings regular experts for training on ICT.					
7	Apart from skills development, training is necessary to remove the fears teach have and offer knowledge support.					

22. Providing ICT devices for each teacher within mainstream schools will contribute to the development of the use of ICT for students with Intellectual Disabilities. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	Devices are important elements in teaching of ICT in mainstream schools and this will go a great way in improving ICT teaching in					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	these schools					
2	Equipping each teacher will be a great way of assisting students with special needs and the normal ones in use of ICT.					
3	Lack of ICT devices hinders successful use of ICT in mainstream schools, providing these devices will solve these problems.					
4	The devices will allow teachers to address the needs of students in an effective manner.					
5	With the right devices for each teacher, the will be encouraged to take in students with special needs.					
6	When teachers are provided					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	with devices sharing will end and this means improved teaching using ICT devices.					
7	Teachers in mainstream schools will embrace more use of ICT when they are each provided with devices.					

Requirements factors for schools' development of using ICT

23. Including ICT in teachers' preparation programmes will contribute to the development of the use of ICT for students with Intellectual Disabilities. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	Teachers remain main players in ICT programmes should be included in their preparedness programmes to enhance their contributions					
2	The training of teachers should as well incorporate					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	use of ICT to enable these teachers be equipped well for future use of ICT.					
3	When teachers are trained in ICT at their colleges and universities they will have a better understanding of teaching using ICT.					
4	Training of teachers on ICT is necessary and very important; therefore, including ICT in preparation programmes will enhance ICT skills among teachers.					
5	Including ICT in teachers 'preparedness reduces the negative perceptions they have about use of ICT.					
6	Technological skills and competences are key to use of ICT, and if ICT is included in					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	teachers' preparedness, their skills and competences will be sharpened.					
7	Teachers will be better prepared to use ICT when their preparations start at their training.					
8	This will be a good strategy of improving the overall use of ICT in schools.					

24. Providing schools with enough educational resources, hardware and software suitable for teaching different skills to students with Intellectual Disabilities in Arabic language will contribute to the development of the use of ICT for such students. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	Provision of enough resources in Arabic will motivate teachers in using ICT devices					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
2	When each student is provided with his/her learning device, and Arabic software, they learn better and even teachers have an easy time.					
3	If we have many Arabic software, teachers will be able to address the individual needs of each student.					
4	Enough Arabic software will highly enhance language learning and among students.					

25. Preparing schools with sufficient network and Internet access will contribute to the development of the use of ICT for students with Intellectual Disabilities. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	There is need to have a reliable Internet connection					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	with high speed for effective use of ICT particularly where online teaching is concerned					
2	In modern days' Internet is required 24/7 and the school boards together with the head teacher has to ensure this for smooth running of ICT					
3	With good Internet connection, teacher can take their teaching lesson and other teaching resources with them and access them later from the school's server.					
4	Mobile computing make a great change in the way ICT is integrated in lessons such as mathematics and therefore Internet connection should be stressed.					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
5	Efficient Internet connection will reduce time and thereby motivate teachers to use ICT.					
6	If we have more technical support to ensure that networking and Internet connection works perfectly, we will achieve much more in use of ICT.					

26. Providing financial support to schools to obtain ICT devices will contribute to the development of the use of ICT for students with Intellectual Disabilities. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	To develop ICT use in this school, the government should have a proper strategy of financing the school to get enough and decent ICT devices.					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
2	Proper budgeting should be done to buy the most used ICT devices and not just big computer.					
3	Proper framework towards equipping ICT in the school should be followed by enough funds from the government.					
4	Integrating ICT into school teaching and learning demand a high budget and this calls for sufficient funding from the government and other players.					
5	Sufficient funds are important in ensuring that ICT is successfully implemented at school by purchasing required devices.					

27. Including ICT implementation in curriculum of students with Intellectual Disabilities will contribute to the development of the use of ICT for such students. Please provide your response by indicating your level of acceptance of the following statements.

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1	To enhance use of ICT in the classrooms it is important to include it in the curriculum to create enough time of teachers.					
2	To increase the seriousness of which teachers treat ICT learning, the ministry of education has focus on strengthening ICT in special education curriculum.					
3	Putting ICT in the curriculum will ensure that it achieves its objectives.					
4	Putting ICT lessons in curriculum will help teachers in lesson planning.					
5	It is necessary to treat ICT as					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
	part of mainstream lessons hence included in curriculum."					
6	Having specific lesson formally in the curriculum will help teachers to treat ICT lessons with more seriousness.					
7	Additional resources in forms of devices and funds will be allocated more when the ICT lessons are integrated in school curriculum.					
8	ICT curriculum should be reviewed on regularly to update the educational needs of students with disabilities.					
9	By putting ICT in school curriculum it will be easy to develop suitable lessons that match individual needs of the students."					

Sl #	Statement	Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
10	The ministry has to support use of ICT by including it in school curriculum at every level.					
11	The importance aspect of curriculum is planning, so ICT lessons will be well planned when in the curriculum."					
12	Inclusion of ICT lessons in the school curriculum will address the interests of students.					

Thank you very much for your time and effort in completing this questionnaire!

APPENDIX C

Interview extracts – Not coded

Extract from interview translated transcript: Theme (2)

Q11- In your opinion, what are benefits in respect to utilising ICT in teaching?

T1: "the benefits of ICT in the classroom is founded on the possibilities of ICT offering an alternative way of communication and providing access to learning material in a very convenient manner and enhancing the motivation of students."

Extract from interview translated transcript: Theme (4)

Q7: Are there any obstacles impeding your use of ICT in teaching? What are they?

T6: "I was discouraged by some teacher who said that ICT has a negative effect on children with disabilities since they heavily depend on ICT."

Extract from interview translated transcript: Theme (7)

Q16: Are there any changes you would you like to be introduced into your classroom environment both in the short and long term?

T12: "if we have more technical support to ensure that networking and Internet connection works perfectly, we will achieve much more in use of ICT."

Coded Extracts

Extract from interview translated transcript: Theme (2), codes applied for Theme 2

T2: Advantages of ICT use	Coded label
Q11- In your opinion, what are benefits in respect to utilising ICT in teaching?	Advantages of ICT use (*ICT Adv.*)
(T1) "the benefits of ICT in the classroom is founded on the possibilities of ICT offering an alternative way of communication and providing access to learning material in a very convenient manner and enhancing the motivation of students."	ICT offers alternative way of communication; convenient access to learning material; and improves student motivation (*ICT Adv.*)

Extract from interview translated transcript: Theme (4)

ST1: Lack of encouragement for teachers to use ICT effectively	Coded label
(Q7) Researcher: Are there any obstacles impeding your use of ICT in teaching? What are they?	Obstacles to use of ICT in teaching (*Barr. ICT. Work.*)
(T6) "I was discouraged by some teacher who said that ICT has a negative effect on children with disabilities since they heavily depend on ICT."	Environment-related factors (*Lck. Enc.*)

Extract from interview translated transcript: Theme (7)

ST3: Factors contributing to the development of ICT use by teachers	Coded label
(Q16) Researcher: Are there any changes you would you like to be introduced into your classroom environment both in the short and long term?	Changes in environment (*Fctr. Tch. Dev.*)
(T12) "if we have more technical support to ensure that networking and Internet connection works perfectly, we will achieve much more in use of ICT."	Adequate information (*Adeq. Info.*)

Main themes, sub-themes and codes of interview extracts

Theme	**Sub-theme**	**Coding framework for thematic analysis**	**Coding label for themes**	**Coding label for sub-themes**
Perceptions of the concept of ICT	None	Concept of ICT	ICT Con.	ICT Con.
Advantages of ICT use	None	Advantages of ICT use	ICT Adv.	ICT Adv.
Disadvantages of ICT use	None	Disadvantages of ICT use	ICT Disadv.	ICT Disadv.
Barriers to ICT use in the Work Environment	Lack of encouragement for teachers to use ICT effectively	Lack of encouragement	Barr. ICT. Work.	Lck. Enc.
	Lack of availability of ICT devices	Lack of availability	Barr. ICT. Work.	Lck. Avl.
	Lack of technical support and maintenance	Lack of technical support	Barr. ICT. Work.	Lck. Tech.
Teacher-	Lack of continuous training	Lack of	Barr. ICT.	Lck.

