

**Assistive Technology's Effect on the Academic
Performance of Students with Disabilities: An
Investigative Study at Higher Education Institutions in
the UAE**

تأثير التكنولوجيا المساعدة على الأداء الأكاديمي للطلبة ذوي الإعاقة: دراسة
استقصائية في مؤسسات التعليم العالي في دولة الإمارات العربية المتحدة

by

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**Dissertation submitted in fulfilment
of the requirements for the degree of
MASTER OF EDUCATION**

at

The British University in Dubai

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ABSTRACT

Assistive Technology (AT) has a significant role in helping people with disabilities to function better in society. The AT becomes an indispensable tool across the education realm, which can be linked to the more significant academic achievement for Students with Disabilities (SWDs). Furthering and integrating AT in higher education settings permits the practice of independence and social participation of SWDs along with their peers free from discrimination based on disability. Accordingly, the United Arab Emirates (UAE) provides great efforts to promote social inclusion by integrating people with disabilities in everyday activities, such as work, sports, and education. The UAE embraced best global practices and solutions in this field through the standards of services provided, initiatives, and technology as a result of implementing the National Policy in Empowering People of Determination and Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs.

This study aims to examine the effects of AT on the academic performance of SWDs in Higher Education Institutions (HEIs) in the UAE. A mixed methods approach of data collection was applied to gathering data quantitatively and qualitatively, which included a questionnaire, interview and analysis of official documents. The target sample population of the study consists of SWDs, teachers and specialist staff who understand the necessity of AT services and evaluate barriers in promoting AT effectively. This study revealed the extraordinary benefits of the use of AT as a way to increase the academic performance of SWDs in HEIs and identifies the major challenges that hinder the successful implementation of AT. The study recommends establishing AT services and support centers in HEIs along with creating an AT Act to be regulate these provisions in the UAE

Keywords: Assistive Technology, Students, Disabilities, Higher Education, UAE, Academic Performance, Services, Act

المخلص

للتكنولوجيا المساعدة دور بالغ الأهمية في مساعدة الأشخاص ذوي الإعاقة على العمل والمشاركة بشكل أفضل في المجتمع. وأصبحت التكنولوجيا المساعدة أداة لا غنى عنها في مجال التعليم، فهي مرتبطة بتحسين المنجزات الأكاديمية التي يحققها الطلاب ذوي الإعاقة بشكل كبير. وتعزيز دمج التكنولوجيا المساعدة في بيئة التعليم العالي يتيح للطلاب ذوي الإعاقة مزيداً من الاستقلالية والمشاركة الاجتماعية جنباً إلى جنب مع أقرانهم الطلبة من دون أي تمييز. في هذا الصدد، تبذل دولة الإمارات العربية المتحدة جهوداً كبيرة لتعزيز هذا الدور الاجتماعي من خلال دمج الأشخاص ذوي الإعاقة في الأنشطة اليومية، كدمجهم في العمل والرياضة والتعليم. فدولة الإمارات العربية المتحدة تبنت أفضل الممارسات والحلول العالمية في هذا المجال من خلال رفع معايير الخدمات المقدمة والمبادرات والتكنولوجيا كنتيجة لتنفيذ السياسة الوطنية لدولة الإمارات في تمكين أصحاب الهمم والقانون الاتحادي رقم 29 لعام 2006 بشأن حقوق الأشخاص ذوي الإعاقة.

تهدف هذه الدراسة إلى قياس تأثير التكنولوجيا المساعدة على الأداء الأكاديمي للطلاب ذوي الإعاقة في مؤسسات التعليم العالي في دولة الإمارات العربية المتحدة، حيث تم تطبيق أساليب مختلطة لجمع البيانات كمياً ونوعياً، والتي تتضمن الاستبيان والمقابلات الشخصية وتحليل الوثائق الرسمية. وتكونت عينة الدراسة المستهدفة من الطلاب ذوي الإعاقة والمدرسين والموظفين المتخصصين لفهم ضرورة تقديم خدمات التكنولوجيا المساعدة وتقييم الحواجز التي تحول دون استخدام التكنولوجيا المساعدة بشكل فعال. وكشفت هذه الدراسة عن الفوائد الجمة لاستخدام التكنولوجيا المساعدة في زيادة الأداء الأكاديمي للطلبة ذوي الإعاقة في مؤسسات التعليم العالي، مع الإشارة إلى التحديات الرئيسية التي تعيق تنفيذ استخدام التكنولوجيا المساعدة بنجاح. وأوصت الدراسة بإنشاء مراكز خدمات ودعم التكنولوجيا المساعدة في مؤسسات التعليم العالي إلى جانب إصدار قانون لتنظيم استخدام التكنولوجيا المساعدة في دولة الإمارات العربية المتحدة.

الكلمات الرئيسية: التكنولوجيا المساعدة، الطلاب، الإعاقة، التعليم العالي، الإمارات العربية المتحدة، الأداء الأكاديمي، الخدمات، القانون

DEDICATION

To The One Who Always Fills My Life with Happiness and Hope (My Dear Mother)

To The Kind of Heart and Soul That I Miss (My Father, May God Have Mercy on Him)

To Those Diagnosed With Duchenne Muscular Dystrophy: Your Fight Is My Fight
(We Are Stronger Than Duchenne)

To All Those Who Create Success from Challenges (People of Determination)

الإهداء

إلى التي دائماً تملأ حياتي بهجة وأملاً (أمي الغالية)

إلى طيب القلب والروح الذي أفنقده (أبي رحمه الله تعالى)

إلى كل المصابين بالضمور العضلي دوشين: معركتنا واحدة (معاً نحن أقوى من الدوشين)

إلى كل الذين يصنعون النجاح من التحديات (أصحاب الهمم)

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Decade after decade, defying against all odds with Duchenne Muscular Dystrophy, it is possible to have a creative, more fruitful and quality of life. Living with the loss of functional abilities can be productive because of varied of customizable technologies and adaptive lifestyle for me as a student. This golden opportunity bestows me to write this great topic and express my personal experiences in higher education levels. In doing so, I can relay my goal of increasing the awareness of how the use of assistive technology proves that life never stops on account of living with disabilities.

I want to extend my sincere gratitude to the following people; without their support, I would not have been able to accomplish my long-range academic success. I thank my dissertation supervisor, Dr. Tendai Charles, for his sincerity and invaluable guidance, knowledge and brilliant insight in handling technology and inspiring me to present this research project comprehensively and objectively. It was a great honor to work under his guidance. Special thanks to Ms. Sheri Henderson for her expert advice and proofreading to my dissertation, and to Ms. Noof Ali for her assistance in translating the abstract into Arabic. My grateful appreciation to Dr. Khawla Al Shehhi for her support and advice toward this journey. My sincere gratitude to the Administration of the British University in Dubai for giving me the significant opportunity to highlight my capabilities and especially for granting me a full scholarship as a Master's Degree student. My appreciation also to Professor Emaan Gaad and to all Education Faculty for guiding me through my graduate education. To all the generous participants of three selected higher education institutions, I extend deep thanks for taking the time in answering and completing the questionnaires and interviews; your cooperation made this study possible.

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Chapter 1: Introduction

1.1 Overview

Information and Communication Technology (ICT) has become a significant component that influences vital fields, such as business, healthcare, and education, especially with increasingly integrated technology within education systems. ICT provides novel and innovative solutions to develop interactive pedagogies capable of improving students' performance, which affects students' behaviour positively by enhancing students' roles - socially, culturally and professionally - to lead the future of a knowledge economy.

The significance of ICT lies in the ability to empower students to gather adequate skills in order to improve their life quality: educators can support Students with Disabilities (SWDs) by implementing and utilizing ICT technologies during their teaching and learning practices. Furthermore, the emerging technologies of ICT are essential tools to enable SWDs to interact with their social environment positively, which provides them with confidence to access schools and Higher Education Institutions (HEIs). The availability of ICT facilitates accessibility to the information that helps SWDs to develop their learning ability and expand understanding of their own aptitudes that lead them to access appropriate educational and training programs, which guide them to future occupational opportunities. Consequently, the potential of social inclusion is increased which helps to integrate SWDs within society and the educational community successfully, as well as facilitating access to services provided for SWDs and reducing barriers encountered by SWDs during their educational experiences from school to higher education.

Moreover, integrating new ICT on Assistive Technology (AT) tools extends SWDs' access to computer-based systems and pedagogical services that allow them the required assistance across information society (Feyerer et al. 2002).

Nowadays, supporting the various types of disabilities in educational settings contributes to increased the number of SWDs who enroll in HEIs. Thus, several difficulties arise with academic performance and within the learning process. As ICT

is implemented in a way that is more effective for SWDs, it equips and allows both students and teachers to build strong teaching, and learning methods, which make learning possible (Heiman et al. 2017). ICT tools play an essential role either at home, school, and work in the life of People with Disabilities (PWDs): adaptation made possible by different kinds of technology make daily tasks easier for SWDs, AT could be the essential instrument that facilitates education (Ravneberg & Söderström 2017). AT removes potential barriers and allows SWDs to achieve academic excellence.

Advancements in AT enable SWDs' entry into HEIs by addressing their independence through recognizing and promoting individual skills. Utilizing technology empowers SWDs: a Bring Own Your Device (B.O.Y.D) policy permits use of AT such as smartphones with voice command or tablets with updated accessibility features.

AT is one of most crucial inclusive tools that enables SWDs to access information online on a large scale; hence, the benefits of integrating AT within the educational process increase when making inaccessible information effectively accessible (Lyner-Cleophas 2019). Moreover, facilitating access to information resources and learning materials through implementing a successful AT system empowers SWDs to embrace the valuable learning opportunity through the concept of inclusive education.

1.2 Background of the Study

There is increasing awareness of the rights of PWDs to live within an accessible community that fully appreciates their hopes to interact positively and productively in society, living life to the fullest as independent, active individuals. SWDs' rights in attaining ideal education remain a significant issue all over the world. As stated by The United Nations Educational Scientific and Cultural Organization (UNESCO), everyone should have “full and equal opportunities for education for all particularly for marginalized and vulnerable groups, including PWDs despite the specific challenges in the pursuit of their right to education” (UNESCO 2015, p.5).

The number of PWDs all over the world shows visible evidence about the extent to which their disabilities were prevalent in the communities regardless of the country's development. The last report on disabilities issued by the World Health Organization (WHO) indicates that “15% (more than 1 billion) of the world's population lives with some form of disability, 2 to 4% (between 110 to 190 million) experience significant difficulties in functioning” (WHO 2011, p.261). These statistics indicate to governments as well as business and organizations in society that they should unify their efforts to improve accessibility, as well as provide psychosocial supports for social inclusion. Increasing educational opportunities can boost knowledge-based information skills and develop PWDs' technical abilities, which guide them for future career opportunities.

With numbers of PWDs within communities continuing to rise, education systems should be aware and consider the possibility of ensuring that SWDs are given fair, equitable and inclusive access to learning from kindergarten to higher education.

Achieving equitable rights of education remains tough for SWDs passions due to inadequate access in educational settings. Thus, lawful education provisions must be recognized and implemented to assure active participation and collaborative ways of learning for all, by explicitly integrating assistive technology. UNESCO (2015) mentions that some countries have been embracing and recognizing the right to education as a protective measure in order to ensure independence and confidence for SWDs by providing an inclusive education approach as well as adapting curriculum alongside integrating AT, thus enhancing teaching and learning development for both SWDs and teachers.

As of now, some countries like the United Arab Emirates (UAE), abide by supporting and empowering PWDs in different fields. In 2006, the UAE's President, His Highness Sheikh Khalifa Bin Zayed Al Nahyan, issued Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs; this law emphasized the rights of PWDs to live with dignity. Accordingly, PWDs have protection against any unlawful treatment regarding their disabilities that forbids them to strengthen their social capabilities in the community and educational environment (UAE Government 2019). Additionally, the UAE signed the United Nations Convention on Rights of Persons with Disabilities that agrees to terminate discrimination and ensures proper

inclusion appropriately for all (Gulf News 2008). As stated by Vice President and Prime Minister of the UAE and Ruler of Dubai, His Highness Sheikh Mohammed bin Rashid Al Maktoum, the National Policy to Empower People of Determination was launched in 2017, which is intended to address both PWDs, and families' desire for quality inclusive society (The National 2017).

The UAE protocols empower PWDs functional condition and independence. The policy safeguards the rights of SWDs to access educational resources, which expand their individual educational potential. The Ministry of Community Development (MOCD) highlighted the National Policy to Empower People of Determination which reinforces inclusion in public and higher education: necessary tools, support materials and technologies contribute to achieving the identified goal of attaining quality education for all (MOCD 2017). This advocacy affirms compassion into General Rules for the Provision of Special Education Programs and Services (Public and Private Schools) that was implemented by the UAE Ministry of Education (MOE) in 2010, likely with the same purpose as the National Policy to Empower People of Determination.

All of the procedures and legislation by the UAE government fall under the umbrella of Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs, which endeavours to provide all requirements and equipment that guarantee education for all, and ensures that SWDs have equal access to all educational institutions. As indicated in Article 15 of the law, “providing advice and technological, technical and educational assistance is important to ensure institutions capacity in order receive SWDs” (MOCD 2006, p.6).

At this point, significant efforts have been made by the UAE government in respect to increasing educational inclusion among the growing number of PWDs. According to Hessa Buhumaid, the number of Emiratis with disabilities has risen to 19,151 (The National 2019). With this significant number of PWDs relative to the UAE's total population of approximately 9.3 million (Gulf News 2018), it is important to activate the National Policy to Empower People of Determination, especially in the field of higher education, which requires more potential to achieve successful inclusive education. Moreover, AT is a necessary tool to improve SWDs' academic performance.

1.3 Assistive Technology's Definition

The definition of Assistive Technology (AT) has been expanded since the increased utilization of AT as an essential tool to facilitate daily life tasks for PWDs, especially with the growth of AT in various fields that augment social inclusion and reform life quality which contribute to enhanced autonomy and active participation for PWDs. The U.S. Assistive Technology Act issued in 2004 defines AT as “Any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities” (Assistive Technology Act of 2004 2004, p.4). This terminology comprises AT service, which is defined as a “service that directly assists an individual with a disability in the selection, acquisition, or use of AT device” (Assistive Technology Act of 2004 2004, p.4).

A broad range of provisions of the AT concept confirms the importance and needs of integrating AT in varying dimensions for PWDs' lives. The WHO (2018) defines AT as devices associated to “maintain or improve an individual's functioning and independence to facilitate participation and to enhance overall well-being that helps prevent impairment and secondary health conditions” (p.1).

Generally, adopting AT to gain independence in communication becomes a reality for PWDs. Revolutionary AT includes features and services such as mobility and apps that are specially designed for PWDs. This rapid occurrence of modifications in specialized computers and software of AT offers benefits for SWDs, in particular trendy smartphones with voice-activated controls and commands for SWDs. Cook and Hussey (2002) define AT as computers with programs that allow students to access the digital environment, promoting individual life and social/education.

These comprehensive concepts of AT lead SWDs to have general knowledge and understanding across SWDs barriers in education systems, reinforce related family members and educational service provider to participate in reforming the advancement purposes and functions of AT in every disability.

1.4 Problem Statement

The calm assurance of AT in humanity is immensely grateful, especially for SWDs. The prominent effect of AT on educational process influences the academic performance of SWDs in higher education; it leads them in diverse practices to nourish their social and psychological learning process in educational settings. McNicholl et al. (2019) assert that the integration of AT inside and outside the classroom empowers SWDs with the capability to interact in social communication and undertake independent participation in their respective academic engagement, thereby leading them to maximize their potential in academic performance and collaboration in the educational environment.

SWDs identify conditions and experiences which somehow recognize their bodies' use of alternative AT tools. These AT, such as smart devices enable SWDs to remove barriers. Being able to identify preferences requires holistic understanding and the significance value of blending devices in teaching and learning methods for SWDs. However, the identification of SWDs precise services and interest allows HEIs to modify and adopt AT, promising convenience for SWDs to fulfill their own expectations across educational settings (Desmond et al. 2018).

Although AT can bring advantages in specific scenarios in the learning environment, SWDs must require self-advocacy skills to determine the nature of their disabilities in order to acquire appropriate accommodations. Therefore, assessing AT provision system in the higher education setting facilitate understanding SWDs educational needs to activate their engagement in the classroom (Cook & Sonnenberg 2014).

To be able to understand the impact of integrating AT within the higher education systems and identify the benefits of AT features means remaining knowledgeable of the AT existence which reflects on the academic performance of SWDs. Therefore, this study has undertaken to examine research gap between the availability of AT and the lack of utilizing it in HEIs to support SWDs: evaluating the AT solution's possibility of facilitating individual capabilities is a necessary part of the context of inclusive education. Thus, expanding the mutual role of integrating AT within classroom and social life increases the opportunity of SWDs for participation and interaction within the community.

1.5 Research Questions

This study focuses on SWDs at HEIs in the UAE and the importance of utilizing AT as an innovative tool that could improve SWDs' academic performance. This study aims to answer the following research questions:

Question 1: How does Assistive Technology assist Students with Disabilities at HEIs in terms of their academic performance?

Question 2: What are the challenges of applying Assistive Technology for Students with Disabilities at HEIs?

Question 3: How does the provision of Assistive Technology services centres in each campus improve Students with Disabilities' academic performance?

Question 4: What recommendations must be made to integrate Assistive Technology effectively within HEIs for Students with Disabilities?

1.6 The Study's Purpose

The purpose of this study is to evaluate the current provisions of AT in supporting and increasing the academic performance of SWDs in HEIs. By involving three selected institutions, the researcher hopes to acquire a comprehensive understanding of the existing system and policies of adopting AT in educational settings of the UAE.

This study discusses the strength and advantages of integrating AT inside and outside the classroom. It considers how both teachers and SWDs participate in applying the beneficial impact of AT on pedagogy and syllabus content. In addition, it considers how academic administration take part in the implementation of the effectiveness of the AT to expand SWDs' academic performances.

Furthermore, the research investigates the related challenges of implementing AT in higher education within the UAE and explores the struggles of incorporating AT services in each institution. The study looks at hoe effectively HEIs fulfil the mandate of National Policy to Empowering People of Determination's guidelines in using AT by

comparing and identifying the probable circumstances that somewhat interfere with the implementation process.

Additionally, this paper examines the influence of the provision of AT resources and a dedicated support centre, which develops the structure and mechanisms to differentiate and understand the effectiveness of AT and acknowledge factors that strengthen academic performances of SWDs' involving common disabilities that include physical disabilities, hearing impairment, visual impairment and learning disabilities that were highlighted in this study. On the other hand, this study explores the potential anticipation of an AT specialist role to initiate strategies for the implementation of equal access in quality inclusive education for SWDs.

Lastly, the research aims to contribute across the higher education sector to convey the process of implementing an AT system particularly in UAE, wherein the relevant research is presently quite limited.

1.7 The Organization of the Study's Paper

This study's paper includes five main chapters which identify the research aims and valuable results of the study. The first chapter introduces the study and provides an overview of the existing research. Also, it contains the background which emphasizes the significance of using AT linked to its effects on SWDs' academic performance in higher education. In addition, it consists of the definitions of AT, the statement of the problem, the research questions, the purpose of the study and organization for each chapter. The second chapter involves a literature review, which indicates the essential relevant points in the literature and explores work by several of researchers and authors regarding the advantages and roles of utilizing AT among SWDs with integrating it within higher education systems. The third chapter discusses the methodology that covers data collection along with the value of using questionnaires and interviews with selected participants, as well as mentions research design. The following chapter includes the results based on discussions of findings of the data analysis. The last chapter concludes the research paper and focuses on the necessary recommendations for future research in accordance with the significance of the study.

Chapter 2: Theoretical Framework and Literature Review

2.1 Conceptual Framework

The selected framework applied to construct a theoretical concept in this study includes the conceptual model founded by Cook and Hussey, who developed a comprehensive model called Human Activity-Assistive Technology (HAAT). The HAAT Model was established in 2002, and is derived from Bailey's human performance model created in 1996. According to Lenker and Paquet (2003, p.3), "HAAT describes an AT system in terms of a person (human) using an assistive technology (AT) device to accomplish the desired task (activity) in a given context (environment)". Four interaction areas of the HAAT model measure the AT integration outcomes demonstrated in Figure 1. HAAT aims to identify AT system performance instead of describing human or device performance and expands social and cultural dimension ranges in using AT. Crucial elements of HAAT reflect how tasks and environments attribute and human performance in a wide range of meaningful activities (Lenker and Paquet 2003). Cook and Hussey (2002) suggest that considering the four components of HAAT model in relation with designing, selecting, implementing and evaluating the best-suited AT for users' diverse needs provides a comprehensive understanding of AT system performance that is consistent to obtain competency levels that enhance a user's satisfaction, efficiency and improve quality of life for PWDs.

Theoretically, the development of the HAAT framework helps the researcher analyze the data collected in the study and thus examine the effects of AT on the academic performance of SWDs as well as assess the teachers' knowledge in integrating AT within teaching and learning approaches and examine the provision of AT specialist in the higher education setting (Cook and Hussey 2002).

CONTEXT

Social Context

Family
Peers
Strangers

Settings

Home
School
Employment
Community

Physical Context

Space
Light
Sound
Temperature

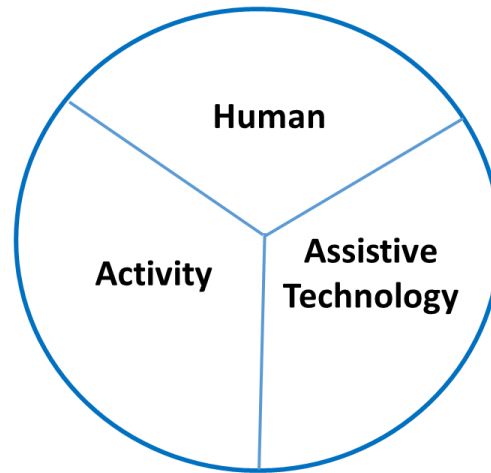


Figure 1. The Human Activity-Assistive Technology (HAAT) Model (Adapted from Cook and Hussey 2002, p.36).

2.2 Special Education and Assistive Technology in the UAE

The special education services structure has ultimately undergone considerable changes across the UAE. Endorsement of the Respective laws was initiated internationally towards SWDs' active engagement in the educational environment (Salend 2008). Hence, the UAE issued several policies and federal laws to empower Persons with Determination (PWD) in various areas to maximize the inclusion throughout the community (UAE Government 2020). In the year 2017, the UAE characterized people with disabilities as a PWD: a reflection of persons with disabilities for being courageous and their perseverance (Dibden 2019).

Moreover, the UAE is ensuring the attributes of PWDs as learners regardless of disabilities by enabling inclusive education become a conception of their learning and communication. Securing sustainability in the inclusive education system is vital for the development in the educational experience of the SWDs, and indicates the progress of pedagogical decisions (Anati 2012). Consequently, the field of special education has experienced significant changes in the UAE; following the publication of the General Rules for the Provision of Special Education Programs and Services

(Public and Private Schools) (MOE 2010). Gaad and Almotairi (2013) indicate that educating SWDs in regular classroom settings became the attention of the Ministry of Education in the UAE, 2010 in order to promote the special education curriculum and provide an equal opportunity in accessing educational services.

On the other hand, the higher education sector in the UAE has created significant development in a wide range of both public and private universities (Gaad & Almotairi 2013), which has led to ensuring an excellent system of social and cultural growth effectively (Chatterton & Goddard 2000). However, several steps have been taken in the UAE when it comes to dealing with SWDs in the education sector. The Knowledge and Human Development Authority (2017) clarifies that the UAE guarantees the development of learning approaches for SWDs that help them to receive reasonable accommodations, maximizing their sense of autonomy and performance for their active participation in future employment opportunities and social inclusion.

Additionally, the advancement of technology in the UAE has increasingly improved as progressive policies and initiatives projects, particularly in the modern learning environment develop. Almekhalafi and Tibi (2012) assert that with a advanced high-tech society, technology plays a significant role to enhance special education as a new field in the UAE, which empowers SWDs to participate in the education process and enable to create inclusive classrooms. Therefore, the revolution of technology established excellent diversified systems within educational settings to assist students with various disabilities, including SWDs with a sensory, cognitive and physical disability for which AT can ensure that SWDs become independent, efficient and have as great a success rate at completing studies in higher education as their peers (Khan et al. 2016). The UAE embraces focusing on education reform of the integration of AT towards SWDs to facilitate the inclusion process (Almekhalafi & Tibi 2012).

2.3 The Significance of Assistive Technology in Higher Education

Providing Information and Communication Technologies (ICT) and Assistive Technology (AT) in the educational system facilitates the Universal Design for Learning (UDL) in access to the learning environment and curriculum content (Burgstahler 2015). The benefits of AT in higher education involves the use of inclusive facilitator tools for various users that makes inaccessible information more accessible towards SWDs in particular (Duplaga 2017). Learning to integrate UDL in an educational environment would foster autonomous and development of inclusive education by mobilizing ICT's advantages as well as facilitating greater access to address the diverse needs of SWDs (McNicholl et al. 2019). UNESCO's (2005) recommendation is to "address and respond to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion within and from education, also by means of ICT tools" (p. 13). The advancement of ICTs has been improved and revised in order to create genuine accessibility to the educational tools that are necessary to enhance the real inclusive classroom in the higher education system (Heiman et al. 2017). Acquiring AT knowledge and ensuring both teachers and all learners have access for educational settings by selecting appropriate ICTs tools and methods for the accommodations strategies is essential (Emiliani et al. 2009).

Therefore, the earlier the adoption AT in learning, the simpler and faster it is to acquire the total rewards of the power of ICT to enable education and social inclusion (ITU 2013). Moreover, providing AT in childhood would prevent a secondary condition like academic difficulties and increase the educational potential of learners for pursuing higher education (Agree & Freedman 2011). Improving access to AT facilitates SWDs' self-development and prevents repetition of missed learning or school lessons due to educational barriers (WHO 2015). The integration of ICT tools and applications eradicates accessibility barriers for SWDs; this involves improving access to learning support services and providing productive environment in accordance to access educational activities and resources with the same format like their peers without disabilities. Emiliani (2009, p. 636) asserts that "all students have the right to benefit from ICT tools to the same extent, irrespective of their disabilities;

this implies all of them having the right to access, and use mainstream educational tools, including ICT-based”.

Consequently, today's education sector aims to fulfil the objectives set out to ensure that SWDs have the same level of education without any distinction and are included as an integral part of the learning community through use of suitable ICT tools (Schindler et al. 2017). Ravneberg and Söderström (2017) describe AT as the fundamental prerequisite that should be taken into consideration to foster harmony between all learners in higher education. In this way, access to ICT tools contributes to overcoming learning barriers and avoids risk of exclusion from active classroom participation for SWDs; everyone with existing difficulties can benefit from ICT development, enabling inclusive learning for all (McNicholl et al. 2019). According to Abbott et al. (2014), the “uses of technology make learning possible where it was not possible before those enabling learners to communicate where they would otherwise be unable to do so” (p. 457).

2.4 The Impact of Assistive Technology on the Academic Performance of Student with Disabilities in Higher Education

Educational rights are being fostered as a critical element to the development of SWDs' quality of life inside and outside of the school; thereby, with opportunities for SWDs to study at HEIs expanded, the need to provide appropriate accommodations for those students is increasing. Consequently, the availability of AT can be promoting educational services provided for SWDs' individual needs that facilitate improving their academic potential and hinder the learning barriers for increasing SWDs' participation with their peers in HEIs (Lersilp 2016). However, offering these AT and educational services does not ultimately benefit SWDs' abilities to achieve their academic goals. Heiman et al. (2017) mention that SWDs might encounter different difficulties when dealing with teaching and learning approaches and cope with academic performance while integrating appropriate AT provide SWDs with a pathway to adapting with various disabilities that enable them to develop learning skills. Lersilp (2016) states that adaptation of high-tech AT tools along appropriate educational services enables SWDs to execute their functional capabilities of learning, accessing and utilizing these schemes. AT allows SWDs to develop their

learning competencies and establish full independence and active engagement in succeeding in higher education settings (McNicholl et al. 2019).

The positive influence of AT assists SWDs to improve academic engagement and increase participation in a higher education environment. According to McNicholl et al. (2019, p. 7) AT does this by “enabling SWDs to perform common academic tasks more easily, allowing SWDs to access and engage with educational material related to their course, increase their learning and promote improved academic performance”. In general, AT empowers SWDs to perform the educational tasks such as taking notes actively, writing, reading and learning more efficiently, without discrimination based on disability (Malcolm & Roll 2018).

Moreover, using AT for SWDs increased their academic performance. Seale, Wald and Draffan (2008) reported that AT allowed SWDs to obtain better results and enhanced their grades. As well, AT enabled them to be more engaged and persevere during the courses (Malcolm & Roll 2018). AT is seen as an enhancer to facilitate academic engagement that is consistent with the approach of a right-based universal model (McNicholl et al. 2019).

Integrating AT within the HEIs reinforces SWDs' participation to accomplish the academic tasks efficiently (Adebisi, Liman, & Longpoe 2015). AT tools could be a means of software or device, which is viewed as a positive manner to develop and maximize their educational performances, particularly learning experiences and communications skills (Assistive Technology Industry Association 2015). Tanners et al. (2012) assert that AT devices have a significant impact on SWDs' ability to perform academic tasks effectively. Dowrick et al. (2005) explain the computer literacy in SWDs' academic performance contributing to accelerating in writing capabilities enabler to generate written form, reduces typing errors and creating favourable of extensive vocabularies in optimal efficiency (Nelson & Reynolds 2015). In addition, usage of specific AT devices such as iPads, reading pens and Personal Device Assistant (PDA) that include voice-over features, speech recognition software and screen reading software influenced SWDs' learning performance rate successfully (Floyd & Judge 2012). Therefore, making use of computer and information technology as AT is of great value to SWDs that helps for revision of examination or completion of assignments by reducing and eliminating some barriers

they encounter and enhances equal opportunities in higher education level (Foley & Masingila 2015).

2.5 Perspectives of the Use of Assistive Technology towards Students with Disabilities

In recent years, the effectiveness of the AT associated with special education has been a subject of controversy caused by people's perspective. Some people view AT as means for SWDs to progress and have academic success while others consider AT makes SWDs dependent and unable to perform tasks by themselves (Edyburn 2006).

Furthermore, the AT implies the technological advancement resources in helping PWDs to acquire social welfare assistance and to enhance their capabilities in social involvement to reduce distinction on disabilities enabling PWDs to achieve the quality of life. Subsequently, integrating AT for SWDs in higher education leads to improved performance and independence, thus facilitating their engagement (Owuor et al. 2018). According to Agree & Freedman (2011, p.1787) "The effectiveness of assistive technology extends beyond the reduction of difficulties with activities and dependence to include a broader psychosocial impact on the perceived quality of life".

AT's prominence has potential in carrying out the psychological change for SWDs. It contributes a sense of autonomy, motivation and confidence that serves as an instrument to empower positivity, which affects the mind-sets of SWDs' sense of belonging within the higher education environment (Heiman & Shemesh 2012). Wessel et al. (2015) affirm that when AT is seen positively, this would also appear to change perceptions of those people without disabilities and helps them to understand the feeling of inclusion for SWDs and their AT use. The familiarity with AT of both students without disabilities and SWDs facilitates communication and sharing of their everyday experiences as a result (Lartz, Stoner & Stout 2008). Utilizing AT for SWDs in the classroom contributed to establishing an inclusive environment within academic courses (Ashby & Causton-Theoharis 2012).

Integrating AT into higher education is a reasonable necessity to cater to their educational aspirations. Using AT tools indeed is of great value to SWDs as they accomplish tasks of teaching and learning process effectively. AT applications increase SWDs' educational opportunities, thereby assisting them to achieve the curricula and teachers' educational objectives and teaching programs (Chukwuemeka & Samaila 2019). AT is a vital tool to maximize SWDs' potential to access the curriculum and enhancing the standards of the learning experience. Increasing teacher's knowledge in the particular environment leads to the development of positive attitudes towards using AT in the classroom and guarantees SWDs' autonomous participation in various educational activities (Alkahtani 2013). Al-Zboon (2019) finds that providing teachers with adequate training and increased practical experiences of using, supporting and selecting AT for SWDs promotes active involvement in activities both inside and outside the classroom. Luik, Taimalu and Suviste (2017) assert that ensuring a comprehensive range of knowledge and skills of using AT helps teachers understand representation and create better instructional practices. For greater efficiency, Gronseth and Dalton (2019) mention that integrating Technology, Pedagogy and Content Knowledge (known as the TPACK model) enables teachers to create a UDL- framework to deliver alternative and flexible instruction using methods alongside appropriate AT resources in interactive ways that accommodate diversity needs for all learners, specifically SWDs (Combs 2014).

Moreover, the extent of using AT in pedagogical and instructional planning in the classroom depends on the quality of the teacher's attitude and prior experience. Therefore, the teacher's role is significant and constant for their participation in any diverse student-centred learning of SWDs' progress. It seems to be necessary for both teachers and SWDs to familiarize themselves in AT functions which are used to ensure adjustments and accommodations that helps SWDs in accessing learning for their individual needs; because of this, the integration of AT use within higher education environment should never be underestimated (Chukwuemeka & Samaila 2019)

Currently, colleges and universities are recognizing the learning needs of SWDs who are pursuing higher education. The increasing numbers of SWDs turning to higher

education face several difficulties in managing academic experience and psychosocial barriers surrounding access to educational settings need proper accommodation and integration of the use of AT (Hadley 2007).

Furthermore, addressing the needs of the most common disabilities seen within the higher education learning environment should equip institutions with an AT to handle the developmental concerns of these types of cases (Teach-nology.com 2019). Students with physical disabilities face limited capacities of physical functioning and mobility (Adebisi 2014), and mostly depend on power and manual wheelchairs that substantially improve their abilities and social participation Rice et al. (2013). Usually, these students face challenges with acquiring information, writing, and reading independently (Adebisi 2014). It appears that the appropriate selection and integration of AT has become a significant manner to increase the level of independence and improve participation in their learning environment. Thus, greater reliance on AT must occur throughout the higher education outcomes (Coleman 2011). Wessel et al. (2015) clarify that providing students with physical disabilities the proper academic support services and AT would motivate them increasing the social inclusion and their academic functional capabilities to meet the higher education personal objectives successfully.

Apart from that, students with learning disabilities (LD) generally deal with deficiencies in learning strategies and academic skills during their growth and development (Brinckerhoff et al. 2002), particularly in literacy skills, planning, and organization, as well as mathematics and memory skills (MacArthur 2009). On that account, compensating for the deficiencies for the student with LD through adaptive ways enabling them to develop coping strategies for their academic studies, acquiring full information more quickly within a short time (Heiman & Shemesh 2012). Lindstrom (2007) finds that to achieve success in higher education, students with LD frequently need to organize special learning methods assisted by AT that serve specific accommodations and contribute to students' ability improvement and help them to fulfil their academic tasks efficiently. Holmes and Silvestri (2012) state that the significance of using AT accommodations is not merely to assess literacy skills but also to offer a student with LD personal preferences. Advantages of the preferred AT accommodation will improve the level of competences, for example, developing

good time management in reading comprehension reduces stress compared to traditional reading practice. Therefore, usage of essential AT accommodations provides further support and illustrates the importance of self-determination (Tanners et al. 2012).

Students living with speech disorders combined with hearing impairment could potentially face language development problems. Those students experience difficulties in educational opportunities and this impairment affects students' ability to communicate with their teachers and peers and may result in declining confidence and social withdrawal in an educational environment (Kuzu 2011). Lartz et al. (2008) argue that these educational barriers demand the provision of sign language services and AT interventions to facilitate classroom involvement during lectures and class discussions. For this reason, AT is a compensating means to access the general curriculum enabling students with hearing impairment to accomplish meaningful inclusion in various activities (Atcherson et al. 2015).

On the other hand, students with visual impairment potentially affect the vision system. The presence of sight impairment limits the students' learning abilities such as social, independent skills, communication and cognitive developmental skills (Lourens and Swartz 2016). Sakız and Sarıcalı (2018) state that mastering visual skills along adaptive techniques of AT use is necessary for their expanded core curriculum outcomes. Strengthening the competence in the expanded core curriculum is essential subjects to provide and develop conceptual learning opportunities between people and real objects in their environment. It is important to understand which direct AT interventions as well as compensatory strategies in the educational concepts may provide for students to achieve long-range academic success (Correa-Torres et al. 2018).

2.6 Availability of Assistive Technology in Higher Education for Student with Disabilities

People with disabilities often face several barriers due to the limitation of access to a broad range of services, facilities and opportunities that hinder their achievement of their social, life and professional aspirations and ambitions. AT tools and products play an important role in assisting PWDs as they tackle these issues and challenges

in actively participating as productive members within the community (Tebbutt et al. 2016).

The availability of AT provided for SWDs in the HEIs helps to overcome many obstacles they encounter; it allows them to have equal access to higher education, instead of facing a lack of academic services and other difficulties in accessing the curriculum, which limits their potentials and reduces their engagement within the classroom. Clouder et al. (2018) explain that diverse levels of obligation to support SWDs in HEIs affects their educational experience and leads to unsatisfactory results due to the limited quality of appropriate services. Increasing the availability and accessibility of AT tools within academic services and ensuring accommodations for SWDs helps to reform and improve the services provided to those students, as well as achieve inclusion effectively within educational settings.

Access to AT requires ensuring the tools, resources, and materials are available for SWDs in the HEIs including effective training to increase the knowledge of both teachers and SWDs in how to use the AT appropriately. Obtainable AT for SWDs consists of tools which support reading, visualization, organizing, planning, recording, screen readers and communication. These forms of AT facilitate access to learning tasks, promote participation, and increase education achievements (Stodden et al. 2006).

De Witte et al. (2018) define the term of AT provision or availability as “entails everything that is needed to assure that a person with disabilities who might benefit from AT actually obtains it and obtains the most appropriate AT solutions for that individual” (p. 468). Therefore, availability of various AT products and devices influences SWDs' higher educational experience through improving their academic performance along with the accomplish learning tasks more effectively wherefore enabling SWDs' access to educational resources and materials easily (McNicholl et al. 2019).

Major specific AT devices that help SWDs to overcome educational barriers are varied according to the type of disability. With the potential effects of utilizing the iPad as an AT device, SWDs' academic performance significantly increased, in particular for students with physical disabilities, hearing impaired, and visually impaired

(Henderson, Gibson & Gibb 2013). The iPad contributes to ensuring SWDs have equitable access to the curriculum through built-in accessibility features that enable them to fulfil their academic tasks successfully (Pérez 2013). Ok (2017) demonstrates that the iPad provides students with visual impairments the ability to read texts and control the device during typing, taking notes, and searching by features of VoiceOver, Siri Voice Commands, Magnifier, Zoom, Dictation (Speech To Text) and Display Accommodations (Screen Customization). These features also assist students with learning difficulties and physical disabilities who are facing difficulties in reading and writing. Also, Ok (2017) adds the iPad is valuable for students with hearing impairment in increasing communication abilities and control when using the device during academic learning tasks through the functions of iMessage, Facetime, Hearing Aids, Mono Audio, and Closed Captions feature. At the same time, students with physical disabilities benefit when accessing the iPad to complete their learning activities efficiently with using Switch Control and AssistiveTouch features. The latest upgrade of accessibility features within the iPad includes Voice Control, which now allows students to interact with the device's hands-free tools such as typing, swiping, zooming, tapping, controlling and opening apps (Neely 2019).

Moreover, enhancing the academic performance of students with severe physical disabilities can improve through integrating Eye Tracking Technology, Speech Recognition Software, and On-Screen Keyboard software within the educational activities. Fang and Shinozaki (2018) find that Eye Movement Recognition Systems enhance writing skills of people with severe disabilities through constantly gazing at characters' keys within on-screen keyboard for a specific duration. Also, Shih et al. (2014) assert that the On-Screen Keyboard helps students with physical disabilities to accomplish their writing tasks effectively by scrolling the computer mouse wheel on the keyboard keys. Besides, Nelson and Reynolds (2015) affirm that Speech Recognition Software such as (Dragon Voice Recognition) enable SWDs who have writing difficulties in completing their learning tasks quickly and efficiently by converting user speech into written text.

Also, students with visual impairment can be using various devices and software to increase their engagement, for instance, Kurzweil 3000, speech to text - text to

speech services, classmate reader devices and screen reading software (McNicholl et al. 2019). Conard-Salvo & Spartz (2012) share that Kurzweil 3000 is a text to speech program that helps students with visual impairment to improve reading comprehension and writing capabilities.

On the other hand, students with Learning Disabilities (LD) can use Smartpens such as Livescribe Pens to increase their academic outcome (Boyle & Joyce 2019). Harper et al. (2016) describe that using Livescribe Pen for students with LD facilitates their access to the curriculum and improves students' literacy skills, through the features of the smartpen which include storing audio, images, and handwritten notes during listening and notetaking that synchronize all data recorded with a tablet or smartphone.

Ultimately, the availability of AT devices and equipment in the HEIs along with appropriate services provided for SWDs must include the provision of AT specialist staff, to facilitate their access to the curriculum and overcomes barriers that hinder SWDs' learning engagement. According to Lersilp (2016, p. 64) "universities should provide the necessary environment, software/hardware, assistive technology and educational services to enhance students access and effective education". University administrations have a responsibility in ensuring the availability of AT educational services for teaching and learning, as well as raising awareness of the importance of AT usage among SWDs (Lersilp 2016). Additionally, the effectiveness of AT availability requires collaboration and support from university administrations in establishing AT centers that involve AT specialists and expert staff in order to improve the ways AT is utilized by supporting SWDs and faculty to acquire skills and knowledge in using AT (Lersilp & Lersilp 2017).

2.7 The Benefits of Assistive Technology Resources and Support Centers at Higher Education Institutions

The development of AT and modernization of higher education play an important role in promoting SWDs' legal rights on reasonable accommodation and resources needed by establishing AT accessibility services centers. These centers facilitate access to AT among SWDs and enable them to acquire appropriate services and AT counselling supports (Resources for College Students with Disabilities 2020).

Malcolm & Roll (2017) state that the provision of AT services is essential assistance for SWDs' academic performance throughout the degree program.

Lersilp (2016) notes that educational AT services provide assistance to help SWDs gain equitable access into classroom activities through accessing and training of using various tools, software, and hardware that enables SWDs to perform academic tasks better. Accessibility via these approaches could enhance self-perceived academic course materials as well as to achieve higher education process for SWDs.

Regulations for providing related educational services encourage equal opportunity from receiving and gaining access to AT in higher education. Meanwhile, these specified services promote the development of learning abilities of SWDs that could contribute to assisting teachers in addressing the teaching and learning approach for SWDs inside and outside of the classroom. Therefore, AT and educational services are conceptualizing into general awareness to guaranteeing access information, learning and social participation in academic activities (Lersilp & Lersilp 2017).

PACES (2020) confirms that by developing AT accessibility centers, SWDs are able to obtain devices for accessing education stress-free which makes their transition into employment easier. Asselin (2014) claims that utilizing AT with SWDs within the context of transition planning method with the objective of extensive preparations using the AT in the higher education setting without limitations.