Theme	Sub-theme	Coding framework for thematic analysis	Coding label for themes	Coding label for sub-themes
related barriers to ICT use	about ICT	training	Tch.	Trg.
	Lack of awareness of ICT advantages	Lack of awareness	Barr. ICT. Tch.	Lck. Aware.
	Lack of educational software in Arabic	Lack of educational software	Barr. ICT. Tch.	Lck. Soft.
Financial Barriers to ICT use	Cost of educational software	Cost of educational software	Barr. ICT. Fin.	Cst. Soft.
	Lack of schools' budget	Schools' budget	Barr. ICT. Fin.	Schl. Bud.
Facilitating ICT use by teachers	Provision of adequate information about the importance of using ICT in the education of students with Intellectual Disabilities	Adequate information	Tch. ICT. Use.	Adeq. Info.
	Provision of continuous	Continuous	Tch. ICT.	Cont.

Theme	Sub-theme	Coding framework for thematic analysis	Coding label for themes	Coding label for sub-themes
	training for teachers	training	Use.	Trg.
	Inclusion of ICT in teachers' preparation programmes	ICT in teachers' preparation programmes	Tch. ICT. Use.	ICT. Prep. Pgm.
	Provision of personal ICT devices for teachers within mainstream schools	Personal ICT devices	Tch. ICT. Use.	Pers. ICT. Dev.
Facilitating ICT use in schools	Provision of sufficient educational resources, hardware and software suitable for teaching different skills to students with Intellectual Disabilities in Arabic.	Sufficient educational resources	Schl. ICT.Use.	Suff. Edu. Res.
	Provision of sufficient network and Internet access	Sufficient network	Schl. ICT.Use.	Suff. Nw.
	Provision of financial support	Financial	Schl.	Fin.

Theme	Sub-theme	Coding framework for thematic analysis	Coding label for themes	Coding label for sub-themes
	to schools to obtain ICT devices	support	ICT.Use.	Supp.
	Inclusion of ICT implementation in curriculum of students with Intellectual Disabilities	Curriculum of students	Schl. ICT.Use.	Curr. Stu.

APPENDIX D

Jeddah LEA's permission letter

[redacted]

إلـــى : سعادة الملحق الثقافي السعودي بلندن . **المحترم**

مـــن : مدير عام التعليم بمحافظة جدة .

بشـأن : الموافقة على قيام باحث بتطبيق أدوات بحثه على عينة من معلمي طلاب ذوي الإعاقة العقلية بتعليم جدة .

السلام عليكم ورحمة الله وبركاته

إشارة إلى خطاب (المرفق) المتضمن الموافقة على مهمة الباحث / **هاني علي سعيد العمري ، المبتعث لدراسة مرحلة الدكتوراه** ، بجامعة Birmingham في مجال التعليم ، وتطبيق أدوات دراسته في الميدان التعليمي بتعليم محافظة جدة في دراسته التي بعنوان " **تصورات المعلمين حول استخدام تكنولوجيا المعلومات و الإتصالات مع الطلاب ذوي الإعاقة العقلية في المدارس السعودية** " واستجابة لرغبته في تزويدكم بالموافقة على المهمة و وفق أفادتكم .

نفيدكم أنه لا مانع من ذلك تشجيعاً للبحث العلمي ؛ وبما يعود على الوطن بمثل هذه البحوث الميدانية ، و نتمنى للباحث التوفيق والسداد .

Ministry of Education

والسلام عليكم ورحمة الله وبركاته

[redacted]

APPENDIX E

Participant consent form (English version)

Consent form

Title of the proposed study is Teachers' perceptions of using ICT with intellectual disabilities students in Saudi Arabia schools.

This information is being collected as part of a research project concerned with the obstacles facing teachers of students with intellectual disabilities in their employment of ICT, and the teachers' viewpoints about the factors that could contribute to a well-developed ICT strategy with intellectually disabled students in Saudi Arabia by the Department of Education in the University of Birmingham in collaboration with The Ministry of Education in Saudi Arabia.
The information which you supply and that which may be collected as part of the research project will be entered into a filing system or database and will only be accessed by authorised personnel involved in the project. The information will be retained by the University of Birmingham and will only be used for the purpose of research, and statistical and audit purposes. By supplying this information you are consenting to the University storing your information for the purposes stated above. The University of Birmingham in accordance with the provisions of the Data Protection Act 1998 will process the information. No identifiable personal data will be published.

Statements of understanding/consent

- I confirm that I have read and understand the participant information leaflet for this study. I have had the opportunity to ask questions if necessary and have had these answered satisfactorily.
- I understand that my participation is voluntary and that I am free to withdraw at any time within two weeks without giving any reason. If I withdraw my data will be removed from the study and will be destroyed.
- I understand that my personal data will be processed for the purposes detailed above, in accordance with the Data Protection Act 1998.
- Based upon the above, I agree to take part in this study.
- I agree to take part in the interviews.

Name of participant..... Date..... Signature.....

Name of researcher/
Individual obtaining consents..... Date..... Signature.....

APPENDIX F

Participant information leaflet (English version)

Participant information leaflet

Title of the proposed study is Teachers' perceptions of using ICT with intellectual disabilities students in Saudi Arabia schools.

It has become paramount to adopt the latest cutting-edge technological solutions and tools in terms of teaching students with intellectual disabilities in order to improve the educational system and to help students to potentially develop their skills. Therefore, attention should be given to teachers' opinions and perceptions towards the use of ICT with students with intellectual disabilities.

Thus, the purpose of this study is to determine the current uses of ICT and to ascertain the perceptions of teachers towards this type. The study also considers the views of teachers of intellectually disabled students about current issues and the potential methods they may consider useful in terms of developing and enhancing the teaching and learning of students with intellectual disabilities in Saudi Arabia.

It is a real pleasure for me to see you participate willingly in this doctoral research on 'Teachers' perceptions of using ICT with intellectual disabilities students in Saudi Arabia schools'. I have to thank you for your kindness and for taking time to do contribute into this effort. If at any time you decide to withdraw from the research project, you can do so simply by inform the researcher.

Teachers will be interviewed about their practice using ICT. The interviews will be recorded using an iPhone and the researcher will make additional notes. The interviews are estimated to take up to 30 minutes.
All data will treated anonymously and all participant information will remain confidential. The only persons who will have access to the data are the researcher and his supervisors. Once completed, if a participant wishes to have a report of the study, they are invited to contact the researcher by email. The Ministry of Education in Saudi Arabia is funding the research.

The information which you supply and that which may be collected as part of the research project will be entered into a filing system or database and will only be accessed by authorised personnel involved in the project. It will be safeguarded as indicated in the information sheet. The information which you supply will be solely used for educational, research-related and publishing purposes.

In the case there are any concerns or difficulties, you can contact the researcher (Hani Al Amri) by emailing him on:
Supervisor's contact details: Professor

APPENDIX G

Participant consent form (Arabic version)

نموذج موافقة

الدراسة المقترحة عنوانها **"تصورات المعلمين حول استخدام تكنولوجيا المعلومات والاتصالات مع طلاب التربية الفكرية في مدارس المملكة العربية السعودية"**.