On the other hand, AT services and accommodations in the HEIs provide a series of effective AT tools and learning techniques due to the increasing numbers of SWDs attending degree programs. Provision of these AT services have wider opportunities associated with SWDs' functional needs and intended purpose until they nurture their academic skills perfectly (Addison 2017). Asselin (2014) states that appropriate AT services facilitate technical assistance and provide sufficient knowledge for SWDs in compliance to individual needs as well as recommending suitable devices.

The intent of AT services providers for SWDs determines the necessary accommodations and alternative approach to fulfil academic objectives by reducing disability barriers and having increased access to instruction and curriculum (Hayes & Bulat 2017). The specific AT services and appropriate accommodations allow

SWDs to obtain equitable and reasonable opportunities in order to achieve active involvement in educational activities (Simoncelli & Hinson 2008).

A better understanding of educational management of the importance of AT provisions and AT specialists into the educational services helps to expand the awareness of AT and educational strategies used with SWDs (Guyer & Uzeta 2009). Georgina and Olson (2008) confirm that providing guidelines for AT services enable teachers to offer new ways of effective teaching and learning in individualized instruction of SWDs. Moreover, effective AT integration along current or future teachers is necessary; maintaining and improving educational pedagogy equalizes learning environments and make earning educational success much easier (Bouck & Flanagan 2015).

AT integration requires careful consideration to adjust or modify the educational instruction to address the use of AT services that accommodate SWDs' individual learning needs (Clouder et al. 2018). Thus, effective planning of AT service implementation shall take place in order to widen the awareness of SWDs, peers, teachers and families' function in using AT (Wendt et al. 2011).

2.8 Overview of the Implementation of Assistive Technology in the UAE

The evolution of ICT in teaching and learning methods ensuring the advance technology-enhanced education to better adapted the needs of SWDs (Fernández-Batanero et al. 2018). Such transformation has changed the UAE by taking the strategic goals to facilitate serving students regardless of their disabilities and abilities with proper in-class support and provision of AT heading up towards formal or regular higher education program (Almekhalafi & Tibi 2012).

Apart from this, HEIs and universities in the UAE are struggling striving to achieve the implementation of appropriate AT use to guarantee comfortable accommodation in blended learning settings while addressing SWDs' diverse needs and providing teachers the opportunity to develop innovative teaching processes (Gaad & Almotairi 2013).

Accordingly, the UAE implemented a set of measurements in the form of rule-making and standard regulations to provide further attention towards PWDs, particularly in regards to disabled-friendly education rights and guarantees to brighter future practice (Almekhalafi & Tibi 2012). This strategic goal became a priority for the UAE government after launching Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs and after joining the United Nations Convention on Rights of Persons with Disabilities in 2008. These acts positively facilitate the inclusion of all SWDs in regular higher education at all levels, especially in modifying legislations and manners to integrate AT in the educational process (Khan et al. 2016).

Article 15 of the Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs mentions the need to emphasize the right to education for PWDs:

Providing advice and technological, technical and educational assistance to all the educational institutions which would like to receive people with special needs, and studying the financing request related to the equipment and techniques and qualifying the educational institutions' environment. (MOCD 2006, p.7).

Under this law, the UAE also initiated the National Policy to Empower People of Determination in 2017 to establish a vast development and empowerment of PWD enabling everyone to demonstrate their potential in creating positive impact towards the community (Achkhani 2017). This policy ensures excellent support for SWDs in the education system through innovative tools and services, which guarantee in accessing curriculum as well as enhanced opportunities of inclusive education (Inclusive 2017).

The MOCD (2017, p.14) revealed that under the policy, the education pillar's shall assure the inclusion in education (public, vocational and higher education with “providing of additional resources, tools and technologies to support the education of people of determination”.

Nevertheless, Khan et al. (2016) believe that integrating AT for SWDs within the UAE's education system plays a vital role in improving the learning environment and in vocational training, which radically impacts SWDs' life skills. Some HEIs in the UAE embraced this educational concept to facilitate SWDs' education and provide

the opportunity to access curriculum efficiently. Among them is Zayed University, which introduced its Khalaf Al Habtoor Assistive Technology Resources Centre on the Dubai campus in 2012 (Moussly 2012). The Humaid Al Tayer Assistive Technology Resources Centre opened on the Abu Dhabi campus in 2014 (Sharjah24 2017). These centres provide appropriate AT tools that encourage SWDs' total learning experiences and extracurricular participation, and are integrated with the university, offering tools such as Braille devices and Text magnifier machines that offer ATs explicitly for students with visual impairment (Moussly 2012). A simplified teaching and learning approach is possible by utilizing iOS' accessibility features (Sharjah24 2017). United Arab Emirates University (UAEU) established an Assistive Technology Lab that provides adequate services for SWDs and includes access to AT in order to increase SWDs' abilities and independence when performing academic tasks effectively via specialized software and hardware (UAEU 2019).

Regulating these laws, policies, and initiatives initiated by the UAE government and these universities to ensuring the PWDs' right to education provides an excellent opportunity to expand their learning capacity through educational support systems across the country with integrating learning AT tools and high-quality services (Khan et al. 2016).

2.9 The Successful Integration of Assistive Technology for Students with Disabilities in Higher Education Worldwide

The rise of AT trends has remarkably influenced the world by a life-changing role in the education access for all, especially for SWDs (Layton & Borg 2019). Following the rise of AT, a range of opportunities sheds light on the advancement of AT's use and reaches many countries who facilitate appropriate access to AT products, applications and solutions as part of SWDs' education and welfare systems (Smith et al. 2018).

According to Layton & Borg (2019, p.6), "it is estimated that 1 billion people need AT globally today, but only 1 in 10 has access. Need for AT is estimated to double globally by 2050". Such claims could serve as an equal basis for AT provisions, solutions and its existence. In contrast, these countries must develop AT provisions and systems to convey suitable AT tools, usage, quality, the efficiency of related

services but also for specialist center availability which educate PWDs on how to obtain high standard services that facilitate the process of AT usage. Meanwhile, De Witte et al. (2019) assert that one of the several things created under the United Nations Convention on the Rights of Person with Disabilities (UNCRPD) is engaging and encouraging countries' ratification and full acknowledgement to commit to the realization of human rights for PWDs. This convention fosters the development of AT provisions, procedures, and policies including self-determination to promote equal participation in public affairs (De Witte et al. 2019). As mentioned in Article 4(1), this convention will “ensure and promote the full realization of all human rights and fundamental freedoms for all people with disabilities” (United Nations 2006, p.5). It also encourages the provision for knowledge, and skills in utilizing AT (Article 4 (1) (g)) and (Article 26(3)) (United Nations 2006). The UNCRPD calls for the growth of inclusive higher education for SWDs involving various objectives to promote equity and encourages participation as well as support for the advocacy of accessibility as mentioned in Article 24 (2) (e) that “effective individualized support measures are provided in environments that maximize academic and social development, consistent with the goal of inclusion” (United Nations 2006, p.17).

Consequently, right now, some countries are embracing this international legal commitment to address the proper measurement of AT provision systems for SWDs. The United States of America (USA) is among the first countries enacting laws classified as the Individuals with Disabilities Act and the Assistive Technology Act. Khan et al. (2016) mention that the Individuals with Disabilities Act highlighted several possibilities involving the use of an Individual Education Plan as a provision to obtaining the rights of the newest AT suitable used both SWDs and teachers in transformative learning processes. At the same time, Bausch et al. (2005) assert that the significant purpose of the AT Act 2004 was to ensure AT accommodation of SWDs of all ages. This act implies that extensive information system plays a role in helping PWDs in selecting appropriate AT tools and identifying related services and specific resources concerning for students, teachers and students' families. Apart from that, this act anticipates strengthening the use of AT during transitioning across education levels and continuous facilitating substantial progress of the policies, public awareness, transition, provisions and accessibility of AT services.

On the other hand, given the history of discrimination in the Republic of South Africa, recognition and establishing a quest for equity and inclusion could be long-term processes. However, in the realm of education, South Africa focuses its attention on creating policy frameworks and foregrounding human rights concerns which promises for fair and positive impacts towards inclusive higher education for SWDs. Furthermore, as mentioned by Subrayen and Dhunpath (2019), South Africa has recently implemented the Higher Education Policy Framework. This policy undertakes as a potential starting point a plan to create universal access in instruction and curriculum as well as combating discrimination and exclusion resulting from disability, particularly in an educational setting. South Africa promises to assist SWDs' right to education and teachers' instructional accessibility in the Post-School Education Sector (PSET), as indicated in the Strategic Disability Policy Framework, which commenced in the year 2018. This policy integrates the need for AT to foster social inclusion and to facilitate an inclusive environment in which standards and norms in the PSET system settled. Lyner-Cleophas (2019) asserts that recognizing AT within Strategic Disability Policy Framework in the PSET increases social change and transformation through equal access and participation to further higher education success outcomes and goal of inclusion.

2.10 Addressing Universal Design in the Implementation of Assistive Technology in Higher Education

In this world, understanding of human behaviour requires transforming facts and information into knowledge. Exploring these ideas of knowledge would foster learning skills and knowing varieties of access solutions that are contextualized within the higher education experience with the roles of Universal Design for Learning (UDL) to prevent and reduce such potential learning barriers for all learners either with or without disabilities (Rose et al. 2005).

Universal Design is a process for precisely designing usable products and frameworks flexible for accommodating students' diversity to increase the benefits for all that design to facilitate alternative solution cause by unpredictable and unstoppable circumstances arise within the academic setting (Gronseth & Dalton 2019).

In relation for learning, Universal Design is based on the Higher Education Opportunity Act and describes a structure that provides flexible ways of presentation and options of engagement in the learning environment and for ensuring appropriate resources and guidance intended for both students without disabilities and SWDs in the education curriculum design (Alnahdi 2014). McNicholl et al. (2019) state that integrating a UDL approach along with AT could be useful in fostering learning goals and barrier-free into curriculum instructions that helps every student maintain a higher level of academic performance.

The main idea of the UDL approach in higher education blends with specific, individualized AT needs to extend the positive effects for all students' chances of accessible curriculum presented in a way which serves SWDs and best-suits their interaction preferences with teachers and their peers (Burgstahler 2015). As stated by Gronseth and Dalton (2019), the UDL framework provides an opportunity for all learners to improve their engagement within the classroom activities through integrating technology products in a more extensive way that addresses the modification of instructional pedagogy wherein the student can gain and demonstrate their learning skills. Part of this strategy is considering the structure of Substitution, Augmentation, Modification and Redefinition (SAMR) model (Gronseth & Dalton 2019). By way of it, teachers are able to normalize the shift using modern technology for both students without disabilities and SWDs in approaches to teaching and learning, which provides all student several ways to access curriculum content easily (Tennyson et al. 2011). Van Thiel (2018) finds that enforcing the combination of UDL and the SAMR model supports the optimal development of inclusive design in the curriculum and educational environment. Hilton (2016) claims that the SAMR model enhances UDL's principles through encouraging students' engagement in challenging academic tasks along with integrating appropriate technology; the substitution concept allows both teachers and students to incorporate technology into classroom activities in a simple way. Also, at the augmentation level, teachers can increase engagement and teach the lessons among all students by using interactive whiteboards, which enable students, particularly SWDs, to obtain sufficient information during the class, thus, facilitate access to the curriculum content. At the same time, teachers can adjust the instruction at the modification level by integrating technology tools such as Google Docs, which helps students to improve their literacy

skills via sharing the document and providing mutual feedback to their peers and the teacher. At the redefinition phase the instructor might reinforce a student's academic abilities and critical thinking skills by utilizing augmented and virtual reality technology tools that lead to rising motivation and collaboration in enriched interactive learning environment (Gronseth & Dalton 2019).

In addition, ensuring that universal design and accessible digital content is used is very helpful for teacher development to create effective e-learning pedagogical approaches, including AT (Al-Azawei et al. 2017). Peake (2018) asserts that AT provides all learners with the ability to understand, manage and interact with e-learning materials. Integrating AT with an e-learning platform and Learning Management Systems (LMS) improves and creates user-friendly curriculum access which track learning progress and achievement of outcomes in the higher education system, thus ensuring equity for all students regardless of their abilities or disabilities (Seale 2013). Moreover, e-learning is an alternative solutions to facing emergencies or crisis, such as the COVID-19 pandemic, for example (Bao 2020). The National Education system rapidly embraced the transition to distance learning in making sure all students continued the learning process, in an effort to reduce anxiety brought on by COVID-19, also promoting a positive level of engagement (Patrick & Barbareschi 2020). With the COVID-19 crisis, several learning adjustments were needed that addressed opportunities as well as challenges such as adapting the curriculum for online delivery with a lack of appropriate tools (Havens 2020). Simultaneously changing the teaching and learning approach necessitated the emphasis of universal design and developing resources of enhancing accessibility features and AT provision for SWDs such as screen-readers and speech to text applications (Charmatz 2020).

To put it briefly, utilizing AT in UDL promotes SWDs' participation and creates universal access solution for all learners in order to overcome anticipated barriers within curriculum content and learning activities (See Figure 2) (Rose et al. 2005).

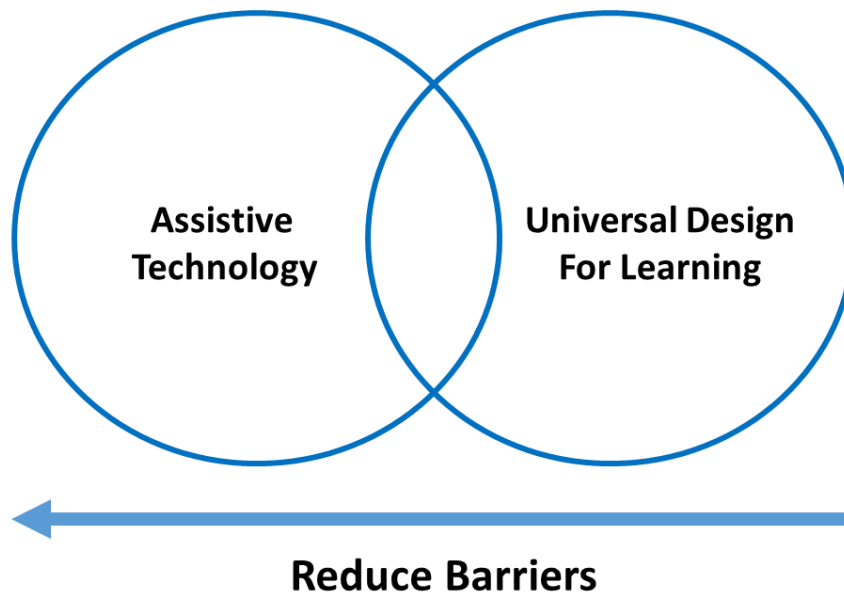


Figure 2: The Relationship Between Assistive Technology and Universal Design for Learning (Adapted from Rose et al. 2005, p. 509)

2.11 Challenges of Utilizing Assistive Technology for Students with Disabilities at Higher Education Institutions

The growth in the number of SWDs in higher education might require the commitment to facilitate AT needs (Chiwandire & Vincent 2019). Nevertheless, the field of educational environment encounters difficulties on the accessibility and integration of AT due to several barriers that hinder the implementation of AT use for SWDs. These barriers encompass the teachers' perspective, instructors' training, SWDs' abandoning of AT as well as financing (Ahmad 2018). Indeed, some teachers experience different issues when incorporating AT into teaching and learning needs of SWDs. From the teachers' view, attending to SWDs' learning needs and differences in the classroom setting has been of continuous significance. Edyburn (2004) mentions that possibly some of these learners are experiencing various deficits, which requires the use of appropriate AT in ensuring classroom assessment and learning progress. Unfortunately, advances in AT for SWDs cannot determine in the assistive devices itself rather it does define or evaluate in both learners' and

teachers' ways of utilizing AT by having positive attitudes that keep users with difficulties more productive, better decision-making, and overcoming teachers unsuccessful endeavours in teaching and learning approach (Chukwuemeka & Samaila 2019).

Although, AT has become challenging for teachers because of the unfamiliar and absence of training with AT devices, Alharbi (2016, p.2) stated that “absence of training and because of the lack of onsite support is challenging for instructors in delivering their lessons”. Also, McNicholl et al. (2019) justify that insufficient training in how to utilize AT is a considerable obstacle that prevents SWDs' engagement across educational activities. Thus, when the instructors are unable to obtain suitable AT and technical assistance, it leads to inadequate information about utilizing and maintenance of the existing AT devices (Abreu-Ellis & Ellis 2006). Despite the fact of AT availability, numerous teachers are intimidated by the extent of AT functions. As a result, abandonment of SWDs' AT occurs due to inappropriate assistance and knowledge to support AT usage, preferences and planning process on the general instruction of SWDs' learning outcome (Alkahtani 2013). For this reason, Alharbi (2016) finds that chances of classroom regular attendance decrease and early dropout happens because of ineffective assessment and supervision of the general teachers in accessing teaching and learning AT tools.

Moreover, a collaboration of the family must involve in dealing with SWDs as these students are intended to acquire suitable tools in order to pursue their educational aspirations (Fischer et al. 2017). However, some of the families still believe that these devices cannot carry out better performance and compare them with teachers' potential teaching skills in the learning environment. For this reason, SWDs are forced to work even harder on their studies compared to students without disabilities (AT HUB 2019). Alharbi (2016) indicates such action viewed as the fail investment of AT tools as their advantage. Thus, SWDs eventually ended up suffering from the consequences of a lack of family involvement in securing suitable AT tools. Nevertheless, due to outdated AT devices, SWDs' solution is to adopt and invest in hi-tech AT devices that are somewhat burdensome and costly for themselves (De Witte et al. 2018). Ahmad (2018) explains that the higher the price and lack of

funding to upgrade AT tools for day-to-day learning activities decreases level of self-determination and development of autonomy.

The purpose of AT integration in the higher education settings is helping SWDs to access curriculum more easy as well as accomplishing education success (Subrayen & Dhunpath 2019). Unfortunately, barriers can block the AT tools from having access and reaching every single of SWDs (Dwivedi 2019).

Chapter 3: Methodology

3.1 Introduction

This chapter illustrates the study's approach and design in choosing appropriate data collection methods to address the research problem and gather relevant responses to the study's questions. With the authorization of selected HEIs as well as the cooperation of students, teachers and specialist staff, the researcher was able to proceed with the data collection from research participants.

This chapter explains the methodology and relevant instruments used for collecting the required data and completing analysis of it. Furthermore, clarification of the research design approach using mixed methods techniques, which includes both qualitative and quantitative aspects, includes a brief explanation of securing informed permission to access to the research site and participants. The researcher identified participants for the study and collected and analyzed data via questionnaire and interview within selected HEIs in the UAE. This chapter explains the impact of various limitations and challenges during the process of collecting data for the study. Finally, this chapter provides details about validity and reliability of the results and considers the related ethical issues to the study as well.

3.2 The Study's Design

This research undertakes to understand the value of the research questions that evaluate the effects of Assistive Technology (AT) on the academic performance of Students with Disabilities (SWDs) in HEIs in the UAE. The study used a mixed methods research approach to collect and analyze data with a combination of both qualitative and quantitative methods. Willington (2015) asserts that the importance of methodology lies in the capability of evaluation, description and justification for the purpose of the research method, which produces the necessary research results through gathering appropriate data. The most appropriate study design for this research is a mixed methods research approach. Mixed methods research is defined as an “approach to an inquiry involving collecting both qualitative and quantitative data, integrating the two forms of data, and using distinct designs that

may involve philosophical assumptions and theoretical frameworks” (Creswell 2014, p.32).

The overall purpose of implementing a mixed methods strategy is generally to provide a comprehensive understanding of investigating the research problem. It is often useful to identify the collected data approach within a pertinent target population Vogt et al. (2014). Thus, the researcher integrated qualitative and quantitative methods to examine the scope of Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs as well as the UAE's National Policy to Empower People of Determination as it pertains to the ability of specialist staff, teachers and SWDs to set out the effects of AT on the academic performance of SWDs across HEIs in the UAE. Moreover, applying a mixed methods approach fully explores any gap which exist between the utilization of AT in HEIs and the UAE's national policy to empower people of determination.

Consequently, the strategy of combining both qualitative (interviews and official documents) and quantitative (questionnaires) research methods facilitates acquiring the results accurately and avoids potential questions about research misinterpretations (Johnson & Onwuegbuzie 2004). According to Cohen et al. (2018), mixed methods research gives the consistency of contextual process that enables the researcher to examine the research phenomenon, which improves for reliability and value of research questions and hence, meaningful accuracy into the final study's results.

In reality, research is not merely intended just for data collection. However, research generalizes to keep track of the research process. Research design presents the relationship between the research process and elements within the research outcomes. In advance of commencing the research, recognition of the research elements guides the researcher in considering every aspect of the research problem. Therefore, the research process comprises eight steps within frameworks of three stages associated with ethical considerations (See below Figure 3). This concept of research process constructs a feasible understanding of the research questions.

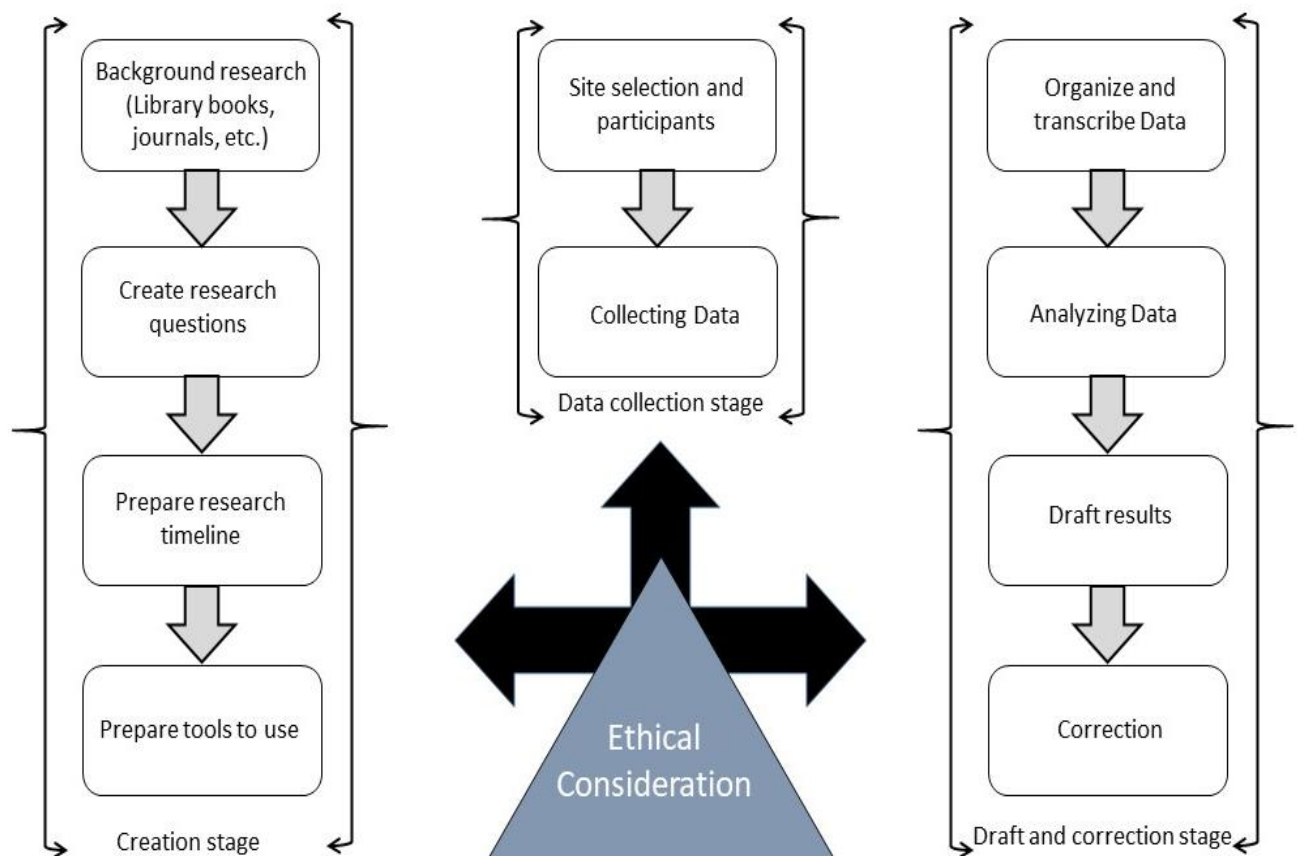


Figure 3: Research Process

3.3 The Pilot Study

The pilot study is a fundamental step of the research process. It provides a helpful evaluation of the research methodology. The primary purpose of the pilot study is to identify the unanticipated problems that occurred during the preparation of data collection instruments. Conducting pilot testing justifies the research plan by determining the content validity to improve the questions, format and scales used on the data collection instruments (Creswell 2014).

The researcher identified five participants from a different site and used their feedback in final instrument objectives. The researcher applied results from the pilot to both instruments: interview and questionnaire. Cohen et al. (2018, p.136) assert that “a pilot study can be useful to judge the effects of a piece of research on participants where a pilot study is not feasible it may be possible arrange one or two scouting forays to

assess possible problems and risks". Therefore, the reliability of researcher must be enhanced and careful in giving interview questions in this way related interviewee would react and interpret the researcher's questions in order to extend information as much as possible. On that account, (McCambridge et al. 2014) noted that measuring the participant's feedback and evaluating data collection methods and outcomes by applying the concept of Hawthorne effect theory during the pilot study allows the researcher to observe participant's behaviour in answering questions and understand the impact as a result of responses being observed. Yet, identifying the integrity of the research outcomes leads the researcher to explore the inconsistencies of data collection methods (Schanzenbach 2012).

At the same time, establishing a pilot survey would be essential to avoid any sampling error and reduced response rate. In addition, the pilot study helps to reform the questionnaire's length and improve the quality of contents to ensure reliability, validity and practicability of the questionnaire's success (Cohen et al. 2018).

The researcher started the pilot study by sending the questionnaires links that were created electronically through Google Form to two teachers and two SWDs via e-mail. Before that, the researcher explained the aims of the dissertation and the pilot study's purpose to each participant; the interview was conducted with one specialist staff via video call after the participant signed the consent form. Within one week, the researcher collected data and comments within provided by the participants to refine the quality of data collection instruments.

The pilot study revealed a couple of mistakes related to the wording of interview questions and helped the researcher to modify the participant consent form to permit anonymous participation. Moreover, the pilot clarified how students with visual impairment could interact with the questionnaire and solved the researcher's concerns about the difficulties that participants may face when answering the SWDs' questionnaire. The pilot study confirms that students with visual impairment can answer the questionnaire easily through utilizing the voice-over feature within smartphones and tablets or screen readers for PCs and laptops as the questionnaire was sent electronically via a Google Form link. On the other hand, the pilot study showed the importance of providing the language preferences options of the questionnaire for participants to use English or Arabic to check the clarity of

questionnaire items thus enabling the researcher to accomplish the purpose of the study efficiently.

3.4 Research Site and Gaining Access

Prior to commencing any data collection, the researcher requested a consent letter from the British University in Dubai to proceed in conducting this study at three selected sites of higher education across the UAE. Accordingly, the priority to support this study is the impact on SWDs' academic performances of AT, a teacher's technical knowledge and specialist staff's educational background in order to validate effects of AT on the academic performance of SWDs, as well as to justify the UAE's National Policy in Empowering People of Determination.

Therefore, to confirm approval of access to the site, the researcher sent an e-mail to each selected site, which contained all related documents: interview questions, an electronic link to the questionnaire, and a consent form to assure participant confidentiality preferences. Hence, thorough e-mail explanations of the study's purpose have been carried out and its benefits on the SWDs' academic performance clarified. As a result, access to conduct research and collect data from the selected sites was granted and the researcher was given permission to enter and distribute questionnaires to both teachers and SWDs, while specialist staff were allowed to participate by online interview. Thus, promising a desire for scholarly collaboration enabled access and made for a successful response rate.

3.5 Participant Selection

Planning a research project involves well-chosen research participants. Selecting participants properly is significant in order to reach target population sample in a research study (Martínez-Mesa et al. 2016). Using purposive sampling technique helps to make sure the responses are varied on research questions. Crossman (2020, p.1) defines purposive sample as “non-probability sample that is selected based on characteristics of a population and the objective of the study”. In addition, it is the key of the researcher to find out volunteer participants of providing experience and knowledge clearly (Bernard 2017).

In achieving the mixed methods objectives, the researcher takes into consideration that the chosen group of participants in this study includes SWDs individual experiences in utilizing AT as well as the important contribution of specialists and teachers in integrating AT within pedagogical content. Thereby the purposive sampling method helps in seeking the success of data collection in research questioning and evaluation process (Flick, 2018).

Additionally, to simplify the collection of responses, the researcher selected three higher educational institutions that were willing and interested in helping with the investigation of AT's effects on the academic performances of SWDs.

Selecting of three institutions enables the researcher to examine inclusive approaches on the implementation of the UAE National Policy in Empowering People of Determination of using AT in the higher education settings. Among these three sites, institutional size and populations of respondents varied. Generally, the sample size consists of 100 participants (50 Teachers and 50 SWDs) from three selected sites that have engaged in the study. Consequently, the credibility of the study contributes to assess the effects of AT on the academic performances of SWDs throughout the learning process based on research objectives.

3.6 Data Collection

This study covered the review of qualitative and quantitative data collection methods via interview, official documents and questionnaire responses. Johnson and Christensen (2017) state that the data collection should be focused on proper procedures to investigate the best answers to the research questions. Therefore, employing a mixed methods approach is a powerful way to analyse both scientific and participant perspectives of the research problem through the collected data from the three selected sites (Gorard & Taylor 2004). Hence, examination of the findings from the qualitative and quantitative data contributes to evaluating the outcome quality of research domain accurately and reliability (Johnson & Onwuegbuzie 2004). Table 1 below shows an outline of the study's method(s).

Study Questions	Method	Instruments	Sample	Data analysis
RQ1: How does Assistive Technology assist Students with Disabilities at higher education institutions in terms of their academic performance?	Qualitative	Interview	Specialist Staff at selected higher education institutions	Coding (Cohen, Manion & Morrison 2018).
	Quantitative	Questionnaire	SWDs Students and teachers at selected higher education institutions	
RQ2: What are the challenges of applying Assistive Technology for Students with Disabilities at higher education institutions?	Qualitative	Interview	Specialist Staff at selected higher education institutions	Coding (Cohen, Manion & Morrison 2018).
	Quantitative	Questionnaire	SWDs Students and Teachers at selected higher education institutions	
RQ3: How does provision of Assistive Technology center in each campus improve Students with Disabilities academic performance?	Qualitative	Interview	Specialist Staff at selected higher education institutions	Coding (Cohen, Manion & Morrison 2018).
	Quantitative	Documents Questionnaire	SWDs Students and teachers at selected higher education institutions	
RQ4: What recommendations must be made to integrate Assistive Technology effectively within higher education institutions for SWDs?	Qualitative	Interview	Specialist Staff at selected higher education institutions	Coding (Cohen, Manion & Morrison 2018).
	Quantitative	Documents Questionnaire	SWDs Students and teachers at selected higher education institutions	

Table 1: Research Methods Outline

3.6.1 Questionnaire

The questionnaire is an important measurement tool used to analyze the collected data through identifying participants' perspectives towards the research questions. Utilizing a questionnaire as a data collection instrument allows the researcher to achieve study objectives precisely through obtaining sufficient information provided by participants' responses to the questionnaire which adds authenticity related to the study's problem. Daniel et al. (2017) define a questionnaire as a data collection tool to gathering data quantitatively in order to measure relative human and social phenomenon such as behavioral and educational issues. In addition, O'Dwyer and Bernauer describe the questionnaire as a “measurement instrument on which research participants self-report about particular attributes” (2014, p.108).

Daniel et al. (2017) mention that introducing the questionnaire with a brief description of the research aims and an explanation of questionnaire answering guidelines provides the participants with a comprehensive understanding of the questionnaire's purpose and how to complete it without difficulties. Thus, in this study the researcher began the questionnaire by asking the participants to read and understand the questionnaire's objectives and instructions on how to complete the questionnaire.

The researcher designed the questionnaire electronically via Google Forms to facilitate access to a variety of question types such as Likert scales, open-ended questions and close-ended questions (see Appendices A, B, C and D). According to Stieger and Reips (2010) currently, online data collection is an alternative to the traditional approach and gives the researcher a method of convenient and efficient access to collection of a large sample of data contributed by students, teachers and educational administrations. Moreover, web surveys secure data collection against possible damage and can be stored into a database for better analysis and response rate (Birnbaum 2004).

The efficiency of distributing/completing online questionnaires ensures SWDs some convenience in time of completion without requiring high computer skills Lefever et al. (2007). Considering this benefit of an online questionnaire guarantees the advantage of quick data gathering in a tremendous response rate of data satisfactorily (De Cesarei & Baldaro 2015).

The researcher distributed the questionnaires to teachers and SWDs within three selected HEIs. Access through online questionnaire is helpful in gathering, extracting and analyzing data on how AT affects the academic performances of SWDs in the HEIs in the UAE.

3.6.2 Interviews

The study employed the interview as qualitative data collection to gather valuable data (see Appendices E and F). Collecting data through an interview can be an interactive process between the researcher and participant during the period of a session that tackles the principles and purpose of the study and focuses on related questions of the study's problem (Merriam & Tisdell 2016). Moreover, providing an interviewee fewer direct questions ensure the clarification of the interview context and creates a reliable answer to the research questions (Vogt et al. 2014).

The semi-structured interview has been applied in the study. According to McIntosh and Morse (2015), a semi-structured interview is a qualitative research method “designed to ascertain subjective responses from persons regarding a particular situation or phenomenon they have experienced” (p.1). In this regard, selecting three participants who are responsible for accommodating SWDs on each chosen campus allows the researcher to gather data that enables to assessment of the research outcomes accurately (Boudah 2011).

In this study, the purpose of applying a semi-structured interview contributes to understanding of the implementation of AT across the higher level of education for maximizing academic performances of SWDs in the UAE. Hence, utilizing open-ended questions permits the researcher to acquire credible details by inviting various participant perception without restrictions (Marshall & Rossman 2011). Indeed, the importance of interviews including open-ended questions enables deeper understanding of the research problem: to enforce the UAE National Policy in Empowering People of Determination and urge equity and independence for learners by providing the AT support conducive to the learning process.

3.6.3 Documents

The study deployed official documents to expand on collected data from valuable resources and which provide a comprehensive understanding of the research problem. Analyzing official documents guarantees the questionnaire and interview answers in supporting research data collection (Creswell 2014). The documentary research involved compares the UAE's National Policy in Empowering People of Determination and Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs as it relates to the strength of the Assistive Technology Act of 2004 of the United States for learning environments (see Appendices G, H and I). The reviews of these different documents associated with the effects of AT on the academic performance of the SWDs at HEIs in the UAE produces additional data to be examined in the form of the standard guidelines for the provision of AT at the resource centers of these institutions.

3.7 Data Analysis

Any researcher takes on deciding how best to solve the research problem through appropriate data analysis. For that, figuring out a strategy of the theoretical framework, selecting sample participants, choosing an appropriate site, which will yield useful data happens by carefully considering and taking particular decisions. Hence, considering the initial ideas of data from several sources enable to mark as collected and processed (Marshall & Rossman 2011).

Addressing the purpose of the research study enables the researcher to manage and evaluate goal setting and progress of SWDs' performance in higher levels of education based on Human Activity-Assistive Technology (HAAT) model, which “considers person and environment factors, emphasizing the influence of environment and culture on task performance carried out by the AT device” (Lenker and Paquet 2003, p.4).

Consequently, this study determines the gap between positive learning experiences among SWDs and integrating use of AT within HEIs in the UAE through data analysis. Gathering and analyzing data collected allows for a consolidated interpretation of the qualitative and quantitative methods in regards to validating the research results.

The deployed triangulation methods create clear decision making during data analysis using more than two data-based methods, thus it becomes easier to visualize the accuracy and credibility of the research findings (Creswell 2014) Hence, using various data collection instruments (interviews, official documents and questionnaires) supports the measurement of the data analysis process. Figure 4 below provides an overview of the data analysis process.

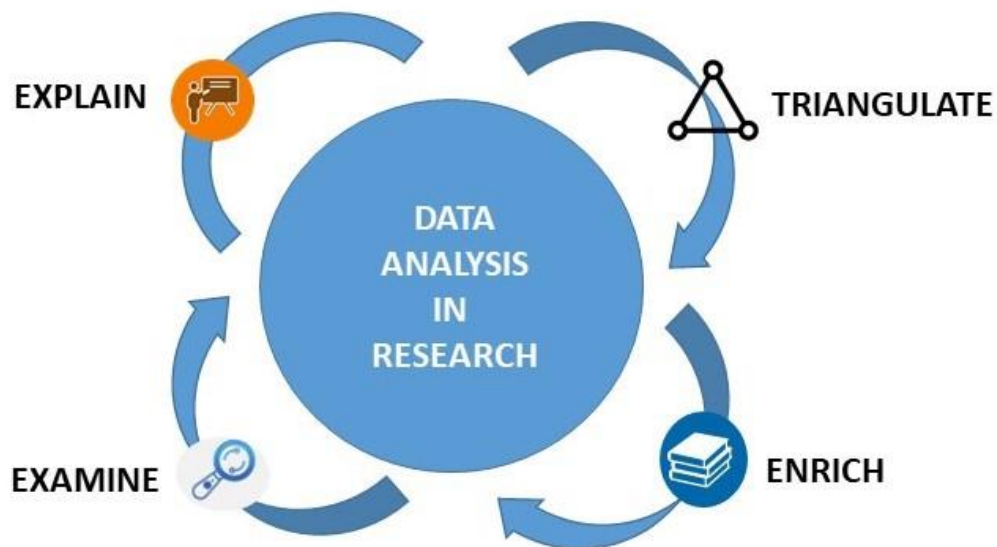


Figure 4: Data Analysis Process

3.8 Limitations and Challenges

In leading a research study, it is appropriate to consider the comprehensive limitations and challenges in conducting research, which clarifies probable weaknesses that may affect the study's validity and results, as well as reinforces readers' understanding of the study's information (Ross & Bibler Zaidi 2019). Consequently, the researcher encountered various limitations that may have influenced the research. The main challenge was the occurrence of Coronavirus (COVID-19), recorded as a pandemic by the World Health Organization (WHO). The outbreak of novel coronavirus (COVID-19) is challenging the world. This pandemic's global impact on public health resulted in people quarantining and refraining face-to-face interaction.

The sudden flare-up of the COVID- 19 pandemic became the most significant challenge for the researcher. Enhanced safety measures, along with social distancing protocols were implemented and all learning and research activities were adapted for online delivery or web-based platforms. Moreover, as many SWDs are at high risk, conducting face-to-face interactive interviews and the normal distribution of questionnaires was restricted temporarily. Thus, it was necessary to conduct interviews via e-mail and phone calls.

Eventually, insufficient evidence of studies that address the integration of AT for SWDs at HEIs in the UAE restrained the researcher in validating findings of relevance to a review of the literature. Nevertheless, unexpected circumstances arise when some participants asked to have the questionnaire provided in Arabic version wherein the content of data collection initially written by the English language. As a result, the researcher happened to do immediate translation to allow related participants to understand the context of the research study.

3.9 Validity and Reliability

Careful consideration in collecting research data relies on the measurement of data analysis that generates the significant relation of evaluating the validity and reliability of the study's results (Fendler 2016)

The mixed methods approach instruments facilitate the presentation idea of validation mechanism and indicate the validity and reliability of the collected data, for that reasonable adjustment should be made by verifying the efficacy and accuracy of the research purpose (Mertens 2015). At this point, several experts, particularly with experience in AT and special education, and the educational counsellor were involved in reviewing the research questionnaire items and interview content.

Including mixed methods in this study examined the level of how integrating AT affects the academic performances of SWDs in HEIs in the UAE as the responsibility of the higher education administration. Also, measuring the valuable interpretation of the UAE National Policy in Empowering People of Determination in the implementation of AT in the higher education setting, which minimizes the bias by the analysis of the finding to achieve the goal of the research validity and reliability (Pannucci & Wilkins 2010).

Ultimately, to reduce the possibility of imperfections in data collection methods, the researcher employed triangulation methods by applying interviews, documents review and questionnaires to emphasize the validity and reliability of the research outcomes (Best & Khan 2006).

3.10 Ethical Considerations

Ethical liability emphasizes several issues following educational research, especially in the process of protecting the research participant's confidentiality and privacy. There are particular criteria for each educational institution subject to Institutional Review Boards (IRB), which require researchers to take their roles in preventing plagiarism and data imitation through providing sufficient information and agreements to applying ethics for educational research (Fendler 2016). According to Khan (2016), the concept of responsibility and fairness within ethics increases the effectiveness of the respective mutual relationship between the researcher and participant, compounding the strength of the ethical principles in the educational research and expanding the researcher's opportunity to avoid erroneous assumptions throughout the collection data in the course of the research process.

Hence, the study considers the ethical issues in respect to enhancing integrity within the scope of the participant's protection prior to initiating data collection (Creswell 2014). The study has been congruent with the British University in Dubai (BUIID)'s ethics structure throughout follow-up with BUIID ethics form (see Appendix J). BUIID's ethics form is a guideline to help determine the level of responsibility of the researcher and any ethical obligations. Subsequently, the study obtained a letter of approval from BUIID to start collecting data from the selected site (see Appendix K).

Moreover, the researcher received clearance from the IRBs at selected HEIs (see Appendix L) to conduct the study by questionnaire and interview. Thus, the consent form was sent to the participants (see Appendix M) to fulfil ethical research accountability. Mandatory agreement involved signing of the consent form by each selected participants in advance collecting data from interviews, which includes the explanation of the main purpose of the study. As well, the researcher noted that a participant has the right to withdraw anytime and protecting participant privacy by keeping information confidential and preserving participant anonymity affirms the data

outcomes will not be shared with anyone. The questionnaire includes a brief introduction of the study's aims and confirmations of participant confidentiality.

Chapter 4: Findings and Discussion

4.1 Introduction

This chapter aims to discuss the process of data collection methods used to answer the study questions by analyzing the results obtained from various research methods instruments: the questionnaire, interviews and official documents. The objective embraced the triangulation method of data collection to ensure the reliability and validity of the research outcomes. The primary purpose of this study was to examine the effects of AT on the academic performance of SWDs at the HEIs in the UAE through gathering data by conducting interviews with the specialist staff who are responsible for accommodating SWDs and distributed the questionnaire among students and teachers. This procedure allows the researcher to determined participants' perceptions on how AT influence the academic performance of SWDs.

4.1.1 Response Rate

As mentioned in Chapter 3, the target population sample was 100 (50 SWDs and 50 teachers) of three selected HEIs in the UAE. Overall, the total responses gathered via Google Forms and data ready for extraction and validation, were 27 SWDs and 20 teachers (47%) who completed the given online questionnaires (See Table 2). The questionnaire measured the importance of AT knowledge and AT used both in HEIs with SWDs and teachers. This step helps to evaluate AT services available on campuses and recognize the challenges which hinder the implementation of AT in three selected HEIs. The questionnaire's findings indicated, according to the goals of the research questions, a need to solve the study problem.