سوف يتم جمع هذه المعلومات كجزء من مشروع بحثي من قبل قسم التربية في جامعة برمنجهام بالتعاون مع وزارة التعليم في المملكة العربية السعودية ويُعنى بدراسة المعوقات التي تواجه معلمي طلاب التربية الفكرية عند استخدامهم لتكنولوجيا المعلومات والاتصالات، وكذلك وجهات نظر المعلمين حول العوامل التي يمكن أن تسهم في تطور استراتيجية استخدام تكنولوجيا المعلومات والاتصالات مع طلاب التربية الفكرية في المملكة العربية السعودية.

وسوف يتم إدخال المعلومات التي ستقوم بتزويدها وتلك التي من الممكن جمعها كجزء من المشروع البحثي في نظام سري للملفات ولن يتمكن أحد من الاطلاع عليها ماعدى الأشخاص المخول لهم بالمشاركة في المشروع البحثي. سيتم الإحتفاظ بالمعلومات في جامعة برمنغهام وسوف تستخدم فقط لأغراض البحث، وكذلك للإحصاء والمراجعة. تقديمك لهذه المعلومات يعتبر موافقة منك على أن تحتفظ الجامعة بالمعلومات الخاصة بك للأغراض المبينة أعلاه. ووفقا لأحكام قانون حماية البيانات لعام 1998 ستقوم جامعة برمنجهام بمعالجة المعلومات. ولن يتم نشر أية بيانات شخصية يمكن التعرف عليها.

بيانات الإتفاقية

أؤكد أنني قد قرأت وفهمت ورقة المعلومات الخاصة بالمشاركة في هذه الدراسة. كما أنه أتيحت لي الفرصة لطرح مجموعة من الأسئلة عندما استلزم الأمر، وقد كانت هذه الإجابات على نحو مرضي.

أنا أفهم أن مشاركتي عن طواعية وبإمكاني الانسحاب في أي وقت خلال أسبوعين دون إبداء أي سبب. إذا انسحبت من المشاركة، ستتم إزالة البيانات الخاصة بي من الدراسة البحثية وسوف يتم التخلص منها نهائيا.

أفهم أنه سيتم معالجة بياناتي الشخصية للأغراض المبينة أعلاه، وفقا لقانون حماية البيانات لعام 1998.

بناء على ما سبق، أنا أوافق على المشاركة في هذه الدراسة.

أوافق على المشاركة في المقابلات.

اسم المشارك:

التاريخ:

التوقيع:

اسم الباحث أو الشخص المكلف بالحصول على الموافقة

التاريخ:

التوقيع:

APPENDIX H

Participant information leaflet (Arabic version)

ورقة معلومات عن الدراسة للمشاركين

عنوان الدراسة المقترحة هو **"تصورات المعلمين حول استخدام تكنولوجيا المعلومات والاتصالات مع طلاب التربية الفكرية في مدارس المملكة العربية السعودية"**.

أصبح من الأهمية بمكان اعتماد أحدث الحلول والأدوات التكنولوجية المتطورة في تدريس طلاب التربية الفكرية من أجل تحسين النظام التعليمي ومساعدة الطلاب كي يطوروا من مهاراتهم بشكل جيد. ولذلك، ينبغي إيلاء الاهتمام لآراء المعلمين وتصوراتهم حول استخدام تكنولوجيا المعلومات والاتصالات مع طلاب التربية الفكرية.

وبالتالي، فإن الغرض من هذه الدراسة هو تحديد الاستخدامات الحالية لتكنولوجيا المعلومات والاتصالات والتأكد من تصورات المعلمين حول هذا النوع من الاستخدامات. تتناول الدراسة أيضا وجهات نظر معلمي طلاب التربية الفكرية حول القضايا الراهنة والأساليب المحتملة التي قد تكون حسب نظرهم مفيدة من أجل تطوير وتحسين عملية تعليم وتعلم طلاب التربية الفكرية في المملكة العربية السعودية.

سوف يكون من دواعي سروري أن تشارك عن طيب خاطر في هذا البحث الذي يندرج تحت درجة الدكتوراه والذي يتناول **"تصورات المعلمين حول استخدام تكنولوجيا المعلومات والاتصالات مع طلاب التربية الفكرية في مدارس المملكة العربية السعودية"**. يجب أن أشكر لكم لطفكم ولأخذ الوقت للمساهمة في هذا الجهد. إذا أردت الإنسحاب من الدراسة في أي وقت، يمكنك القيام بذلك بكل سهولة عن طريق إبلاغ الباحث.

سيتم إجراء مقابلات مع المعلمين عن ممارساتهم العملية في استخدام تكنولوجيا المعلومات والاتصالات. وسوف يتم تسجيل المقابلات باستخدام جهاز الآيفون وسوف يقوم الباحث بتدوين أي ملاحظات إضافية. وستستغرق المقابلات حوالي ثلاثين دقيقة.

سيتم التعامل مع جميع البيانات دون الإشارة إلى أي أسماء كما سيتم التعاطي مع البيانات الشخصية في كنف السرية التامة. والأشخاص الوحيدون المخول لهم الاطلاع على البيانات هم الباحث ومشرفيه. وبمجرد الانتهاء من البحث، إذا أراد المشارك أن يتحصل على تقرير خاص بالدراسة، فإنهم مدعوون للاتصال بالباحث عن طريق البريد الإلكتروني.

وزارة التربية والتعليم في المملكة العربية السعودية هي الجهة الممولة للبحث.

وسوف يتم إدخال جميع المعلومات التي سيتم جمعها كجزء من المشروع البحثي في نظام سري لحفظ الملفات ولن يتمكن أي شخص من الإطلاع عليها ماعدى الأشخاص المسموح لهم بالمشاركة في المشروع البحثي. سيتم حماية تلك المعلومات على النحو المبين في ورقة المعلومات. كما يجدر بالذكر أن المعلومات التي ستقوم بتزويدها سوف تستخدم فقط لأغراض تعليمية، وأخرى متعلقة بالبحوث والنشر.

في حالة وجود أية مخاوف أو صعوبات، يمكنك الاتصال بالباحث (هاني العمري) عن طريق البريد الإلكتروني: [redacted]

Appendix I

Questionnaire (Arabic version)

إستبيان

السلام عليكم ورحمة الله وبركاته،

لقد أجريت دراسة بحثية في مرحلة الدكتوراه حول "تصورات المعلمين حول استخدام تكنولوجيا المعلومات والاتصالات مع طلاب التربية الفكرية في مدارس المملكة العربية السعودية". سأكون ممتنا لو تفضلتم بتخصيص وقتكم الثمين للمساهمة في دراستي من خلال ملء الاستبيان. سوف تبقى البيانات التي يتم جمعها من خلال هذا الاستبيان سرية وسوف تستخدم لأغراض أكاديمية فقط.

مع تحياتي،

هاني العمري

القسم الأول: المعلومات الديموغرافية:

1 العمر:

21 25 سنة ☐ 26 30 سنة ☐ 31 35 سنة ☐ فوق 35 ☐

2 المؤهل الأكاديمي:

بكالوريوس ☐ دراسات عليا ☐ دكتوراه ☐ دبلوم ☐

3 كم سنة عملت مع الطلاب ذوي الإعاقات الذهنية؟

أقل من سنة ☐ بين سنتين و5 سنوات ☐ بين 6 و10 سنوات ☐ أكثر من 11 سنة ☐

4 هل شاركت في حصص تدريب على استخدام تكنولوجيا المعلومات والاتصالات للطالب ذوي الإعاقات الذهنية؟

نعم ☐ لا ☐

5 هل يعترف فريق برنامج التعليم الفردي (إيب) في مدرستك بضرورة استخدام أدوات تكنولوجيا المعلومات والاتصالات مع الطلاب ذوي الإعاقة؟

نعم □ لا □

6 هل يستطيع الطالب ذو الإعاقة في مدرستك الوصول إلى أدوات تكنولوجيا المعلومات والاتصالات؟

نعم □ لا □

7 هل تستخدم أدوات تكنولوجيا المعلومات والاتصالات مع الطلبة ذوي الإعاقة الذهنية في مدرستك؟