Questionnaire Given	Responses Numbers	Response Rate (%)
50 (SWDs)	27	54%
50 (Teachers)	20	40%
Total of 100	47	47%

Table 2: Questionnaire Response Rate

4.2 Findings of the Questionnaire

Assessing SWDs' and teachers' knowledge on utilizing AT in the questionnaire has revealed the necessity of access to AT accommodations in maximizing the academic performance of SWDs at HEIs in the UAE. The interpretation of the questionnaire's findings is demonstrated below:

4.2.1 User's Diversity towards Assistive Technology in HEIs

The respondents at three selected HEIs highlighted different experiences toward AT usage. Diversity in participant age, major, disability condition(s), and faculty proficiency in dealing with SWDs and experience incorporating AT in daily life influenced the participants' perceptions of using AT that guarantee the validity and reliability of the study results.

The findings indicate that 26% of SWDs who responded were above 40 years of age, while the majority were aged between 20-30 years, with 48% presently pursuing studies; 86% were enrolled in Bachelor's programs and a smaller proportion are in masters and PhD, overall 14%. Most respondents were majoring in social and human sciences (52%). In comparison, 40% have dealt with courses like medical and computer science, and the remaining 8% study media and education (See Figures 1 to 4 - Appendix N). Findings show that the highest number of respondents (37%) bear physical disability while others are affected by common disabilities as mentioned in Chapters 1 and 2. The vast range (89%) of respondents assert that AT is beneficial

in their everyday lives (See Figures 5 and 6). Half of the teachers' responses suggested having perceived adequate training regarding SWDs while 100% teachers report that AT makes life easier for SWDs (See Figures 7 and 8).

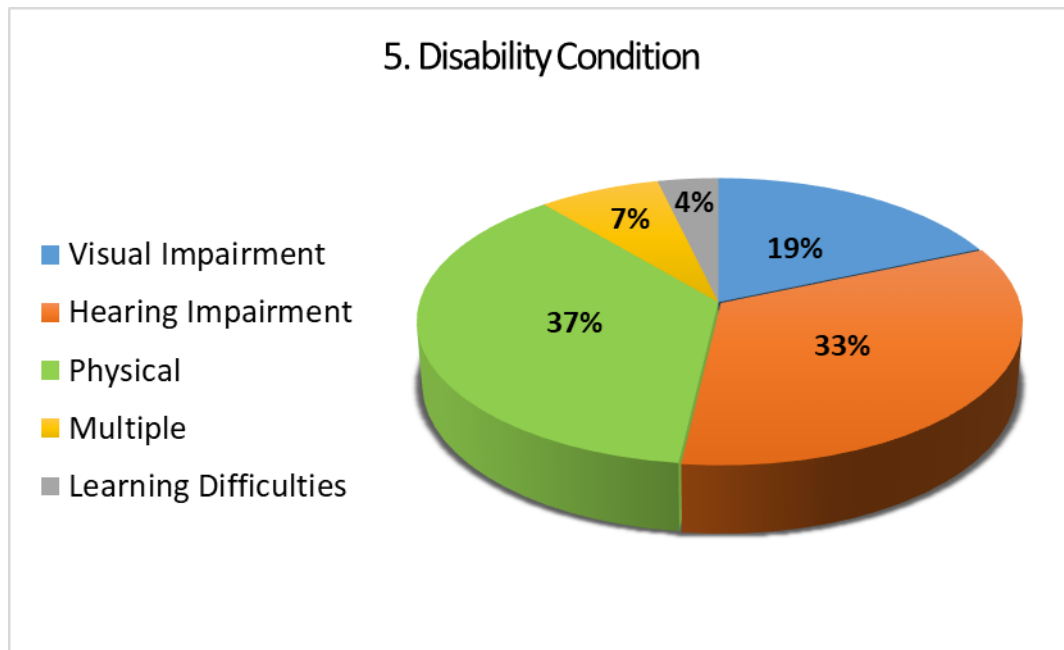


Figure 5: Participants' Disability Conditions

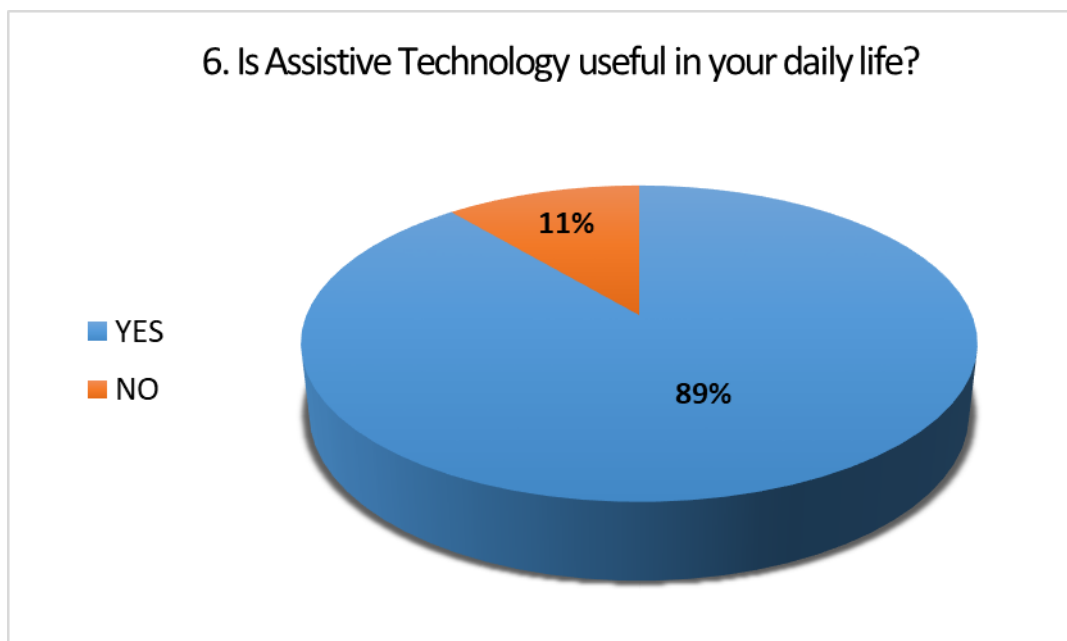


Figure 6: Benefits of Assistive Technology Use in Daily Life

9. Have you had any training in how to deal with SWDs?

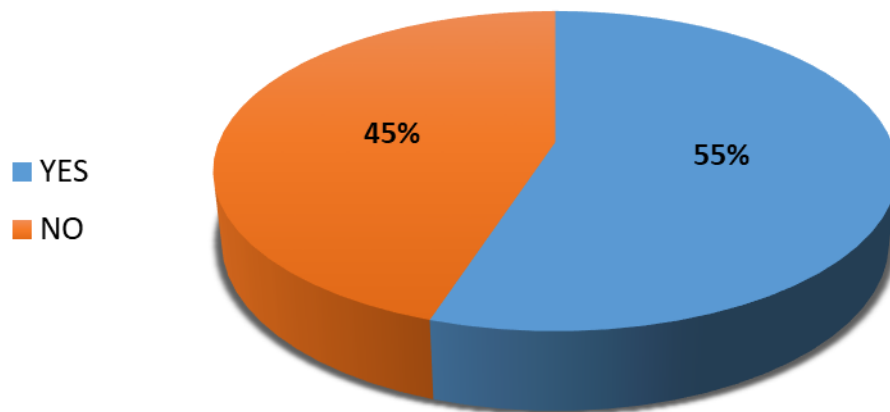


Figure 7: The Importance of Training Teachers to Deal with Students' Disabilities

6. Do you think Assistive Technology is useful for SWDs' daily life?

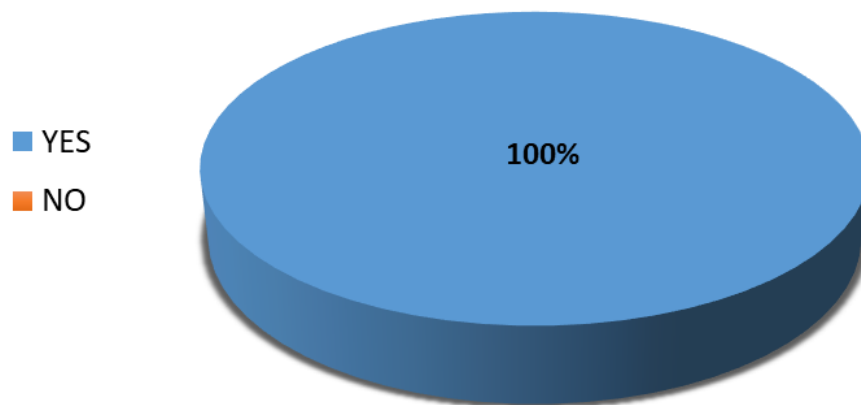


Figure 8: The Effect of Assistive Technology on Students with Disabilities Life

4.2.2 Availability of Assistive Technology in the Educational Process

The findings illustrate that 78% of SWDs have used AT during their studies (See Figure 7- Appendix N). Both SWDs and teachers affirm HEIs offering workshops related to AT with corresponding range of 67% of SWDs and 85% of teachers (See Figures 9 and 10), while the majority of the teachers (75%) were incorporating AT for SWDs during the lessons (See Figure 7- Appendix O). In open-ended questions, SWDs reveal that HEIs provide some AT devices to SWDs during the class such as Braille technology, recording devices and digital materials. Nevertheless, half of the teachers mention that HEIs do not provide AT support for SWDs' learning progress within the classroom. In contrast, the remainder indicate there is the presence of AT; however, based on the responses, it appears teachers have insufficient knowledge of AT resources due to improper understanding and selection of AT devices suited for the specific disability (See Figure 11).

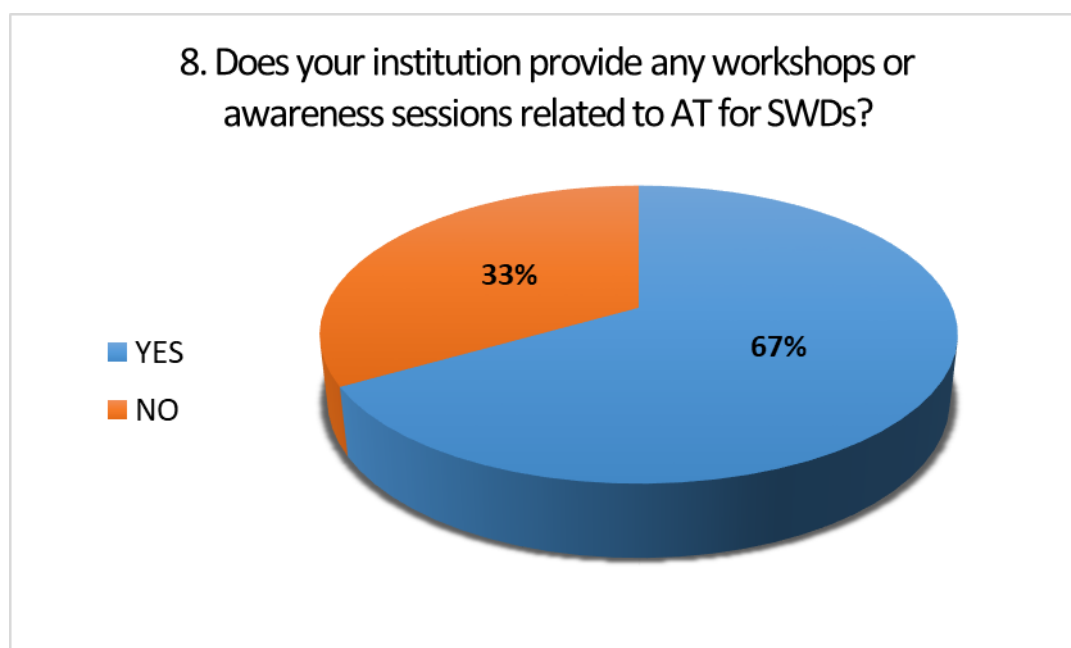


Figure 9: Availability of Assistive Technology Workshops and Awareness Sessions for Students with Disabilities

8. Does your institution provide any workshops or awareness sessions related to AT for teachers?

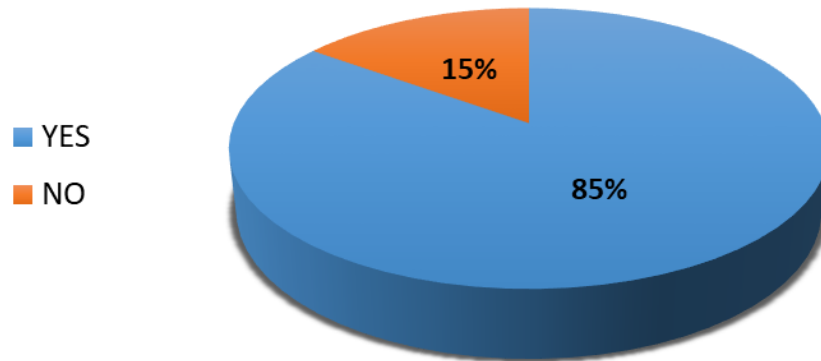


Figure 10: Availability of Assistive Technology Workshops and Awareness for Teachers

10. Are there specific Assistive Technology services provided for SWDs in the class by your institution? (If yes, please explain how or give an example)

No

2 responses

As an example, SWDS can get recorded video lectures, extended time for Quizzes and Exams.

1 response

Not really but to help them by giving them more time in tests

1 response

no knowledge of AT services

1 response

Not sure

1 response

No idea

1 response

Figure 11: Teacher Responses on Availability of Assistive Technology

4.2.3 Assistive Technology Facilitates Access to Curriculum Content

The majority of the respondents across three selected HEIs strongly agree and agree that using AT in education facilitates SWDs' access to syllabus content easily: with an entire total of 74% (See Figure 12). Seventy percent of teachers strongly agree and agree that using AT improves access to curriculum content and enhances pedagogical approaches in the educational process for SWDs (See Figure 13). Both SWDs (52%) and teachers (65%) strongly agree that maximizing teachers' knowledge of AT enhances the academic performance of SWDs (See Figure 10 (Appendix N) and See Figure 11 (Appendix O) respectively).

Responses to open-ended questions suggest that SWDs and teachers believe that various AT tools such as LMS (Blackboard) E-learning, audio enhancement apps, speech to text and text to speech and screen readers facilitate teaching and learning for SWDs. Furthermore, both groups state several benefits of AT including saving a tremendous amount of time and effort, enhancing students' participation and communication and equitable learning opportunities that affect the academic performance of SWDs.

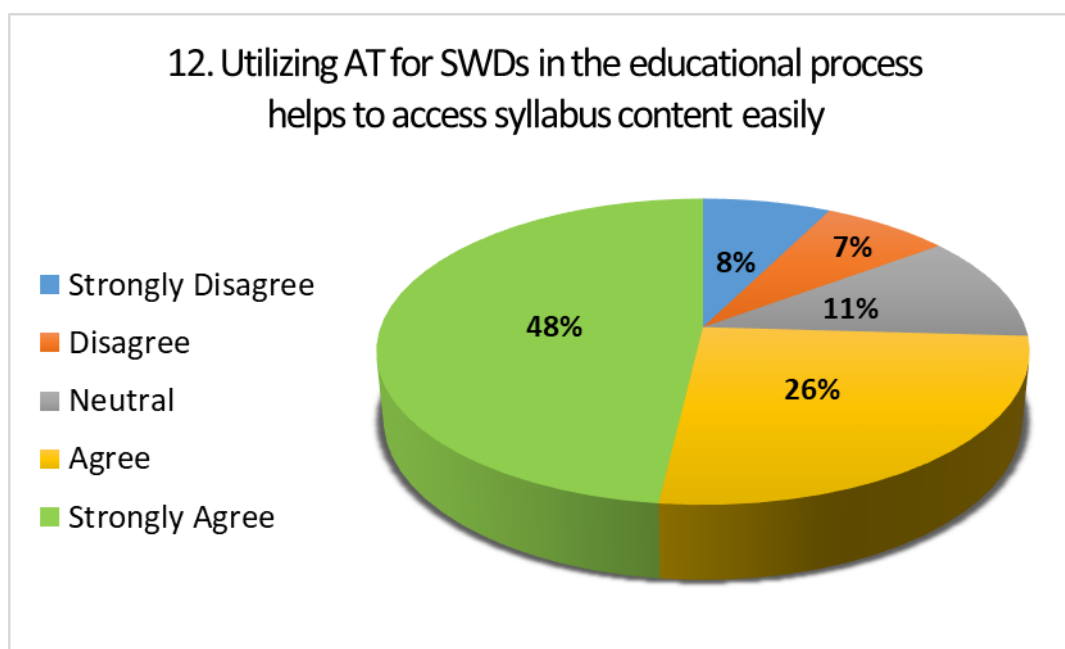


Figure 12: The Importance of Assistive Technology to Access Syllabus Content

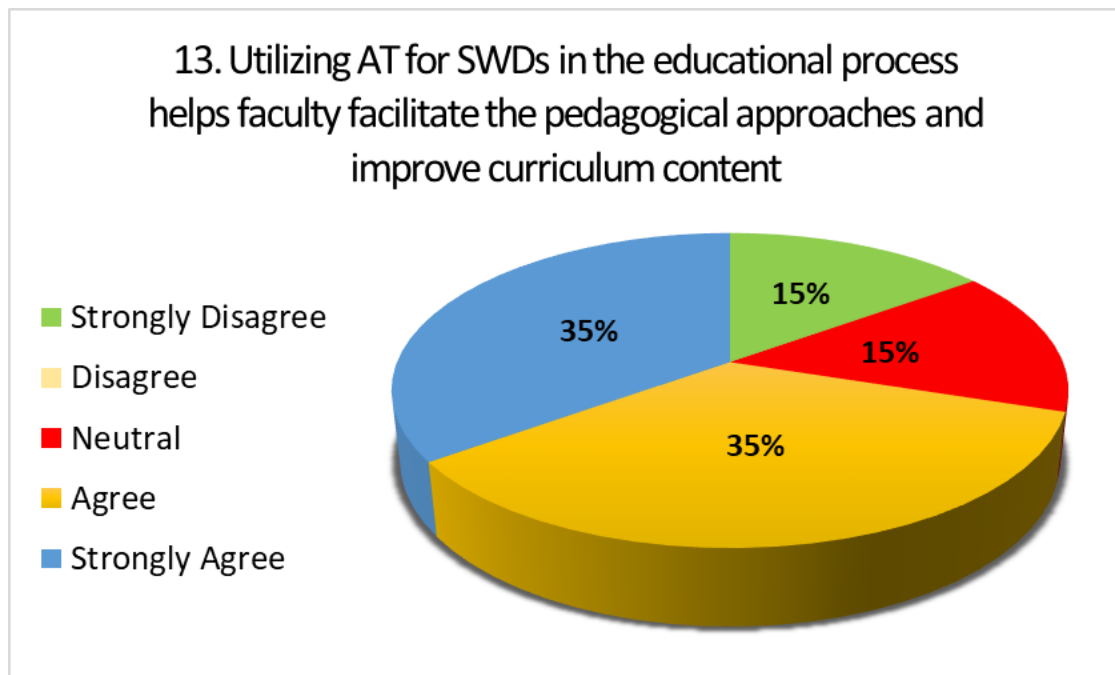


Figure 13: The Importance of Assistive Technology to Facilitate Pedagogical Approaches

4.2.4 Assistive Technology Services Enhance Inclusive Education

A total of 78% of SWDS (See Figure 11 - Appendix N) and 95% of teachers (See Figure 12 - Appendix O) strongly agree and agree the understanding of AT awareness in HEIs is highly relevant in implementing AT policies. Moreover, providing AT centers on campus facilitates the use of AT was strongly agreed with or agreed with by both SWDs (85%) and teachers (90%) (See Figures 14 and 15). Therefore, the majority of SWDs and teachers both strongly agree and agree to the great importance of AT specialists on campuses with the sum of 67% and 70% respectively (See Figures 16 and 17). The findings indicate that SWDs and teachers believe the availability of AT tools and services in HEIs reinforce inclusive education with a total of 78% SWDs and 95% of teachers strongly agreeing and agreeing (See Figures 18 and 19). The highest number of SWDs (82%) and teachers (95%) both strongly agree and agree that using an E-learning approach is enhanced by using AT during an emergency crisis, COVID-19 pandemic as an example.(See Figure 19 (Appendix N) and Figure 20 (Appendix O) respectively).

The results from open-ended questions indicate that teachers and SWDs alike became more knowledgeable and willing to obtain support and guidance to use best-suited AT, which promote access to learning and communication with peers and teachers through the significant impact of AT center to increase the academic performance of SWDs.

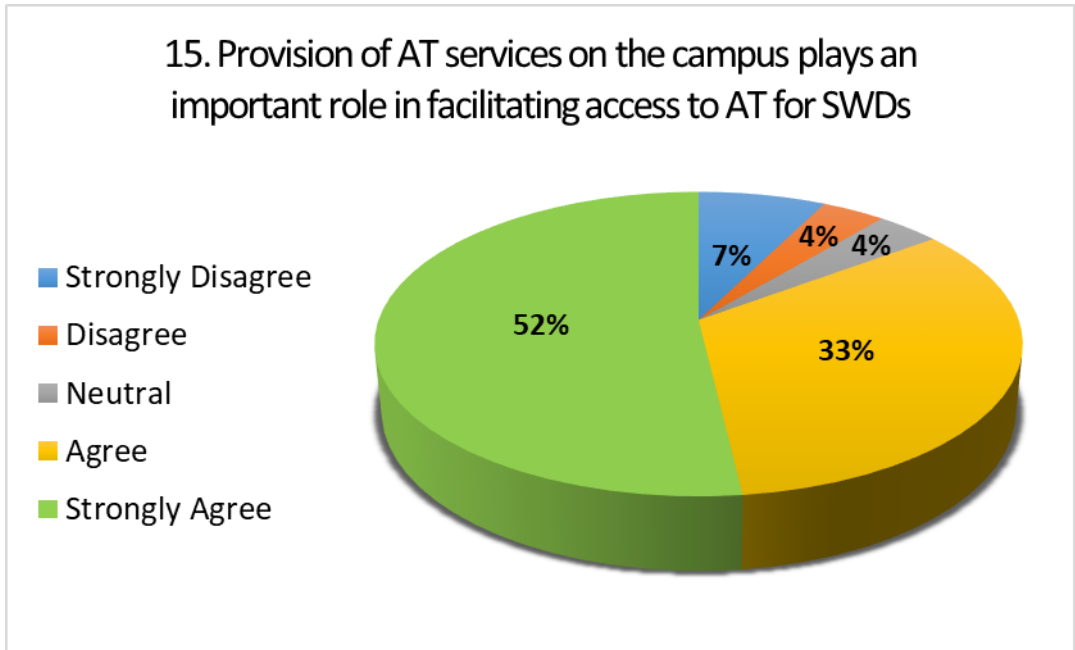


Figure 14: The Provision of Assistive Technology Services

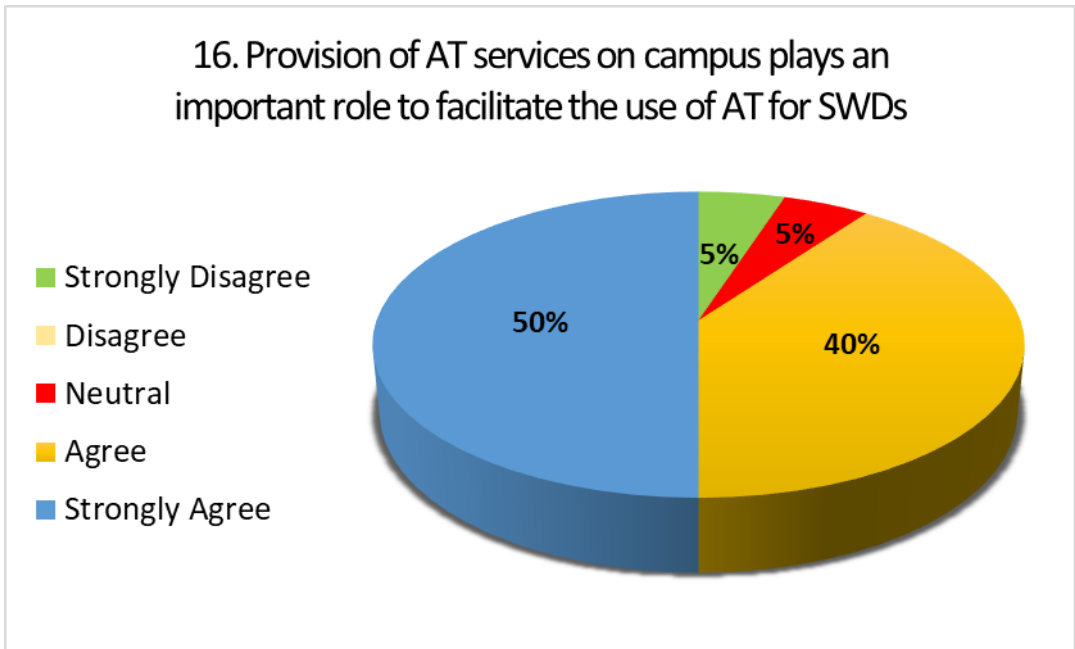


Figure 15: The Importance of Assistive Technology Services to Facilitate Accessibility

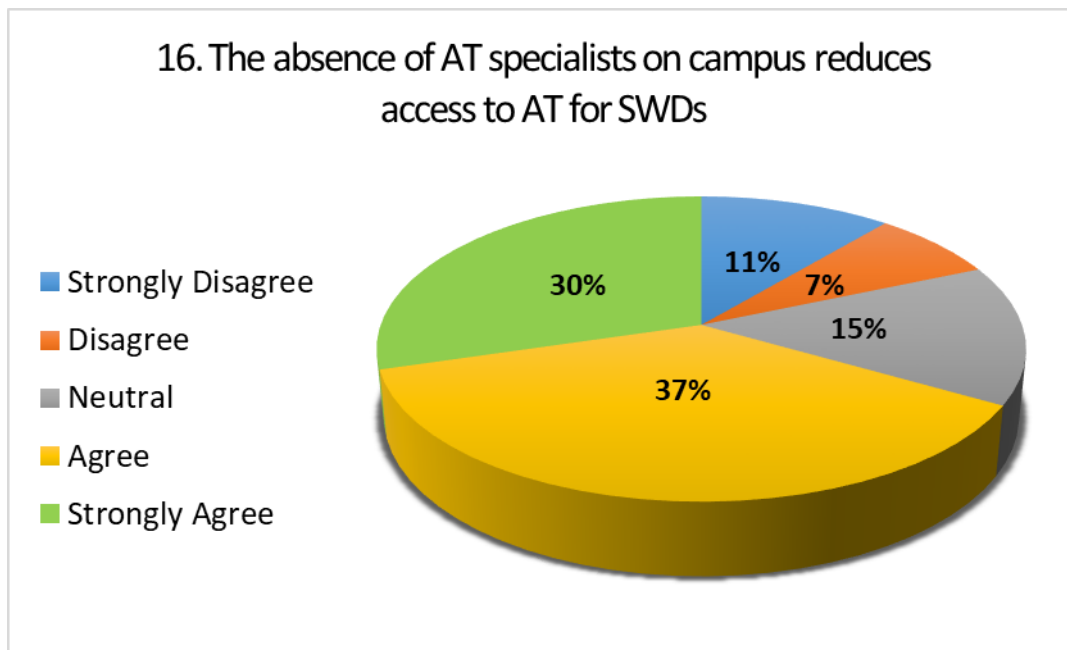


Figure 16: The Importance of Assistive Technology Specialists

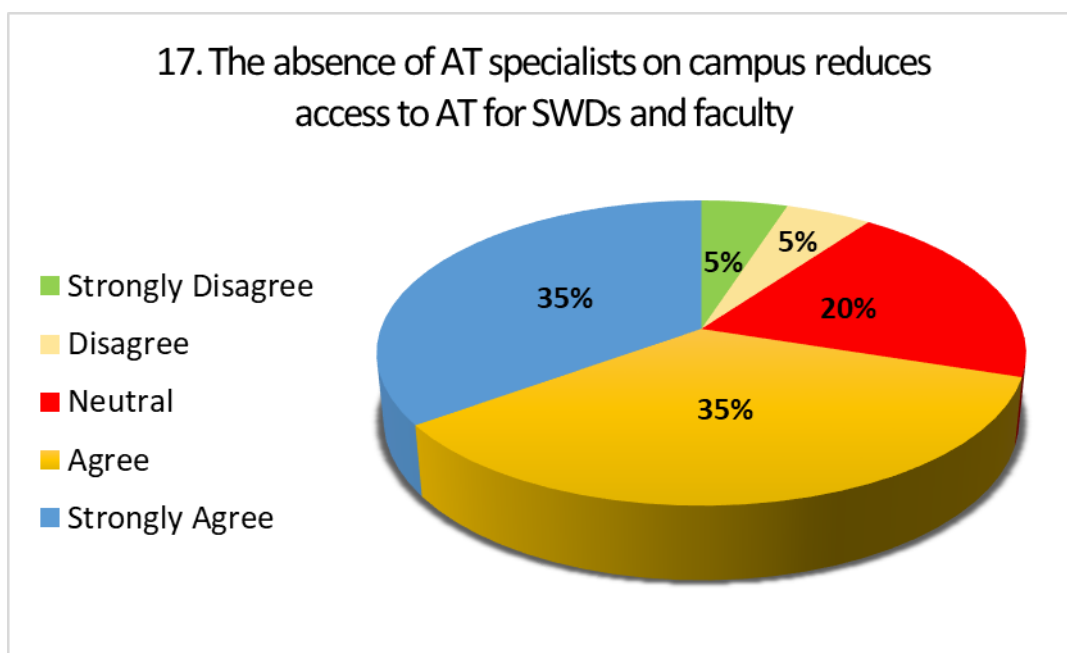


Figure 17: The Role of Assistive Technology Specialists in Enhancing Services

18. Availability of AT tools and services in each institution increases the opportunity to achieve inclusive education

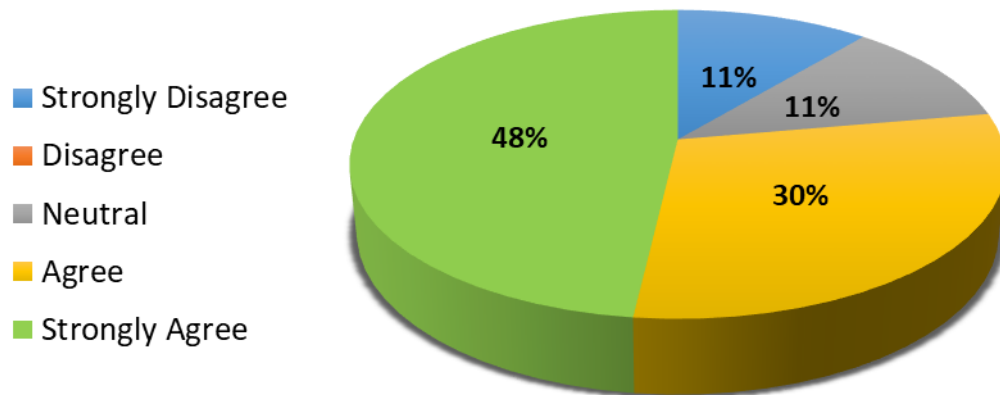


Figure 18: The Relationship between Assistive Technology and Inclusive Education

19. Availability of AT tools and services in each institution increases the opportunity to achieve inclusive education

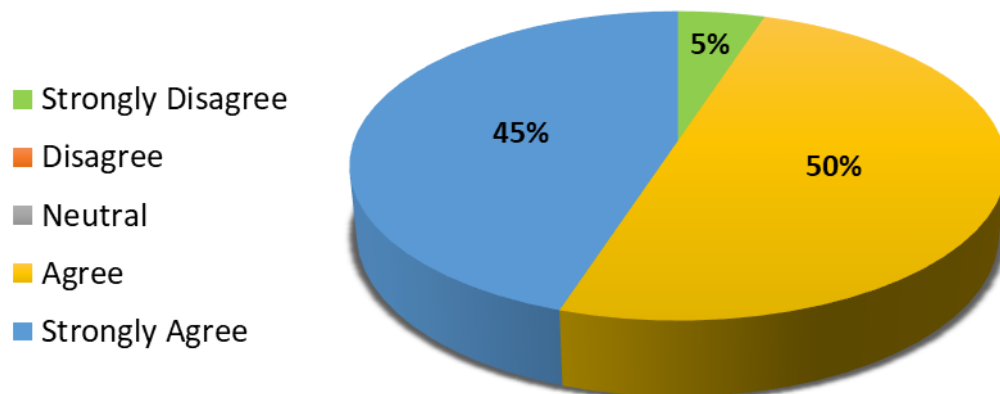


Figure 19: The Importance of Assistive Technology to Achieve Inclusive Education

4.3 Findings of the Interview

4.3.1 The Role of HEIs Administrations in Implementing Assistive Technology Systems and Policies

The findings indicate that the role of specialist staff in the area of disability services does not include AT services but is only concerned with providing psychological, social and academic support to SWDs through counseling and guidance. Moreover, the results reveal there is an absence of AT guidelines and policies to follow in order to implement effective AT systems for SWDs that are beneficial in providing a better understanding of using AT for students, faculty and administrative entities. Only one selected site mentions that the campus has developed an internal regulation, which includes all instructions and procedures for using and borrowing all AT devices by SWDs. There is a lack of policies put on by the HEIs administrations to make more efforts to implement AT policy. The findings indicate adopting AT policies by HEIs administration contributes to regulating AT use and abiding of procedures and guidelines.

4.3.2 The Importance of Assistive Technology Specialists on the Campus

The results presented necessitate the provision of an AT center and AT specialist(s) on campus. In three selected sites, one only has a resource center, yet is without an AT specialist. The findings indicate that availability of a specialized AT center contributes to identify the appropriate AT interventions and technical support for the diverse needs of their students. In fact, AT is viewed as compensating measures in carrying out prescribe academic tasks for SWDs. As a result, the teachers are able to acquire complete information concerning of specific AT provided for SWDs. Furthermore, the findings indicate that an AT specialist contributes to raising awareness of using AT tools and acts as a liaison between the SWDs and teacher(s) to integrate appropriate technology for a wide range of disability needs.

4.3.3 Awareness of Using Assistive Technology Facilitates Accommodations for SWDs

The findings show that two of three selected HEIs offer Awareness sessions for all SWDs and their peers, as well as for members of the teaching and administrative staff who wish to attend. Thus, awareness of using AT helps to recognize SWDs' AT needs and highlight accommodations services, which concentrate on improving the academic performance of SWDs. The results illustrate that ensuring that syllabus content can be accessed using a variety of AT tools enables SWDs to access information sources in a way that suits SWDs and helps faculty to develop inclusive pedagogical approaches, which increases SWDs' academic performance and responds to their needs. For example, students with visual impairment may use Braille AT devices and screen reader programs to follow their lessons in a manner that suits them. At the same time, students with learning difficulties can use special recording devices to repeat and retrieve lectures at the time and speed that suits them.

4.3.4 Challenges of Integrating Assistive Technology for SWDs in HEIs

The findings show that the main challenges encountered when integrating AT for SWDs in HEIs are the lack of understanding of AT as a right of SWDs, the prohibitive costs of some technology, as well as limited technical support in troubleshooting and maintaining AT devices. Solving these challenges help SWDs and teachers to benefit from AT's advantages; the findings illustrate that the most crucial advantage of AT lies in providing equal access to educational opportunities. On the other hand, the findings reveal few negative thought wherein SWDs being dependent totally on AT in completing their learning tasks which decrease the opportunities of improving their individual competencies.

4.4 Findings of the Official Documents

4.4.1 The Importance of an Assistive Technology Services Center

The benefits of having an AT resources and support center at HEIs is extensively investigated in the Literature Review Chapter. As stated in the USA's Assistive

Technology Act of 2004 (2004), facilitating access to AT services increases the opportunity for inclusion within the community and social activities, which enhances PWDs' autonomy and productivity. Consequently, the provision of AT services raises the availability and access to AT devices through providing appropriate funding and training about AT that empowers SWDs to obtain sufficient information in utilizing and improving the functionality of AT that enhance and meet their AT needs; this increases the SWDs' engagement and independence in the learning environment. The findings revealed there is a lack of AT services as outlined in the UAE's National Policy in Empowering People of Determination and Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs. This lack of desire might hinder HEIs' ability to provide AT services centers.

4.4.2 Policy Development

The findings in this study indicate that two of the selected HEIs are not following the UAE's National Policy in Empowering People of Determination and Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs, nor do they have any internal guidelines for implementing AT systems for SWDs. Both the policy and federal law emphasize the importance of granting AT for SWDs within the general and higher education settings as mentioned earlier in the Chapters 1 and 2 (MOCD 2006, 2017). Moreover, the regulations towards enhancing the use of AT were developed as the guiding document or General Rules for the Provision of Special Education Programs and Services (Public and Private Schools) must reinforce this vision, which clearly states the responsibility and requirement of integrating AT systems within schools. The general rules insist that, "AT should be provided to all students with special needs in order to help achieve their academic potential and facilitate the process of inclusion" (MOE 2010, p. 68). However, the higher education sector in the UAE still has not developed any guidelines or policy to ensure it successfully meets the AT needs for SWDs.

4.5 Discussion

The discussion aims to answer the research questions by applying the factors of human behaviour, task performance, AT devices and environment using the conceptual framework described by Cook and Hussey (2002) in their Human Activity-Assistive Technology (HAAT) model. Thus, the framework guiding this investigation to measure the effect of AT on the academic performance of SWDs in the HEIs in the UAE based on the interpretation of essential findings that related to the literature review.

4.5.1 Discussion of the First Research Question

The first question of this study intends to evaluate how AT assists SWDs at HEIs to increase academic performance. The findings from the three-selected HEIs report AT ensure the maximum academic performance of SWDs at the higher education level; most participants consider AT a key instrument as a facilitator to accessing curriculum content and the modification of teaching and learning methods. Participants imply that integrating AT within higher education learning experiences for SWDs enhances optimum participation and personal communication in completing day-to-day academic activities. Understanding the needs for AT further promotes necessary accommodation for SWDs, which fosters their academic performance, resulting in greater autonomy and self-confidence. McNicholl et al. (2019, p.8) confirm that “AT use was found to improve SWDs' performance of academic tasks, increase learning and engagement with educational materials and increase academic performance”.

Consequently, utilizing AT in the classroom permits teachers to differentiate SWDs' levels of abilities by improve pedagogical approaches such as the TPACK mode, thus, creating a positive inclusive learning environment that helps SWDs' to perform academic tasks better.

4.5.2 Discussion of the Second Research Question

The second question of this study seeks to determine the challenges of applying AT for SWDs at HEIs. The results indicate several factors that hinder implementing effective AT systems for SWDs at HEIs in the UAE. These factors reflect likely in the

high-cost of AT, resulting in a reluctance to provide the latest devices and best quality equipment. Technical support is an additional barrier to the implementation of AT use. In fact, due to the absence of technical assistance, teachers and SWDs experience difficulties in diagnosing and solving malfunctions associated with AT devices.

Moreover, a training deficiency for teachers and SWDs is another critical barrier; this in itself becomes a significant reason for AT abandonment. The respondents emphasize they received training workshops in using AT for SWDs, but in fact, the findings show insufficient knowledge among teachers and SWDs in adopting AT in the learning process. Addressing this issue; it is essential to ensure that AT training programs are well designed and prepared to help SWDs and teachers understand and adapt to the evolving types of AT in the educational field. A recent study by Ahmed (2018) regarding the perceptions of utilizing AT for SWDs in the classroom argues that providing appropriate training and preparation of AT use assists the teacher in being aware and familiar with various AT tools to accommodate SWDs' learning needs.

4.5.3 Discussion of the Third Research Question

The third question of this study aims to examine how the provision of AT service centers in HEIs improves SWDs' academic performance. The findings report that the present unavailability of AT in the classroom demands more attention of HEIs; managing (or opening/establishing) AT services centers, including hiring AT specialist staff, increases opportunities for sufficient knowledge and assistance in using AT with proper and effective interventions and promotes SWDs' engagement by facilitating access to learning activities. Raising awareness that utilizing AT appropriately among students and faculty necessitates the existence of AT services and support centers on the campus and assists SWDs to improve academic performance; such services provide them with an equal chance to access higher education by considering the benefits and potential for AT to be used effectively by SWDs and teachers. To facilitate accommodation needs, modify instruction and assessment practices, and to substitute or adjust and adapt curriculum ensures that SWDs succeed academically and fosters inclusive education.

Chapter 5: Conclusions and Recommendations

5.1 Conclusion

Assistive Technology (AT) is a tool or device that supports and improves the ability of PWDs to function in everyday activities and educational settings. AT is a key driver to enhance collaborative learning and facilitate communication which increases a student's abilities and cognitive development. Adopting AT for SWDs in HEIs expands the opportunities to receive equal access to curriculum content and learning materials that reinforce students' participation and greater self-determination since AT can be customized to accommodate the diverse needs of SWDs.

The potential of AT lies in its use to provide both SWDs and teachers with innovative teaching and learning methods: to modify curricula in response to the needs for all learners, to achieve an interactive learning environment in which positively affects academic engagement and performance, to facilitate the feeling of inclusion for SWDs in HEIs. However, the experiences faced by SWDs may be still be unsatisfactory due to the accessibility and availability of AT services across HEIs in the UAE. Such practice ought to be supported and nurtured from institution to institution until embedding and normalizing AT practice in the educational process is commonplace.

Overall, the collaboration between teachers, specialist staff, HEIs administration as well as family involvement must be ensured in fostering AT within the educational environment to move towards successful academic outcomes for all, but particularly SWDs.

5.2 Recommendations

Advancing AT significantly pushes back the challenges for all in educational settings. The essence of this study indicates using AT for SWDs and the importance of teachers' skills development in adapting and integrating AT, which increases SWDs' academic performance. Based on analysis of the findings, the discussion points out the challenges of implementing and integrating effective AT systems that require additional efforts from HEIs administrations to understand the benefits of establishing on campus AT services and support centers, along with the provision of AT specialists staff who promote both SWDs and teachers' access to AT effectively.

As mentioned in Chapter 1, the purpose of the fourth question of the study provides the most important recommendations to integrate AT effectively within HEIs for SWDs in the UAE. The absence of an AT Act in the UAE limits or inhibits any establishment of AT services in different HEIs that facilitate the support and assistance in furthering AT use efficiently to ensure that SWDs feel nurtured because of AT's value to enhance communication process toward learning environment. It is strongly recommended that specialized entities in the UAE impose an AT Act to regulate the utilization of AT in all aspects of life and which corresponds to the USA's AT Act (2004) mentioned in Literature Review and official document findings. Making a new AT Act in the UAE will commit to promote education for all, alongside the UAE's National Policy in Empowering People of Determination and Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs. Ultimately, this viable solution promises to promote quality teaching and learning experiences for SWDs through the provision of AT service centers and AT specialist as well as adopting/mandating the use of Universal Design for Learning (UDL) in curriculum development.