نعم □ لا □

القسم الثاني: تصورات المعلمين حول استخدام تكنولوجيا المعلومات والاتصالات مع الطلاب المعاقين ذهنيا؟

8 ما هي تصوراتكم لمفهوم تكنولوجيا المعلومات والاتصالات؟ يرجى الإجابة من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

1. غير موافق تماما 2. غير موافق 3. موافق نوعا ما 4. موافق 5. موافق تماما

رقم البيان	البيان	1	2	3	4	5
1	تكنولوجيا المعلومات والاتصالات تعني التدريس والتعلم باستخدام أدوات تكنولوجيا المعلومات والاتصالات مثل الحواسيب.					
2	تكنولوجيا المعلومات والاتصالات هي الطريقة الحديثة للتدريس حيث يستخدم المعلمون الأجهزة والطرق التكنولوجية في التدريس خاصة فيما يتعلق بالطلاب ذوي الإعاقة.					
3	المقصود من تكنولوجيا المعلومات والاتصالات هو الأدوات التي يمكن استخدامها في تعلم وتعليم مفاهيم ومهارات محددة لدعم الطلبة ذوي الإعاقات الذهنية.					
4	الغرض من تكنولوجيا المعلومات والاتصالات هو خلق تفاعل جديد بين المعلمين والطلاب ذوي الإعاقة.					
5	في مجال تكنولوجيا المعلومات والاتصالات، يتوقع من المعلم استخدام لوحات تفاعلية، ومعدات مراقبة، وأجهزة عرض وحواسيب عند التدريس.					
6	تشمل تكنولوجيا المعلومات والاتصالات استخدام الأدوات التكنولوجية لتعليم الطلاب.					
7	تكنولوجيا المعلومات والاتصالات طريقة معقدة للتدريس، حيث يتطلب الأمر وقتا كبيرا لجمع المحتوى أو تطويره.					
8	في مجال تكنولوجيا المعلومات والاتصالات، يتم استخدام برامج البرمجيات كي يتمكن الطلاب ذوي الإعاقة من فهم المواد التعليمية بشكل أفضل.					
9	في مجال تكنولوجيا المعلومات والاتصالات، يستخدم المعلمون والطلاب التكنولوجيا إلى					

	جانب المناهج التقليدية للتعليم والتعلم.					
10	تسعى تكنولوجيا المعلومات والاتصالات إلى دمج التكنولوجيا في التعليم والتعلم لخلق تجربة أفضل.					
11	تكنولوجيا المعلومات والاتصالات هي أدوات تهدف إلى تحسين قدرات الطلاب على فهم المواضيع والموضوعات المختلفة.					

9 تتمتع تكنولوجيا المعلومات والاتصالات بالمزايا التالية. يرجى الإجابة من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

1. غير موافق تماما 2. غير موافق 3. موافق نوعا ما 4. موافق 5. موافق تماما

رقم البيان	البيان	1	2	3	4	5
12	تتيح تكنولوجيا المعلومات والاتصالات وسيلة بديلة للاتصال في الفصول الدراسية.					
13	توفر تكنولوجيا المعلومات والاتصالات إمكانية الوصول إلى المواد التعليمية بطريقة مناسبة للغاية.					
14	استخدام تكنولوجيا المعلومات والاتصالات يعزز دافعية الطلاب.					
15	استخدام تكنولوجيا المعلومات والاتصالات في الفصول الدراسية يمكن أن تساعد الطلاب ذوي الإعاقة الفكرية في التواصل وفي القراءة والكتابة.					
16	يمكن للطلاب ذوي الإعاقة استخدام العديد من أدوات تكنولوجيا المعلومات والاتصالات.					
17	يساعد استخدام تكنولوجيا المعلومات والاتصالات في التغلب على عائق الوقت ويعزز الأداء اللازم وتنمية المهارات الحساسة لدى الطلاب ذوي الإعاقة.					
18	تسهم تكنولوجيا المعلومات والاتصالات في زيادة فعالية عمليات التعلم من خلال مساعدة الطلاب ذوي الإعاقة على المشاركة بشكل نشط في التدريس والتعلم.					
19	الأدوات المساعدة تسهّل المشاركة الاجتماعية للطلاب الذين يعانون من ضعف البصر والسمع.					
20	أدوات تكنولوجيا المعلومات والاتصالات، والتكنولوجيا المساعدة على وجه الخصوص، لديها القدرة على خلق وجود أكثر وضوحا في المدرسة للطلاب ذوي الإعاقة.					
21	استخدام أدوات تكنولوجيا المعلومات والاتصالات، مثل لوحات المفاتيح ، تعزز مهارات الاتصال والأداء الإملائي للطلاب الذين يعانون من صعوبات في الكلام.					
22	تعزز تكنولوجيا المعلومات والاتصالات مهارات القراءة والكتابة لدى الطلاب ذوي الإعاقة.					
23	يزيد استخدام أدوات تكنولوجيا المعلومات والاتصالات من المشاركة العملية للطلاب ذوي					

	الإعاقة في أنشطة الفصول الدراسية.					
24	الأدوات المساعدة، مثل الاتصالات المحمولة والوسائل المساعدة في الكتابة، لا تساعد فقط في الإنتاجية ومحو الأمية لدى الطلاب ذوي الإعاقة، ولكن أيضا في بناء العلاقات الاجتماعية.					
25	تزداد استقلالية الطلاب ذوي الإعاقة من خلال استخدام تكنولوجيا المعلومات والاتصالات في الفصول الدراسية.					
26	استخدام تكنولوجيا المعلومات والاتصالات من شأنه أن يدعم ويعزز الأنشطة الاجتماعية والأكاديمية للطلاب ذوي الإعاقة.					
27	استخدام برامج خاصة يمكن أن يساعد الطلاب على تحسين مهاراتهم في الكتابة.					
28	يمكن لتكنولوجيا المعلومات والاتصالات أن تعزز القراءة والتعلم والمفردات للتواصل بين الطلاب ذوي الإعاقة.					
29	استخدام الحواسيب مفيد للطلاب ذوي الاعاقة الحركية المعتدلة لأنه يمكنهم من تحسين مهاراتهم اللغوية من خلال تقليل الأخطاء في الكتابة.					

10 هناك سلبيات في استخدام تكنولوجيا المعلومات والاتصالات. يرجى الإجابة من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

1. غير موافق تماما 2. غير موافق 3. موافق نوعا ما 4. موافق 5. موافق تماما

رقم البيان	البيان	1	2	3	4	5
30	من الممكن أن يسبب الاعتماد الشديد على التكنولوجيا من قبل الطلاب ذوي الإعاقة مشكلة في بيئات مختلفة كالمنزل على سبيل المثال.					
31	استخدام تكنولوجيا المعلومات والاتصالات لا يؤدي مباشرة إلى الاستقلالية والكفاءة والقبول الاجتماعي للطلاب ذوي الإعاقة.					
32	استخدام تكنولوجيا المعلومات والاتصالات، وتحديدا استخدام الأجهزة المساعدة، يمكن أن يؤدي إلى التصنيف الاجتماعي للطلاب ذوي الإعاقة.					
33	من شأن استخدام التكنولوجيا المساعدة التي لا تتناسب مع احتياجات الطلاب ذوي الإعاقة أن يؤثر سلبا عليهم.					
34	يتطلب استخدام تكنولوجيا المعلومات والاتصالات معلمين يمتلكون مهارات عالية.					
35	أدوات تكنولوجيا المعلومات والاتصالات معرضة للفشل ويمكن أن تتعرض موثوقيتها كذلك للخطر.					

36	يمكن أن تؤثر مشاكل توصيل الشبكة على موثوقية أجهزة تكنولوجيا المعلومات والاتصالات.					
37	لا يمكن الاعتماد على استخدام تكنولوجيا المعلومات والاتصالات لأن الطلاب يواجهون مشكلة في التعامل مع تكنولوجيا المعلومات والاتصالات.					
38	تتطلب تكنولوجيا المعلومات والاتصالات الكثير من الوقت حيث يتعين على المعلم التعامل مع طلبة لهم احتياجات مختلفة.					
39	التكاليف التي ينطوي عليها استخدام تكنولوجيا المعلومات والاتصالات مرتفعة جدا.					
40	قد يسبب عدم القدرة على استخدام وسائل وأدوات تكنولوجيا المعلومات والاتصالات قلقا لدى الطلاب ذوي الإعاقة.					
41	تؤثر المعوقات التكنولوجية بشكل سلبي على الطلاب ذوي الإعاقة.					
42	من شأن الاستخدام المكثف لتكنولوجيا المعلومات والاتصالات من قبل الطلاب ذوي الإعاقة أن يحد من قدراتهم على تحسين الذات.					

القسم الثالث: العوائق الرئيسية التي يواجهها المعلمون عند استخدام تكنولوجيا المعلومات والاتصالات مع الطلاب ذوي الإعاقة الذهنية.

□□□□□ □□□□ □□ □□□□□□□□ □□□□□□□

11 هل تفتقر إلى التشجيع على استخدام تكنولوجيا المعلومات والاتصالات في صفك؟ يرجى الإجابة من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
43	أنا غير متشجع استخدام تكنولوجيا المعلومات والاتصالات في الفصل الدراسي بسبب مواقف المعلمين الآخرين.					
44	لا أتلقى دعما كافيا من رئيس المدرسة فيما يتعلق باستخدام تكنولوجيا المعلومات والاتصالات في الفصول الدراسية.					
45	لا يتم تعويضي عن الجهد الإضافي والوقت الذي أمضيه في استخدام تكنولوجيا المعلومات والاتصالات.					
46	أنا أفتقر إلى الثقة بالنفس في استخدام مختلف أجهزة تكنولوجيا المعلومات والاتصالات وهذا ما يثبطني من					

	استخدامها.					
47	التجارب السلبية السابقة مع استخدام تكنولوجيا المعلومات والاتصالات تقيد استخدامي لتكنولوجيا المعلومات والاتصالات.					
48	في بعض الأحيان ليس لدي الوقت الكافي لاستخدام تكنولوجيا المعلومات والاتصالات بسبب عملي.					
49	أخشى أنني لن أكون قادرا على استخدام تكنولوجيا المعلومات والاتصالات بشكل فعال بما أن بعض الأجهزة جديدة بالنسبة لي.					
50	أخشى أن يؤدي عدم معرفتي بأجهزة تكنولوجيا المعلومات والاتصالات إلى إخفاقي وإحراجي أمام طلابي.					
51	تعتبر إدارة الصف الدراسي عائقا أمام تكنولوجيا المعلومات والاتصالات خاصة عندما تكون الأجهزة قليلة.					
52	المدرسة لا تحفزني على استخدام تكنولوجيا المعلومات والاتصالات.					
53	إن نقص مهارات إدارة التغيير يمنعني من استخدام تكنولوجيا المعلومات والاتصالات.					
54	يشكل الافتقار إلى الحافز لتغيير أساليب التدريس التقليدية تراجعا كبيرا في استخدام تكنولوجيا المعلومات والاتصالات.					
55	يشكل عدم كفاية الوقت لتحضير دروس تكنولوجيا المعلومات والاتصالات عائقا أمام استخدامي لتكنولوجيا المعلومات والاتصالات.					

12 هل هناك نقص في معدات تكنولوجيا المعلومات والاتصالات في مدرستك؟

نعم ☐ لا ☐

30) إن كانت إجابتك ب "نعم"، يرجى منكم تقديم معلومات إضافية من خلال الإشارة إلى مستوى قبولك للبيانات التالية.
وإن كانت إجابتك ب "لا"، يرجى الانتقال إلى السؤال 31.

رقم	البيان	غير	غير	موافق	موافق	موافق

البيان		موافق تماما	موافق	نوعا ما		تماما
56	مدرستي ليس لديها ما يكفي من معدات تكنولوجيا المعلومات والاتصالات.					
57	مدرستي لديها معدات قديمة وعفا عليها الزمن.					
58	هناك عدد قليل جدا من أجهزة تكنولوجيا المعلومات والاتصالات في مدرستي.					
59	تتوفر في مدرستي برمجيات وأجهزة قديمة.					
60	لا يمكن للبنية التحتية للفصول الدراسية استيعاب ما يكفي من معدات تكنولوجيا المعلومات والاتصالات لجميع الطلاب.					
61	لا تتم صيانة الآلات بشكل جيد، لذلك لا يتم التعويل عليها.					
62	تحتاج الأجهزة إلى فحوص مستمرة وصيانة منتظمة.					
63	آلات تتعطل دائما وغير متوفرة للاستخدام.					
64	لا توجد أجهزة كافية لعدد الطلاب في المدرسة.					
65	هناك نقص في المعدات لأنها مرتفعة الثمن.					

13 هل هناك ما يكفي من الدعم الفني والصيانة لمعدات تكنولوجيا المعلومات والاتصالات في مدرستك؟

نعم □ لا □

31) إذا أجبت ب "لا"، يرجى تقديم المزيد من التفاصيل عن طريق الإشارة إلى مستوى قبولك للبيانات التالية وإذا أجبت بنعم، يرجى الانتقال إلى السؤال 32.

رقم البيان	**البيان**	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
66	لا يوجد دعم مؤسسي فيما يتعلق بتخطيط واستخدام تكنولوجيا المعلومات والاتصالات.					
67	مدرستي ليس فيها فريق فني كامل من الموظفين.					
68	ليس هناك انتظام في إجراء الصيانة الدورية مثل إزالة الغبار أو المسح الضوئي لأجهزة الكمبيوتر للتخلص من الفيروسات.					

69	الفنيون بطيؤون في الاستجابة لطلبات المساعدة.					
70	لا أتلقى دعما تقنيا كافيا بشأن كيفية استخدام أجهزة تكنولوجيا المعلومات والاتصالات.					
71	يتم استنزاف موظفو الدعم الفني فهم يشتغلون أكثر من اللازم.					
72	لا توجد سياسة واضحة بشأن صيانة أجهزة تكنولوجيا المعلومات والاتصالات.					
73	يتجاهل الدعم التقني مسائل مثل ارتفاع طفيف في الكهرباء وسوء معالجة أجهزة تكنولوجيا المعلومات والاتصالات من قبل الطلاب.					
74	المدرسة لا تقوم بالصيانة المنتظمة للأجهزة بما فيها الأجهزة المساعدة البسيطة، مثل مكبرات الصوت ولوحات الكتابة.					
75	في مدرستي، يتم التغافل عن الأجهزة بمجرد اقتنائها وتثبيتها.					

المسائل المتعلقة بالمعلم

14 هل هناك نقص في التدريب المستمر حول تكنولوجيا المعلومات والاتصالات؟

نعم □ لا □

32) إذا أجبت ب "نعم"، يرجى تقديم المزيد من المعلومات عن طريق الإشارة إلى مستوى قبولك للبيانات التالية وإذا أجبت ب "لا"، يرجى الانتقال إلى السؤال 33.

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
76	تكنولوجيا المعلومات والاتصالات في تطور مستمر، ولكننا بالكاد نمتلك تدريبا منتظما فيما يتعلق باستخدام تكنولوجيا المعلومات والاتصالات في الفصول الدراسية.					
77	لم تنظم مدرستي أي تدريب هذا العام.					
78	من أجل الاستخدام الفعال لتكنولوجيا المعلومات والاتصالات في المدارس، ينبغي تدريب المعلمين باستمرار على المعدات والتقنيات والطرق الجديدة.					