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Appendices

Appendix A

Students with Disabilities Questionnaire (English Version)

Assistive Technology Effect on the Academic Performance of Students with Disabilities: An Investigation Study at Higher Education Institutions in the UAE (SWDs Questionnaire)

The following questionnaire is to measure the effects of Assistive Technology (AT) on the academic performance of Students with Disabilities (SWDs) at higher education institutions in the UAE. It will take around 10 minutes of your time and all responses will be kept confidential.

The key definitions:

Assistive Technology (AT): refers to "all kind of tools, devices or systems enabling students with disabilities (SWDs) to (easier and safer) perform a task" (Feyerer et al. 2002, p.107).

Students with Disabilities (SWDs): refers to "learners with learning, physical, and developmental disabilities; behavioral, emotional, and communication disorders; and learning deficiencies" (Kryszewska 2017, p.525).

E-learning: refers to the use of information and communication technologies (ICTs) at web sites, personal computers (PCs), tablet PCs, cell phones, learning management system (LMS), televisions (TVs), radios and other means to improve teaching and learning processes (Mothibi 2015).

Please tick (✓) the box in front of the appropriate answer, or answer in the space provided.

* Required

1. Gender *

- ☐ Male
- ☐ Female

2. Age *

- ☐ 17 - 20
- ☐ 20 - 30
- ☐ 30 - 40
- ☐ Above 40

3. Major *

- ☐ Computer Science
- ☐ Engineering
- ☐ Social and Human Sciences
- ☐ Education
- ☐ Business
- ☐ Medical
- ☐ Other: _____

4. Degree *

- ☐ Diploma
- ☐ Higher Diploma
- ☐ Bachelor's
- ☐ Master's
- ☐ Ph.D. or Doctorate

5. Disability condition *

- ☐ Visual Impairment
- ☐ Hearing Impairment
- ☐ Physical
- ☐ Intellectual
- ☐ Multiple
- ☐ Learning Difficulties
- ☐ Other: _____

6. Is Assistive Technology useful in your daily life? *

- ☐ Yes
- ☐ No

7. Did you use any Assistive Technology during your study? *

☐ Yes

☐ No

8. Does your institution provide any workshops or awareness sessions related to AT for SWDs? *

☐ Yes

☐ No

9. Are there specific Assistive Technology services provided in the class by your institution? (If yes, please explain how or give an example) *

Your answer _____

10. Do you think the availability of Assistive Technology services (Resources and Support Center) on the campus increases the academic performance of SWDs? Yes or No, and Why? *

Your answer _____

11. Does your institution follow a policy or federal law launched by the UAE government to organize utilizing AT for SWDs (Example: The National Policy for Empowering People of Determination)? Yes or No and if yes, explain how your institution implements it? *

Your answer _____

12. Utilizing AT for SWDs in the educational process helps you to access syllabus content easily. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

13. Increased teacher knowledge of AT helps to improve the academic performance of SWDs. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

14. Raising awareness of AT at higher education institutions helps SWDs and faculty understanding the importance of implementing AT policy in the higher education system. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

15. Provision of AT services (Resources and Support Center) on the campus plays an important role in facilitating access to AT for SWDs. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

16. The absence of AT specialists on campus reduces access to AT for SWDs. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

17. Higher education institutions' administration must increase their efforts to implement successful AT systems and policy. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

18. Availability of AT tools and services in each institution increases the opportunity to achieve inclusive education. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

19. Utilizing AT for SWDs facilitates E-learning processes during crisis situations (Coronavirus Covid-19 as an example). *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

20. Based on your experience, can you mention some AT that might help to facilitate the Teaching and Learning processes for SWDs? *

Your answer

21. Please indicate the most relevant advantages of AT that may affect the academic performance of SWDs. *

Your answer

22. Please identify any disadvantage of using AT for SWDs. *

Your answer

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Appendix B

Students with Disabilities Questionnaire (Arabic Version)

تأثير التكنولوجيا المساعدة على الأداء الأكاديمي للطلبة ذوي الإعاقة: دراسة استقصائية في مؤسسات التعليم العالي في دولة الإمارات العربية المتحدة (استبيان للطلبة ذوي الإعاقة)

الاستبيان التالي يهدف إلى قياس تأثير التكنولوجيا المساعدة على الأداء الأكاديمي للطلاب ذوي الإعاقة في مؤسسات التعليم العالي في دولة الإمارات العربية المتحدة. سيستغرق الأمر حوالي 10 دقائق من وقتك، وجميع المعلومات المسجلة سيتم التعامل معها بسرية تامة.

التعريفات الرئيسية:

التكنولوجيا المساعدة: تشير إلى "أي عنصر أو وسيلة أو منتج تجاري جاهز أو معدل أو مفصل أو مكيف وفقاً للاحتياجات الشخصية، ويستخدم لزيادة أو المحافظة على أو تحسين القدرات الوظيفية والأدائية للأشخاص ذوي الإعاقة" (نهى محمود، 2015).

الطلاب أو الأشخاص ذوي الإعاقة: "كل من يعانون من نواحي ضعف طويلة الأجل بدنية أو عقلية أو ذهنية أو حسية، قد تمنعهم لدى التعامل مع مختلف الحواجز من المشاركة بصورة كاملة وفعالة في المجتمع على قدم المساواة مع الآخرين" (يونيسيف، 2014).

يرجى وضع علامة (√) في المربع الموجود أمام الإجابة المناسبة، أو الإجابة في الخانة الفارغة في حال تطلب الأمر.

*مطلوب

1. الجنس *

ذكر ☐

أنثى ☐

2. العمر *

إجابتك

3. التخصص *

علوم الحاسوب ☐

الهندسة ☐

العلوم الاجتماعية والإنسانية ☐

الاعلام ☐

إدارة الأعمال ☐

الطب ☐

أخرى: ☐

4. الدرجة العلمية *

الدبلوم ☐

الدبلوم العالي ☐

البكالوريوس ☐

الماجستير ☐

الدكتوراه ☐

5. نوع الإعاقة *

☐ بصرية

☐ سمعية

☐ جسدية

☐ ذهنية

☐ متعددة

☐ صعوبات التعلم

☐ أخرى:

6. هل التكنولوجيا المساعدة مفيدة في حياتك اليومية؟ *

☐ نعم

☐ لا

7. هل تستخدم أي تكنولوجيا مساعدة خلال دراستك؟ *

☐ نعم

☐ لا

8. هل تقدم مؤسستك التعليمية أي ورش عمل أو جلسات توعية تتعلق بالتكنولوجيا المساعدة للطلاب ذوي الإعاقة؟ *

☐ نعم

☐ لا

9. هل هناك خدمات تكنولوجيا مساعدة محددة تقدم لك في الفصل الدراسي من قبل مؤسستك التعليمية؟ (إذا كانت الإجابة بنعم، يرجى توضيح كيفية ذلك أو تقديم مثال) *

إجابتك

10. هل تعتقد أن توفر خدمات التكنولوجيا المساعدة (مركز الموارد والدعم) في الحرم الجامعي يزيد من الأداء الأكاديمي للطلاب ذوي الإعاقة؟ نعم أو لا ولماذا؟ *

إجابتك

11. هل تتبع مؤسستك التعليمية سياسة أو قانوناً اتحادياً أطلقتته حكومة الإمارات العربية المتحدة بشأن تنظيم استخدام التكنولوجيا المساعدة للطلاب ذوي الإعاقة (مثال: السياسة الوطنية لتمكين ذوي الهمم)؟ نعم أو لا أو غير متأكد، وإذا كان الجواب نعم، اشرح من فضلك كيفية تنفيذ مؤسستك التعليمية ذلك؟ *

إجابتك

12. يساعد استخدام التكنولوجيا المساعدة الطلاب ذوي الإعاقة خلال العملية التعليمية على الوصول إلى محتوى المناهج بسهولة. *

☐ لا أوافق بشدة

☐ لا أوافق

☐ غير متأكد

☐ موافق

☐ موافق بشدة

13. تساعد زيادة معرفة المعلم بالتكنولوجيا المساعدة على تحسين الأداء الأكاديمي للطلاب ذوي الإعاقة. *

- ☐ لا أوافق بشدة
- ☐ لا أوافق
- ☐ غير متأكد
- ☐ موافق
- ☐ موافق بشدة

14. يساعد رفع مستوى الوعي بالتكنولوجيا المساعدة في مؤسسات التعليم العالي الطلاب ذوي الإعاقة والهيئة التدريسية على فهم أهمية تنفيذ سياسة التكنولوجيا المساعدة في نظام التعليم العالي. *

- ☐ لا أوافق بشدة
- ☐ لا أوافق
- ☐ غير متأكد
- ☐ موافق
- ☐ موافق بشدة

15. تقديم خدمات التكنولوجيا المساعدة (مركز الموارد والدعم) للطلاب ذوي الإعاقة في الحرم الجامعي يلعب دوراً مهماً في تسهيل استخدام التكنولوجيا المساعدة بفعالية. *

- ☐ لا أوافق بشدة
- ☐ لا أوافق
- ☐ غير متأكد
- ☐ موافق
- ☐ موافق بشدة

16. عدم وجود موظفين متخصصين في التكنولوجيا المساعدة في الحرم الجامعي يقلل من إمكانية وصول الطلاب ذوي الإعاقة إلى التكنولوجيا المساعدة.*

☐ لا أوافق بشدة

☐ لا أوافق

☐ غير متأكد

☐ موافق

☐ موافق بشدة

17. يجب على إدارات مؤسسات التعليم العالي زيادة جهودها لتطبيق أنظمة وسياسة ناجحة في تنظيم استخدام التكنولوجيا المساعدة.*

☐ لا أوافق بشدة

☐ لا أوافق

☐ غير متأكد

☐ موافق

☐ موافق بشدة

18. توفر أدوات وخدمات التكنولوجيا المساعدة في مؤسسات التعليم العالي يزيد من فرص تحقيق التعليم الدامج.*

☐ لا أوافق بشدة

☐ لا أوافق

☐ غير متأكد

☐ موافق

☐ موافق بشدة

19. استخدام التكنولوجيا المساعدة للطلاب ذوي الإعاقة يسهل عمليات التعلم عن بعد أثناء الأزمات، (أزمة فيروس كورونا كوفيد -19) على سبيل المثال *

☐ لا أوافق بشدة

☐ لا أوافق

☐ غير متأكد

☐ موافق

☐ موافق بشدة

20. استناداً إلى تجربتك، هل يمكنك ذكر بعضاً من أدوات وأجهزة التكنولوجيا المساعدة التي قد تساعد في تسهيل عمليات التدريس والتعلم للطلاب ذوي الإعاقة؟ *

إجابتك

21. يرجى الإشارة إلى أهم إيجابيات استخدام التكنولوجيا المساعدة التي قد تؤثر على الأداء الأكاديمي للطلاب ذوي الإعاقة. *

إجابتك

22. يرجى تحديد أي سلبيات لاستخدام التكنولوجيا المساعدة للطلاب ذوي الإعاقة. *

إجابتك

إرسال

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Appendix C

Teachers Questionnaire (English Version)

Assistive Technology Effect on the Academic Performance of Students with Disabilities: An Investigation Study at Higher Education Institutions in the UAE (Teachers Questionnaire)

The following questionnaire is to measure the effects of Assistive Technology (AT) on the academic performance of Students with Disabilities (SWDs) at higher education institutions in the UAE. It will take around 10 minutes of your time and all responses will be kept confidential.

The key definitions:

Assistive Technology (AT): refers to "all kind of tools, devices or systems enabling students with disabilities (SWDs) to (easier and safer) perform a task" (Feyerer et al. 2002, p.107).

Students with Disabilities (SWDs): refers to "learners with learning, physical, and developmental disabilities; behavioral, emotional, and communication disorders; and learning deficiencies" (Kryszewska 2017, p.525).

E-learning: refers to the use of information and communication technologies (ICTs) at web sites, personal computers (PCs), tablet PCs, cell phones, learning management system (LMS), televisions (TVs), radios and other means to improve teaching and learning processes (Mothibi 2015).

Please tick (✓) the box in front of the appropriate answer or fill the space provided.

* Required

1. Gender *

- ☐ Male
- ☐ Female

2. Faculty *

- ☐ Computer Science
- ☐ Engineering
- ☐ Social and Human Sciences
- ☐ Education
- ☐ Business
- ☐ Medical
- ☐ Other: _____

3. Qualification *

- ☐ Doctorate
- ☐ Master's
- ☐ Bachelor's
- ☐ Higher Diploma
- ☐ Diploma

4. Disability conditions you have encountered among your students (Choose all that apply). *

☐ Visual Impairment

☐ Hearing Impairment

☐ Physical

☐ Intellectual

☐ Multiple

☐ Learning Difficulties

☐ None of the above

☐ Other: _____

5. Number of SWDs you have taught in your classes *

☐ Less than 5

☐ 5 - 15

☐ 15 - 20

☐ More than 20

6. Do you think Assistive Technology is useful for SWDs' daily life? *

☐ Yes

☐ No

7. Did you use any Assistive Technology for SWDs during the class? *

☐ Yes

☐ No

8. Does your institution provide any workshops or awareness sessions related to AT for teachers? *

☐ Yes

☐ No

9. Have you had any training in how to deal with SWDs? *

☐ Yes

☐ No

10. Are there specific Assistive Technology services provided for SWDs in the class by your institution? (If yes, please explain how or give an example) *

Your answer

11. Do you think the availability of Assistive Technology services (Resources and Support Center) on campus helps teachers to increase their knowledge about utilizing appropriate AT for SWDs in order to improve their academic performance? Yes or No and Why? *

Your answer

12. Does your institution follow a policy or federal law launched by the UAE government to organize utilizing AT for SWDs (Example: The National Policy for Empowering People of Determination)? Yes or No and if yes, explain how your institution implements it? *

Your answer

13. Utilizing AT for SWDs in the educational process helps faculty facilitate the pedagogical approaches and improve curriculum content. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

14. Increased teacher knowledge of AT helps to improve the academic performance of SWDs. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

15. Raising awareness of AT in higher education institutions helps SWDs and faculty understanding the importance of implementing AT policy in higher education systems. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

16. Provision of AT services (Resources and Support Center) on campus plays an important role to facilitate the use of AT for SWDs. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

17. The absence of AT specialists on campus reduces access to AT for SWDs and faculty. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

18. Higher education institutions' administration must increase their efforts to implement successful AT systems and policy. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly agree

19. Availability of AT tools and services in each institution increases the opportunity to achieve inclusive education. *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

20. Utilizing AT for SWDs facilitates E-learning processes during crisis situations (Coronavirus Covid-19 as an example). *

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

21. Based on your experience, can you mention some AT that might help to facilitate the Teaching and Learning processes for SWDs? *

Your answer

22. Please indicate the relevant advantages of AT that may affect the academic performance of SWDs. *

Your answer

23. Please identify any disadvantage of using AT for SWDs. *

Your answer

Submit

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Appendix D

Teachers Questionnaire (Arabic Version)

تأثير التكنولوجيا المساعدة على الأداء الأكاديمي للطلبة ذوي الإعاقة: دراسة استقصائية في مؤسسات التعليم العالي في دولة الإمارات العربية المتحدة (استبيان لأعضاء الهيئة التدريسية)

الاستبيان التالي يهدف إلى قياس تأثير التكنولوجيا المساعدة على الأداء الأكاديمي للطلاب ذوي الإعاقة في مؤسسات التعليم العالي في دولة الإمارات العربية المتحدة. سيستغرق الأمر حوالي 10 دقائق من وقتك، وجميع المعلومات المسجلة سيتم التعامل معها بسرية تامة.

التعريفات الرئيسية:

التكنولوجيا المساعدة: تشير إلى "أي عنصر أو وسيلة أو منتج تجاري جاهز أو معدل أو مفصل أو مكيف وفقاً للاحتياجات الشخصية، ويستخدم لزيادة أو المحافظة على أو تحسين القدرات الوظيفية والأدائية للأشخاص ذوي الإعاقة" (نهى محمود، 2015).

الطلاب أو الأشخاص ذوي الإعاقة: "كل من يعانون من نواحي ضعف طويلة الأجل بدنية أو عقلية أو ذهنية أو حسية، قد تمنعهم لدى التعامل مع مختلف الحواجز من المشاركة بصورة كاملة وفعالة في المجتمع على قدم المساواة مع الآخرين" (يونسيف، 2014).

يرجى وضع علامة (√) في المربع الموجود أمام الإجابة المناسبة، أو الإجابة في الخانة الفارغة في حال تطلب الأمر.

*مطلوب

1. الجنس *

ذكر ☐

أنثى ☐

2. الكلية (الهيئة التدريسية) *

- ☐ علوم الحاسوب
- ☐ الهندسة
- ☐ العلوم الاجتماعية والإنسانية
- ☐ الاعلام
- ☐ إدارة الأعمال
- ☐ الطب
- ☐ أخرى: _____

3. المؤهل العلمي *

- ☐ الدكتوراه
- ☐ الماجستير
- ☐ البكالوريوس
- ☐ الدبلوم العالي
- ☐ الدبلوم

4. حالات الطلبة ذوي الإعاقة التي واجهتك أثناء مسيرتك التعليمية (اختر جميع الحالات التي تنطبق عليها الإجابة) *

☐ بصرية

☐ سمعية

☐ جسدية

☐ ذهنية

☐ متعددة

☐ صعوبات التعلم

☐ لا يوجد

☐ أخرى:

5. عدد الطلبة ذوي الإعاقة الذين قمت بتدريسهم أثناء مسيرتك التعليمية *

☐ أقل من 5

☐ من 5 إلى 15

☐ من 15 إلى 20

☐ أكثر من 20

6. هل تعتقد التكنولوجيا المساعدة مفيدة للطلبة ذوي الإعاقة في حياتهم اليومية؟ *

☐ نعم

☐ لا

7. هل تستخدم أي تكنولوجيا مساعدة للطلبة ذوي الإعاقة أثناء الحصص الدراسية؟ *

نعم ☐

لا ☐

8. هل تقدم مؤسستك التعليمية أي ورش عمل أو جلسات توعية للمعلمين فيما يتعلق بالتكنولوجيا المساعدة للطلاب ذوي الإعاقة؟ *

نعم ☐

لا ☐

9. هل لديك أي خبرة أو تدريب سابق في كيفية التعامل مع الطلبة ذوي الإعاقة؟ *

نعم ☐

لا ☐

10. هل هناك خدمات تكنولوجيا مساعدة محددة تقدم للطلبة ذوي الإعاقة في الفصل الدراسي من قبل مؤسستك التعليمية؟ (إذا كانت الإجابة بنعم، يرجى توضيح كيفية ذلك أو تقديم مثال). *

إجابتك

11. هل تعتقد أن توفر خدمات التكنولوجيا المساعدة (مركز الموارد والدعم) في الحرم الجامعي يساعد المعلمين على زيادة معرفتهم حول استخدام التكنولوجيا المساعدة للطلبة ذوي الإعاقة من أجل تحسين أدائهم الأكاديمي؟ نعم أو لا ولماذا؟ *

إجابتك

12. هل تتبع مؤسستك التعليمية سياسة أو قانوناً اتحادياً أطلقتته حكومة الإمارات العربية المتحدة بشأن تنظيم استخدام التكنولوجيا المساعدة للطلاب ذوي الاعاقة (مثال: السياسة الوطنية لتمكين ذوي الهمم)؟ نعم أو لا أو غير متأكد، وإذا كان الجواب نعم، اشرح من فضلك كيفية تنفيذ مؤسستك التعليمية ذلك؟ *

إجابتك

13. استخدام التكنولوجيا المساعدة للطلاب ذوي الإعاقة في العملية التعليمية يساعد أعضاء الهيئة التدريسية على تسهيل وتحسين محتوى المناهج الدراسية. *

- ☐ لا أوافق بشدة
- ☐ لا أوافق
- ☐ غير متأكد
- ☐ أوافق
- ☐ أوافق بشدة

14. تساعد زيادة معرفة المعلم بالتكنولوجيا المساعدة على تحسين الأداء الأكاديمي للطلاب ذوي الاعاقة. *

- ☐ لا أوافق بشدة
- ☐ لا أوافق
- ☐ غير متأكد
- ☐ موافق
- ☐ موافق بشدة

15. يساعد رفع مستوى الوعي بالتكنولوجيا المساعدة في مؤسسات التعليم العالي الطلاب ذوي الإعاقة والهيئة التدريسية على فهم أهمية تنفيذ سياسة التكنولوجيا المساعدة في نظام التعليم العالي.*

☐ لا أوافق بشدة

☐ لا أوافق

☐ غير متأكد

☐ موافق

☐ موافق بشدة

16. تقديم خدمات التكنولوجيا المساعدة (مركز الموارد والدعم) للطلاب ذوي الإعاقة في الحرم الجامعي يلعب دوراً مهماً في تسهيل استخدام التكنولوجيا المساعدة بفعالية.*

☐ لا أوافق بشدة

☐ لا أوافق

☐ لا أوافق ولا أرفض

☐ موافق

☐ موافق بشدة

17. عدم وجود موظفين متخصصين في التكنولوجيا المساعدة في الحرم الجامعي يقلل من إمكانية وصول الطلاب ذوي الإعاقة وأعضاء الهيئة التدريسية إلى التكنولوجيا المساعدة.*

☐ لا أوافق بشدة

☐ لا أوافق

☐ غير متأكد

☐ موافق

☐ موافق بشدة

18. يجب على إدارات مؤسسات التعليم العالي زيادة جهودها لتطبيق أنظمة وسياسة ناجحة في تنظيم استخدام التكنولوجيا المساعدة.*

- ☐ لا أوافق بشدة
- ☐ لا أوافق
- ☐ غير متأكد
- ☐ موافق
- ☐ موافق بشدة

19. توفر أدوات وخدمات التكنولوجيا المساعدة في مؤسسات التعليم العالي يزيد من فرص تحقيق التعليم الدامج.*

- ☐ لا أوافق بشدة
- ☐ لا أوافق
- ☐ غير متأكد
- ☐ موافق
- ☐ موافق بشدة

20. استخدام التكنولوجيا المساعدة للطلاب ذوي الإعاقة يسهل عمليات التعلم عن بعد أثناء الأزمات، (أزمة فيروس كورونا كوفيد-19) على سبيل المثال*

- ☐ لا أوافق بشدة
- ☐ لا أوافق
- ☐ غير متأكد
- ☐ موافق
- ☐ موافق بشدة

21. استنادًا إلى تجربتك، هل يمكنك ذكر بعضا من أدوات وأجهزة التكنولوجيا المساعدة التي قد تساعد في تسهيل عمليات التدريس والتعلم للطلاب ذوي الاعاقة؟ *

إجابتك

22. يرجى الإشارة إلى أهم إيجابيات استخدام التكنولوجيا المساعدة التي قد تؤثر على الأداء الأكاديمي للطلاب ذوي الاعاقة. *

إجابتك

23. يرجى تحديد أي سلبيات لاستخدام التكنولوجيا المساعدة للطلاب ذوي الإعاقة. *

إجابتك

إرسال

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Appendix E

The Interview Questions (English Version)

Interview with Staff Responsible for Students with Disabilities in the Higher Education Institution

The interview questions below are to measure the effects of Assistive Technology (AT) on the academic performance of Students with Disabilities' (SWDs) at higher education institutions in the UAE. It will take around 10 minutes of your time, and all responses will be kept confidential.