79	يعطي التدريب المعلمين مزيدا من الثقة والدافعية لاستخدام تكنولوجيا المعلومات والاتصالات، ولكن لا يتم توفيره بشكل منتظم.					
80	يمكن معالجة المهارات المحدودة لتكنولوجيا المعلومات والاتصالات وكذلك القلق والخوف من الفشل عن طريق التدريب المستمر للمعلمين.					
81	التدريب يتيح الفرصة للخبراء والمعلمين الآخرين كي يتفاعلوا مع بعض ولتبادل الخبرات التي تشجع على استخدام تكنولوجيا المعلومات والاتصالات.					
82	يمكن أن يؤدي نقص التدريب على تكنولوجيا المعلومات والاتصالات للمعلمين إلى العزوف عن تبني تكنولوجيا المعلومات والاتصالات.					
83	التدريب الداخلي على أساس مستمر يمكن أن يحسن فهمي لمعدات تكنولوجيا المعلومات والاتصالات.					

15 هل أنت على علم بمزايا تكنولوجيا المعلومات والاتصالات؟

نعم □ لا □

33) إذا أجبت ب "نعم"، يرجى تقديم المزيد من المعلومات عن طريق الإشارة إلى مستوى قبولك للبيانات التالية وإذا أجبت ب "لا"، يرجى الانتقال إلى السؤال 34.

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
84	لا أرى ضرورة استخدام هذه الأجهزة أو التقنيات، مثل شرائح البوربوينت، طالما أستطيع أن أستعمل طرقي المعتادة.					
85	أستطيع أن أجهز درسا تفاعليا دون استخدام أدوات تكنولوجيا المعلومات والاتصالات.					
86	تمكن تقنيات التدريس التقليدية الطلاب من الشعور واللمس والتعلم بشكل أفضل.					
87	أشعر بالتضايق كلما أعددت دروسا تتطلب استخدام تكنولوجيا المعلومات والاتصالات لأنها تستغرق وقتا طويلا					

	وفوائدها ضئيلة.					
88	أعتقد أن استخدام الموسيقى والألوان والصور في التحضير للفصول الدراسية التفاعلية ليست مناسبة للطلبة البالغين سن السادسة عشرة بما فيهم ذوي الإعاقة.					
89	أنا لا أجيد استخدام الكمبيوتر أو أجهزة الكمبيوتر المحمولة وإلى جانب ذلك، يستغرق الأمر الكثير من الوقت، لذلك أنا لا أحب استخدامها.					
90	أعتقد أن أهمية تكنولوجيا المعلومات والاتصالات مبالغ فيها.					
91	تكنولوجيا المعلومات والاتصالات تدفع الطلاب إلى الكسل، لذلك أنا أحب الطريقة التقليدية.					
92	إن فوائد تكنولوجيا المعلومات والاتصالات قليلة، ويمكن تغطيتها بالتعليم المعتاد، وهذا يعني أنه ليست هناك حاجة إلى التشديد على استخدام تكنولوجيا المعلومات والاتصالات في الفصول الدراسية.					
93	عبء العمل المنوط بعهدتي حاليا أكثر من اللازم، وليس لدي اهتمام مرة أخرى في إعداد الدرس من خلال أدوات تكنولوجيا المعلومات والاتصالات.					
94	أعتقد أن تكنولوجيا المعلومات والاتصالات مخصصة لبعض الطلبة ذوي الإعاقات الشديدة ولكن لهؤلاء الذين لديهم إعاقات بسيطة.					

16 يشكل عدم توفير البرمجيات التعليمية باللغة العربية عائقا أمام استخدام تكنولوجيا المعلومات والاتصالات.

يرجى الرد بالإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
95	معظم البرامج التعليمية في السوق تهيمن عليها اللغة الإنجليزية، وهذا يسبب للمعلمين مشاكل، خاصة عند تعليم الطلاب من ذوي الإعاقة اللغوية.					
96	المحتوى مهم جدا في مجال الاستخدام الفعال لتكنولوجيا المعلومات والاتصالات، ولكن العديد من البرمجيات في					

	السوق ليست باللغة العربية.					
97	على الرغم من أن بعض المحتوى متوفر باللغة العربية، إلا أنه ليس له أهمية تذكر في تدريسي لأن المحتوى قد تم تطويره في البلدان الأجنبية.					
98	يبدو أن لدينا عدد قليل من خبراء البرمجيات المهتمين في تطوير البرمجيات للأطفال ذوي الإعاقة في هذا البلد، لأنه ليس هناك العديد من البرمجيات المتاحة باللغة العربية.					
99	من المتوقع منا أن ندرس باستخدام البرمجيات العربية، ولكن المدرسة لا توفر برامج كافية لهذا الغرض.					
100	لم تبذل وزارة التربية والتعليم الكثير في تزويد المعلمين بما يكفي من برامج الحاسوب باللغة العربية التي يمكن استخدامها في تعليم الطلاب ذوي الإعاقة.					
101	على الرغم من الجهود التي بذلتها المدارس، فمن الواضح أن هناك نقصا استراتيجيا في البرامج العربية التي يمكن استخدامها في تحقيق الأهداف من استخدام تكنولوجيا المعلومات والاتصالات في المدارس.					

المشاكل المالية

17 تمثل تكلفة البرمجيات التعليمية عائقا أمام استخدام تكنولوجيا المعلومات والاتصالات. يرجى الرد بالإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
102	تكلفة تكنولوجيا المعلومات والاتصالات المطلوبة لمساعدة الطلاب ذوي الإعاقة، وخاصة ذوي الإعاقات الشديدة، مرتفعة جدا لأنها تتطلب تكنولوجيا مساعدة مصممة خصيصا.					
103	على الرغم من أن تمويل تكنولوجيا المعلومات والاتصالات يمكن الحصول عليه من مصادر أخرى بخلاف الحكومة، فإن هذه الأموال ليست كافية.					
104	حاولت الحكومة توفير ما يكفي من الأموال، ولكن المبالغ					

	المطلوبة تتزايد دائما وليست كافية لأن أدوات تكنولوجيا المعلومات والاتصالات مكلفة.					
105	أحد أسباب التأخر في استخدام تكنولوجيا المعلومات والاتصالات في هذه المدرسة هو عدم إعطاء ميزانية كافية للبرامج التعليمية، وهذا يعني عدم استخدام بعض البرامج المهمة جدا للأنشطة الصفية.					

18 تعتبر الميزانيات المدرسية غير الكافية عائقا أمام استخدام تكنولوجيا المعلومات والاتصالات. يرجى الرد بالإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
106	يتطلب بعض الطلاب ذوي الإعاقة برامج فردية وأدوات خاصة لتكنولوجيا المعلومات والاتصالات ولكن ليس لدى المدرسة مثل هذه الميزانية.					
107	القيود المالية هي من بين العوائق الرئيسية التي تحول دون حصول المدرسة على أجهزة تكنولوجيا المعلومات والاتصالات لاستخدامها مع الطلاب.					
108	على الرغم من الوعي الموجود في المدارس بأهمية استخدام تكنولوجيا المعلومات والاتصالات مع الطلاب ذوي الإعاقة، فإنه ليس هناك موارد مالية للمدرسة مخصصة لشراء تكنولوجيا متخصصة للمعلومات والاتصالات لكل طالب.					
109	هناك العديد من الأنشطة التي تستلزم استخدام تكنولوجيا المعلومات والاتصالات، على سبيل المثال، التدريب الداخلي، ورش العمل، الصيانة، وكل هذا يتطلب الدعم المالي، ولكن المدرسة لا تملك ميزانية مخصصة لهذه المسائل.					
110	على الرغم من محاولات المدارس للحصول على أجهزة تكنولوجيا المعلومات والاتصالات لكل طالب، بما في ذلك هؤلاء الذين يعانون من إعاقات شديدة، فإنه لم تتم إدارتها بشكل كامل بسبب الأموال المحدودة.					
111	الحكومة ليست سريعة في استجابتها للاحتياجات المالية					

	للمدارس بسبب منهجها البيروقراطي.					

القسم الرابع: العوامل الرئيسية التي تسهم في تطوير استخدام تكنولوجيا المعلومات والاتصالات مع الطلاب ذوي الإعاقة الذهنية

العوامل المطلوبة لتطوير المعلمين في مجال استخدام تكنولوجيا المعلومات والاتصالات

19 سيسهم تزويد المعلمين بمعلومات كافية عن أهمية استخدام التكنولوجيا الجديدة لتعليم الطلاب ذوي الإعاقة الذهنية في تطوير استخدام تكنولوجيا المعلومات والاتصالات لهؤلاء الطلاب. يرجى تقديم ردك من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
112	تزويد المعلمين بالمعلومات الصحيحة المتعلقة بتكنولوجيا المعلومات والاتصالات سوف يعزز استخدام تكنولوجيا المعلومات والاتصالات.					
113	يمكن للثقافة أن تعرقل استخدام تكنولوجيا المعلومات والاتصالات، وهذا يستلزم تثقيف المعلمين بشأن الحاجة إلى اعتماد ثقافة تشجع على استخدام تكنولوجيا المعلومات والاتصالات.					
114	تمثل التجارب والمعتقدات السابقة حواجزا تحول دون استخدام تكنولوجيا المعلومات والاتصالات ويجب تمكين المعلمين من خبرات ومعتقدات جديدة لاحتضان تكنولوجيا المعلومات والاتصالات.					
115	يمكن أن يكون للتصورات تأثيرا كبيرا على قبول المعلمين لتكنولوجيا المعلومات والاتصالات، وهناك حاجة إلى الحصول على المعرفة الصحيحة لتشكيل التصورات الصحيحة.					
116	باكتسابهم للمعلومات الصحيحة، سيكون للمعلمين آراء إيجابية نحو إدماج تكنولوجيا المعلومات والاتصالات في تعليمهم.					
117	العنصر الرئيسي في استخدام تكنولوجيا المعلومات والاتصالات هو غرس المعتقدات والمواقف الصحيحة، ويجب القيام بذلك بالنسبة لأولئك الذين لا يمتلكون سوى القليل					

	من المعرفة عن استخدام تكنولوجيا المعلومات والاتصالات.					
118	يعتقد بعض المعلمين أن لاستخدام تكنولوجيا المعلومات والاتصالات نتائجا سلبية على الطلاب، ولذا يجب إخبار هؤلاء المعلمين بوضوح إلى ضرورة استخدام تكنولوجيا المعلومات والاتصالات.					
119	يستخدم بعض المعلمين الدين لمقاومة استخدام تكنولوجيا المعلومات والاتصالات، ولذلك ينبغي للمدرسة أن تعالج مثل هذه الحالات لضمان نجاح واستمرارية تكنولوجيا المعلومات والاتصالات.					

20 سيسهم توفير التدريب المستمر للمعلمين في تطوير استخدام تكنولوجيا المعلومات والاتصالات للطلاب ذوي الإعاقة الذهنية. يرجى تقديم ردك من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	**البيان**	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
120	سيوفر التدريب المستمر للمعلمين تقنيات ومهارات جديدة، مما سيحسن من مستواهم في استخدام تكنولوجيا المعلومات والاتصالات.					
121	من خلال التدريب المستمر، سوف يكون المعلمون قادرين على تعزيز طرائق التعليم الخاصة بهم، وبالتالي استخدام تكنولوجيا المعلومات والاتصالات بشكل ناجح.					
122	يعتبر التدريب المنتظم أحد سبل تعزيز الدافعية والثقة بالنفس، وهذا من شأنه أن يؤدي إلى تطبيق أفضل لتكنولوجيا المعلومات والاتصالات.					
123	عندما توفر المدارس تدريبا منتظما مثل ورش العمل، سيتمكن المعلمون من فهم دواعي استخدام تكنولوجيا المعلومات والاتصالات بشكل أفضل.					
124	التدريب مهم لأنه يشحذ مهارات المعلمين ويعطيهم خبرة ميدانية.					
125	إذا أرادت إدارة المدرسة أن تضمن فعالية المعلمين، فعليها أن تضمن جلب خبراء تدريب على تكنولوجيا المعلومات					

	والاتصالات بصفة دورية.					
126	بالإضافة إلى تنمية المهارات، هناك ضرورة ملحة للتدريب حتى يتخلص المعلمون من المخاوف التي تراودهم ولتقديم الدعم المعرفي.					

21 سيسهم توفير أجهزة تكنولوجيا المعلومات والاتصالات لكل معلم في المدارس العادية في تطوير استخدام تكنولوجيا المعلومات والاتصالات مع الطلاب ذوي الإعاقة الذهنية. يرجى تقديم ردك من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
127	الأجهزة هي عناصر مهمة في تدريس تكنولوجيا المعلومات والاتصالات في المدارس العادية، وهذا سوف يكون له شأن كبير في تحسين تدريس تكنولوجيا المعلومات والاتصالات في هذه المدارس.					
128	توفير التجهيزات لكل معلم سيكون وسيلة رائعة لمساعدة الطلاب ذوي الاحتياجات الخاصة والطلاب العاديون في استخدام تكنولوجيا المعلومات والاتصالات.					
129	يمثل الافتقار إلى أجهزة تكنولوجيا المعلومات والاتصالات عائقا أمام الاستخدام الناجح لتكنولوجيا المعلومات والاتصالات في المدارس العادية، ولذا سيكون توفير هذه الأجهزة حلا لهذه المشاكل.					
130	سوف تمكن الأجهزة المعلمين من تلبية احتياجات الطلاب بطريقة فعالة.					
131	توفير الأجهزة المناسبة لكل معلم سوف يشجعهم على قبول الطلاب ذوي الاحتياجات الخاصة.					
132	عندما يتم تزويد المعلمين بالأجهزة، سوف ينتهي التقاسم. وهذا يعني تحسين التدريس باستخدام أجهزة تكنولوجيا المعلومات والاتصالات.					
133	سيكثف المعلمون في المدارس العادية من استخدامهم لتكنولوجيا المعلومات والاتصالات بمجرد تزويدهم بأجهزة.					

العوامل المطلوبة لتطوير المدارس في مجال استخدام تكنولوجيا المعلومات والاتصالات

22 إدراج تكنولوجيا المعلومات والاتصالات في برامج إعداد المعلمين من شأنه أن يسهم في تطوير استخدام تكنولوجيا المعلومات والاتصالات للطلاب ذوي الإعاقة الذهنية. يرجى تقديم ردك من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
134	لا يزال المعلمون هم اللاعبون الرئيسيون في برامج تكنولوجيا المعلومات والاتصالات التي ينبغي إدراجها في برامج التأهيل لتعزيز مساهماتهم.					
135	ينبغي أن يشمل تدريب المعلمين أيضا استخدام تكنولوجيا المعلومات والاتصالات لتمكين هؤلاء المعلمين من التحضير بشكل جيد لاستخدام تكنولوجيا المعلومات والاتصالات في المستقبل.					
136	عندما يتم تدريب المعلمين على تكنولوجيا المعلومات والاتصالات في الكليات والجامعات، يتكون لديهم فهم أفضل للتدريس باستخدام تكنولوجيا المعلومات والاتصالات.					
137	تدريب المعلمين على تكنولوجيا المعلومات والاتصالات ضروري للغاية. وبالتالي، إدراج تكنولوجيا المعلومات والاتصالات في إعداد البرامج سوف تعزز مهارات تكنولوجيا المعلومات والاتصالات بين المعلمين.					
138	إدراج تكنولوجيا المعلومات والاتصالات في تحضير المعلمين من شأنه أن يقلل من التصورات السلبية لدى استخدام تكنولوجيا المعلومات والاتصالات.					
139	المهارات والكفاءات التكنولوجية هي عناصر رئيسية في استخدام تكنولوجيا المعلومات والاتصالات، وإذا تم تضمين تكنولوجيا المعلومات والاتصالات في تحضير المعلمين، سيسهم ذلك في صقل مهاراتهم واختصاصاتهم.					
140	سيكون المعلمون على استعداد أفضل لاستخدام تكنولوجيا المعلومات والاتصالات عندما يبدأ تحضيرهم على هذا الاستخدام في تدريبهم.					

141	ستكون هذه استراتيجية جيدة لتحسين الاستخدام العام لتكنولوجيا المعلومات والاتصالات في المدارس.					

23 تزويد المدارس بما يكفي من الموارد التعليمية والأجهزة والبرمجيات المناسبة لتدريس مهارات مختلفة للطلاب ذوي الإعاقة الذهنية في اللغة العربية من شأنه أن يسهم في تطوير استخدام تكنولوجيا المعلومات والاتصالات لهؤلاء الطلاب. يرجى تقديم ردك من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
142	توفير الموارد الكافية باللغة العربية من شأنه أن يحفز المعلمين على استخدام أجهزة تكنولوجيا المعلومات والاتصالات.					
143	عندما يتم تزويد كل طالب بجهازه التعليمي، وببرمجيات عربية، سيتعلمون بشكل أفضل وحتى المعلمين ستسهل مهمتهم.					
144	إذا كان لدينا العديد من البرمجيات العربية، سيتمكن المعلمون من تلبية الاحتياجات الفردية لكل طالب.					
145	وجود ما يكفي من البرامج العربية سوف يعزز إلى حد كبير تعلم اللغة بين الطلاب.					

24 سيسهم إعداد المدارس التي لديها شبكة كافية وإمكانية الوصول إلى الإنترنت في تطوير استخدام تكنولوجيا المعلومات والاتصالات للطلاب ذوي الإعاقة الذهنية. يرجى تقديم ردك من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
146	هناك حاجة إلى وجود شبكة إنترنت موثوق بها ولها سرعة عالية للاستخدام الفعال لتكنولوجيا المعلومات والاتصالات وخاصة فيما يتعلق بالتدريس عبر الإنترنت.					
147	في عصرنا الحديث، الإنترنت مطلوبة على مدار الساعة، ومجالس المدارس كما هو الشأن بالنسبة لمدير المدرسة،					

	عليهم ضمان هذا لسلاسة عملية إدراج تكنولوجيا المعلومات والاتصالات.					
148	توفير اتصال جيد بشبكة الإنترنت من شأنه أن يمكّن المعلم من استقدام الدرس والموارد التعليمية الأخرى إلى الفصل حتى يضمن الدخول إليها في وقت لاحق من الحاسوب الخادم/الملقم بالمدرسة.					
149	تؤدي الحوسبة المتنقلة إلى تغيير كبير في طريقة دمج تكنولوجيا المعلومات والاتصالات في دروس صفية مثل الرياضيات، وبالتالي ينبغي أن يكون هناك اتصال بالإنترنت.					
150	إن الاتصال الفعال بالإنترنت سوف يقلل من الوقت، وهذا ما سيحفز المعلمين على استخدام تكنولوجيا المعلومات والاتصالات.					
151	إذا توفر المزيد من الدعم الفني لضمان فعالية الشبكات والاتصال بالإنترنت، سوف يتم تحقيق الكثير في استخدام تكنولوجيا المعلومات والاتصالات.					

25 تقديم الدعم المالي للمدارس للحصول على أجهزة تكنولوجيا المعلومات والاتصالات سيسهم في تطوير استخدام تكنولوجيا المعلومات والاتصالات للطلاب ذوي الإعاقة الذهنية. يرجى تقديم ردك من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	البيان	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
152	لتطوير استخدام تكنولوجيا المعلومات والاتصالات في هذه المدرسة، يجب أن يكون لدى الحكومة استراتيجية مناسبة لتمويل المدرسة للحصول على ما يكفي من أجهزة تكنولوجيا معلومات واتصالات لائقة.					
153	ينبغي وضع الموازنة المناسبة لشراء أجهزة تكنولوجيا المعلومات والاتصالات الأكثر استخداما، وليس فقط جهاز كمبيوتر كبير.					
154	يجب أن يكون هناك إطارا صحيحا لإدماج تكنولوجيا					

	المعلومات والاتصالات في المدرسة بأموال كافية من الحكومة.					
155	يتطلب دمج تكنولوجيا المعلومات والاتصالات في التدريس والتعلم في المدارس ميزانية عالية، ولذلك هناك حاجة ماحة لتمويل كاف من الحكومة وغيرها من الجهات الفاعلة.					
156	الأموال الكافية مهمة لضمان نجاح عملية إدماج تكنولوجيا المعلومات والاتصالات في المدارس من خلال شراء الأجهزة المطلوبة.					

26 تطبيق تكنولوجيا المعلومات والاتصالات في المناهج الدراسية للطلاب ذوي الإعاقات الذهنية من شأنه أن يسهم في تطوير استخدام تكنولوجيا المعلومات والاتصالات لهؤلاء الطلاب. يرجى تقديم ردك من خلال الإشارة إلى مستوى قبولك للبيانات التالية:

رقم البيان	**البيان**	غير موافق تماما	غير موافق	موافق نوعا ما	موافق	موافق تماما
157	لتعزيز استخدام تكنولوجيا المعلومات والاتصالات في الفصول الدراسية، من المهم إدراجها في المناهج الدراسية لتوفير وقت كاف للمعلمين.					
158	لزيادة أهمية تعامل المعلمين مع تكنولوجيا المعلومات والاتصالات، تركز وزارة التعليم على تعزيز تكنولوجيا المعلومات والاتصالات في مناهج التعليم الخاص.					
159	إن إدراج تكنولوجيا المعلومات والاتصالات في المناهج الدراسية يضمن تحقيق أهدافها.					
160	إن إدراج دروس تكنولوجيا المعلومات والاتصالات في المناهج الدراسية سيساعد المعلمين في التحضير والتخطيط للدروس.					
161	من الضروري التعامل مع تكنولوجيا المعلومات والاتصالات كجزء من الدروس التي تقدم في المدارس العادية، ومن ثم إدراجها في المناهج الدراسية.					
162	إن وجود درس معين بشكل رسمي في المنهج الدراسي سيساعد المعلمين على التعامل مع دروس تكنولوجيا					

	المعلومات والاتصالات بأكثر جدية.					
163	سيتم تخصيص موارد إضافية في شكل أجهزة وأموال عند دمج دروس تكنولوجيا المعلومات والاتصالات في المنهج الدراسي.					
164	ينبغي مراجعة مناهج تكنولوجيا المعلومات والاتصالات بشكل منتظم لتحديث الاحتياجات التعليمية للطلبة ذوي الإعاقة.					
165	من خلال وضع تكنولوجيا المعلومات والاتصالات في المناهج المدرسية، سيكون من السهل تطوير الدروس المناسبة التي تتناسب مع الاحتياجات الفردية للطلاب.					
166	يجب على الوزارة دعم استخدام تكنولوجيا المعلومات والاتصالات من خلال إدراجها في المناهج المدرسية على جميع المستويات.					
167	إن الجانب المهم من المناهج الدراسية هو التخطيط، لذلك سيتم تخطيط دروس تكنولوجيا المعلومات والاتصالات بشكل جيد عندما تدرج في المناهج الدراسية.					
168	إن إدراج دروس تكنولوجيا المعلومات والاتصالات في المناهج الدراسية سيكون في مصلحة الطلاب وتطلعاتهم.					

شكرا جزيلا على وقتك وجهدك في استكمال هذا الاستبيان!

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