The key definitions:

Assistive Technology (AT): refers to “all kind of tools, devices or systems enabling SWDs to (easier and safer) perform a task” (Feyerer et al. 2002, p.107).

Students with Disabilities (SWDs): refers to “learners with learning, physical, and developmental disabilities; behavioral, emotional, and communication disorders; and learning deficiencies” (Kryszewska 2017, p.525).

E-learning: refers to the use of Information and Communication Technologies (ICTs) at web sites, personal computers (PCs), tablet PCs, cell phones, Learning Management System (LMS), televisions (TVs), radios and other means to improve teaching and learning processes (Mothibi 2015).

Interview questions:

1. What is your role in terms of dealing with services for SWDs at your campus?
2. Can you explain to what extent you think utilizing AT during the teaching and learning process affects SWDs' academic performance at higher education institutions?
3. Is there any guideline to implement an AT system for SWDs in your institution? If yes, do you recommend it and why? If no, please move to the next question.
4. In your opinion, do you think it is important to develop an AT guideline in higher education institutions to increase the academic performance of SWDs? Why or why not?
5. Are you aware of the UAE National Policy to Empower People of Determination and Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs? If yes, please move to the next question.
6. Do you think your university is implementing the policies mentioned above in terms of AT and accommodations for SWDs? Why or why not?

7. How does the provision of AT resources and a support center affect the academic performance of SWDs?
8. Do you think the availability of AT specialists at each campus is necessary to support both teachers and SWDs to increase knowledge and use of the AT tools? Why or why not?
9. In your opinion, what is the responsibility of higher education institutions' administration to reform and set out AT policies to develop SWDs' academic performance?
10. Does your institution provide any training or awareness sessions related to AT for specialist staff, SWDs, and faculty to increase their experience with the benefits of using AT?
11. Do you consider how to utilize AT for SWDs to facilitate access to syllabus content and develop inclusive pedagogical approaches? Please explain how or give an example.
12. In your opinion, what are the challenges that might hinder implementation of AT systems for SWDs at higher education institutions?
13. From your experience, what are the advantages and disadvantages of utilizing AT for SWDs at higher education institutions?

Appendix F

The Interview Questions (Arabic Version)

مقابلة مع المسؤول عن الطلاب ذوي الإعاقة في مؤسسة التعليم العالي

هذه المقابلة تهدف إلى قياس تأثير التكنولوجيا المساعدة على الأداء الأكاديمي للطلاب ذوي الإعاقة في مؤسسات التعليم العالي في دولة الإمارات العربية المتحدة. سيستغرق الأمر حوالي 10 دقائق من وقتك، وجميع المعلومات المسجلة سيتم التعامل معها بسرية تامة.

التعريفات الرئيسية:

التكنولوجيا المساعدة: تشير إلى "أي عنصر أو وسيلة أو منتج تجاري جاهز أو معدل أو مفصل أو مكيف وفقاً للاحتياجات الشخصية، ويستخدم لزيادة أو المحافظة على أو تحسين القدرات الوظيفية والأدائية للأشخاص ذوي الإعاقة" (نهى محمود، 2015).

الطلاب أو الأشخاص ذوي الإعاقة: "كل من يعانون من نواحي ضعف طويلة الأجل بدنية أو عقلية أو ذهنية أو حسية، قد تمنعهم لدى التعامل مع مختلف الحواجز من المشاركة بصورة كاملة وفعالة في المجتمع على قدم المساواة مع الآخرين" (يونييسيف، 2014).

أسئلة المقابلة:

1. ما هو دورك فيما يتعلق بالخدمات المقدمة للطلبة ذوي الإعاقة في الحرم الجامعي؟
2. هل يمكنك أن توضح إلى أي مدى تعتقد أن استخدام التكنولوجيا المساعدة أثناء العملية التعليمية يؤثر على الأداء الأكاديمي للطلبة ذوي الإعاقة في مؤسسات التعليم العالي؟
3. هل هناك أي دليل إرشادي لتطبيق استخدام التكنولوجيا المساعدة للطلبة ذوي الإعاقة في مؤسساتك التعليمية؟ إذا كانت الإجابة بنعم، فهل توصي بتنفيذه ولماذا؟ إذا كانت الإجابة بلا، فيرجى الانتقال إلى السؤال التالي.
4. هل تعتقد في رأيك أنه من المهم تطوير دليل إرشادي لاستخدام التكنولوجيا المساعدة للطلبة ذوي الإعاقة في مؤسسات التعليم العالي لزيادة أدائهم الأكاديمي؟ لماذا؟
5. هل أنت على علم بالسياسة الوطنية لدولة الإمارات العربية المتحدة لتمكين أصحاب الهمم والقانون الاتحادي رقم 29 لسنة 2006 بشأن حقوق ذوي الاحتياجات الخاصة؟ إذا كانت الإجابة بنعم، يرجى الانتقال إلى السؤال التالي.
6. هل تعتقد أن مؤسساتك التعليمية تنفذ القانون أو السياسة المذكورة أعلاه فيما يتعلق باستخدام التكنولوجيا المساعدة للطلبة ذوي الإعاقة؟ لماذا؟

7. كيف يؤثر وجود مركز مصادر ودعم لاستخدام التكنولوجيا المساعدة للطلبة ذوي الإعاقة في مؤسسات التعليم العالي على أدائهم الأكاديمي؟

8. هل تعتقد أن وجود موظف متخصص في التكنولوجيا المساعدة في كل حرم جامعي ضروري لدعم كل من المعلمين والطلبة ذوي الإعاقة لزيادة المعرفة باستخدامات أدوات التكنولوجيا المساعدة للطلبة ذوي الإعاقة؟ لماذا؟

9. في رأيك، ما هي مسؤولية إدارة مؤسسات التعليم العالي في تحسين ووضع السياسات المناسبة لاستخدام التكنولوجيا المساعدة من أجل تطوير الأداء الأكاديمي للطلبة ذوي الإعاقة؟

10. هل تقدم مؤسستك التعليمية أي دورات تدريبية أو توعية تتعلق بالتكنولوجيا المساعدة للموظفين المتخصصين، والطلبة ذوي الإعاقة، وأعضاء الهيئة التدريسية لإثراء خبراتهم في الاستفادة من التكنولوجيا المساعدة لتطوير الأداء الأكاديمي للطلبة ذوي الإعاقة؟

11. هل تعتقد الاستفادة من التكنولوجيا المساعدة للطلبة ذوي الإعاقة تساعد في تسهيل الوصول إلى محتوى المناهج بفعالية وتطوير طرق تعليمية وتربوية شاملة؟ يرجى شرح ذلك أو إعطاء مثال.

12. ما هي في رأيك التحديات التي قد تحد من استخدام أنظمة التكنولوجيا المساعدة للطلبة ذوي الإعاقة في مؤسسات التعليم العالي؟

13. من خلال خبرتك، ما هي أهم إيجابيات وسلبيات استخدام التكنولوجيا المساعدة للطلبة ذوي الإعاقة في مؤسسات التعليم العالي؟

Appendix G

UAE National Policy in Empowering People of Determination



UNITED ARAB EMIRATES
MINISTRY OF COMMUNITY DEVELOPMENT

National Policy to empower People of Determination



Policy

The Vision

An integrated community, free from barriers, which empowers people of determination and guarantees their right to a dignified life

Mission

Empowering people of determination and their families, through setting policies and innovating services that allow them to enjoy a high quality of life

Objectives

- Achieving social inclusion
- Enhancing equal opportunities
- Active participation
- Supporting individuals and their families to perform their roles



Policy pillars

1 Healthcare and rehabilitation



2 Education



3 Vocational training and employability



4 Vocational training and employability



5 Accessibility



6 Public, cultural and sports life





1.1 Goal Guaranteeing a comprehensive and high quality healthcare

- Initiatives
- Expanding healthcare services and programs to cover all factions of community
 - Expanding the scope of services provided by development clinics and ensuring that develop-ment surveys are mandatory
 - Developing regular and post-accident rehabilitation programs
 - Developing special plans for the elderly of determination
 - Providing a set of medical tests for the various stages of pregnancy and postpartum, as a pre-vention from possible disabilities

1.2 Goal Accurate and high quality diagnosis of disabilities

- Investing in research and studies on disabilities, hereditary syndromes and rare diseases that cause disability
- Launching a national program for the early detection and diagnosis of disabilities and delayed development including neo-natal and pre-marital tests
- Standardize diagnosis procedures and measures

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1.3 Goal Providing information on all people of determination in the UAE

- Initiatives
- Launching a national registrar for newborns with disabilities and delayed development
 - Establishing a central database for people of determination (all cases in the UAE)

1.4 Goal Providing specialized medical staff and health specialists in disabilities

- Initiatives
- Launching a qualification program for national workers in the domain of early detection of disabilities and delayed development, in addition to training them on the variations causing disabilities and how to prevent them
 - Launching training and qualification programs for national workers in the fields of disabilities and supporting treatment services

Stakeholders

- Ministry of Health and Prevention
- Ministry of Community Development
- Local Health Authorities
- Federal, Local and Private Disability Centers
- Schools
- Universities and Higher Education Institutions

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2 / Pillar – Education



2.1 Goal Enhancing the inclusion in education (public, vocational and higher education)

- Initiatives
- Providing a clear education track for people of determination through all stages
 - Redesigning and adapting the curricula to respond to the needs of people of determination
 - Providing additional resources, tools and technologies to support the education of people of determination
 - Providing treatment support services (speech, functional, behavioral...)
 - Empowering and engaging communities and families in educational, entertainment, arts, sports and cultural activities
 - Launching awareness campaigns targeting the community and school students on the importance of inclusion
 - Launching home schooling programs for certain disabilities

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2.2 Goal providing highly qualified teachers and experts in education for people of determination across different learning stages

- Initiatives
- Inaugurating specializations in education for people of determination in universities and colleges (such as education in the cases of autism and severe disabilities)
 - Ensuring that universities introduce the teachers in the pre-service stage, to the principles of teaching and assessing students with disabilities and learning difficulties
 - Launching a training program for Emirati nationals working in the fields of disabilities, including teachers and education specialists

Stakeholders

- Ministry of Education
- Ministry of Community Development
- Local Education Authorities
- Education councils
- Schools
- Federal, Local and Private Disabled Centers
- Universities and higher education institutions
- Associations
- Parents of disabled children

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3 Pillar – vocational training and employability



3.1 Goal providing vocational training adapted to different disabilities and levels of severity

- Initiatives
- Developing training programs to respond to the requirements of the labor market
 - Launching vocational programs for people of determination in collaboration with various public and private organizations

3.2 Goal providing adequate employment opportunities for various types of disabilities and levels of severity

- Initiatives
- Elaborating policies to employ people of determination in both the public and private sectors
 - Providing a database about people of determination in search of vocational training and employment, possible employers of people of determination Adopting and implement employment support programs in competitive work environments
 - Providing a channel of communication between the public and private sectors to support the employment of people of determination
 - Establishing partnerships to provide micro-financing and market the products of people of determination

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3.3 Goal providing vocational training adapted to different disabilities and levels of severity

- Initiatives
- Providing incentives, rewards, and exemptions to encourage the recruitment of people of determination in the private sector. Providing qualifications and vocational training programs
 - Training work colleagues and employers to ensure optimal treatment of people of determination
 - Adopting an assessment program to evaluate the work environment and its adequacy to people of determination, and accordingly introduce the required changes

Stakeholders

- Ministry of Human Resources and Emiratization
- Ministry of Community Development
- Federal Authority for Government Human Resources
- Ministry of Education
- Federal, Local and Private Disabled Centers
- Zayed Higher Organization for Humanitarian Care
- Community Development Authority - Dubai
- Sharjah City for Humanitarian Services

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4 / Pillar – Accessibility



4.1 Goal providing standardized specifications for buildings in the UAE taking into account the needs of people of determination

- Initiatives
- Developing national standards and specifications for buildings to reflect the needs of people of determination, elaborate an implementation mechanism with a set of sanctions to penalize violators
 - Launching the disabled friendly building award, and the disabled friendly hotels standards

4.2 Goal providing easy access to people of determination to various information, depending on their individual abilities

- Initiatives
- Providing information about the services to the disabled and their families in all the emirates; ensuring they are easily accessible (for instance, treatment facilities, types of services, available activities, etc.)
 - Making information accessible to people who suffer visual and hearing disabilities using modern technology

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4.3 Goal ensuring people of determination have safe and easy access to various places and services

- Initiatives
- Improving public transportation for the disabled through the adoption of a set of specifications for various modes of transport
 - Introducing changes to public places, services and buildings to facilitate the access of people of determination to them

4.4 Goal allowing people of determination to communicate with service providers as best suited with their abilities

- Initiatives
- Launching service-related standards in all of the UAE
 - Launching programs to train and license sign language translators
 - Training service providers on how to address and communicate with people of determination

continued

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4 / Pillar – Accessibility



4.5 Goal providing easy access for people of determination to their homes and facilitate their day lives

- Initiatives
- Developing standards for accessible equipped homes for people of determination and their families, equip current houses

Stakeholders

- Ministry of Infrastructure Development
- Telecommunications Regulatory Authority
- Municipalities
- Sheikh Zayed Housing Program
- Departments of Transport
- Mohammed bin Rashid Housing Establishment

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5 / Pillar – Social protection and family empowerment



5.1 Goal developing social security policies that are adequate for people of determination

- Initiatives
- Unifying categorization of disabilities in the UAE
 - Increasing the number of registered people of determination for the card through linking it to services (healthcare, education, etc.)
 - Linking the card for people of determination to the Emirates ID

5.2 Goal ensuring the respect of the rights of the people of determination and protect them from any exploitation or abuse

- Initiatives
- Establishing a hot-line to ensure the complaints people of determination are heard when their rights are violated, or they are victim of exploitation and abuse
 - Elaborating policies to limit and prevent any abuse of the disabled, put in place mechanisms to detect disabilities and rehabilitate victims of abuse
 - Launching a training program for females of determination with specific training to protect them from exploitation and abuse

continued

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5 Pillar – Social protection and family empowerment



5.3 Goal making care and rehabilitation services available for severe disabilities

- Initiatives
- Launching a mobile unit to deliver various care and rehabilitation services for severe disabilities and their families in their homes

5.4 Goal actively engaging the family in providing rehabilitation services

- Initiatives
- Launching a support program for families and care providers (training, consultations, habilitation, training on sign language,...etc)
 - Certification of all special education specialists, treatment support services, and all relevant fields

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Stakeholders

- Ministry of Community Development
- Ministry of Health & Prevention
- Ministry of Justice
- Ministry of Education
- Ministry of Culture and Knowledge Development
- Ministry of Infrastructure Development
- National Council
- Local Executive Councils
- Emirates Identity Authority
- Zayed Higher Organization for Humanitarian Care
- Community Development Authority - Dubai
- Sharjah City for Humanitarian Services
- Humanitarian Associations
- Associations
- Federal Competitiveness and Statistics Authority
- Statistics Centers

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6 Pillar – Public, cultural and sports life



6.1 Goal integrating people of determination in different cultural and social activities

- Organizing competitions to engage people of determination in various cultural, sports and social activities

Initiatives

6.2 Goal providing services to people of determination is a right and not charity

- Launching awareness campaigns targeting various segments of society to educate them about disabilities

Initiatives

6.3 Goal empowering people of determination to take part in sports activities, local and international competitions

- Launching sports activities that ensure the participation of people of determination
- Expanding the scope of inclusive sports clubs at the national scale

Initiatives

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6.4 Goal adopting the creativity of people of determination and sponsor them in various cultural activities, sports and arts

- Launching a national program to discover talents among the disabled in different areas of sports, arts and culture
- Establishing special arts groups

Initiatives

Stakeholders

- Ministry of Culture and Knowledge Development
- General Authority of Youth and Sports Welfare
- Ministry of Community Development
- Ministry of Infrastructure Development
- Clubs for the people of determination
- Federal, Local and private centers for people of determination

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Appendix H

Federal Law No. 29 of the Year 2006 on the Rights of People with Special Needs

Federal Law No. 29 of 2006
In Respect of
The Rights of People with Special Needs

We, Khalifa Bin Zayed Al-Nahyan , President of the United Arab Emirates,

Upon reviewing the constitution,

The federal law No. 1 of 1972 in respect of the competences of ministries and powers of ministers and the laws amending it ,

The federal law No. 11 of 1972 in respect of the mandatory education,

The federal law No. 12 of 1972 in respect of regulating the clubs and associations operating in the field of the youth welfare,

The federal law No. 4 of 1976 in respect of establishing and organizing the United Arab Emirates University and the laws amending it,

The federal law No. 9 of 1976 in respect of the delinquent and the homeless juvenile,

The federal law No. 8 of 1980 in respect of regulating the work relationships, and the laws amending it,

The penal law promulgated under the federal law No. 3 of 1987 and the laws amending it,

The law of penal procedures promulgated under the federal law No. 35 of 1992 and the laws amending it,

The law of pensions and social insurances promulgated under the federal law No. 7 of 1999 and the laws amending it,

The federal law No. 21 of 1995 in respect of traffic and driving,

The federal law No. 25 of 1999 in respect of the general authority of Youth and Sports.

And pursuant to the proposal of the minister of the social affairs, the approval of the council of ministers, and the endorsement of the supreme federal council,

We have promulgated the following law:

Section One
General Provisions
Article (1)

Definitions:

In the implementation of the provisions of the present law, the following words and expressions mentioned therein shall have the meanings shown opposite each of them , unless otherwise is required by the context:

The State:	The United Arab Emirates
The Ministry:	The Ministry of Social Affairs
The Minister:	The Minister of Social Affairs
The Concerned Authorities:	The federal and local authorities concerned with the implementation of the provisions hereof.
A Person with Special Needs:	Every person suffering from a temporary / permanent, full /partial deficiency or infirmity in his physical, sensational, mental, communicational, educational or psychological faculties to an extent decreasing the possibility of satisfying his ordinary requirements in the conditions of people without special needs.
The Card:	The personal card granted by the ministry to the person with special needs which is considered as an official document indicating that its holder is a person with special needs. This card guarantees for its holder the rights and services shown herein, and in the bylaws and decisions issued in implementation hereof.

The Distinction:

Any discrimination, exclusion or restriction due to special needs which cause damaging or denying recognition of any rights prescribed under the legislations applicable in the state, enjoying them or practicing the same equally.

Article (2)

This law aims to guarantee the rights of the person with special needs and to provide all the services within the bounds of his abilities and capacities. The special needs may not be a reason to hinder the person with special needs from obtaining such rights and services especially in the field of welfare and social, economic, health, educational, professional, cultural and promotional services.

Article (3)

The state guarantees for the person with special needs the equality with people without special needs and non-discrimination due to special needs in all the legislations. It also guarantees to observe the same in all the policies and programs of economic and social development, and to take the appropriate procedures to prohibit the discrimination based on the special needs.

Article (4)

The ministry, in coordination with the concerned authorities, prepares programs to educate the person with special needs, his/ her family and local environment in all what concerns the rights provided for under this law and the other legislations, as well as the services provided for him.

Article (5)

Any judgment, standard or practice based on a lawful basis shall not be considered as a discrimination. The state guarantees to take all the necessary procedures to enable the person with special needs to enjoy his rights and liberties, and prohibit any infringement upon him or depriving him of them abusively.

Article (6)

The state guarantees the legal assistance for the person with special needs in all cases where his liberties are restricted for any legal reason. Upon issuing any decision restricting the freedom of a person with special needs, the following should be taken:

1. Treating him humanely, taking into account his condition and his needs as a person with special needs.
2. To provide the necessary information and data which are connected to the reasons of restricting his freedom.
3. To provide the appropriate assistance in case he is unable to pay the legal fees, expenses or fines, as stipulated under a resolution issued by the council of ministers.

Article 7

The state guarantees for the person with special needs to practice his right of expression and giving the opinion by using Braille, the language of sign and the other methods of communication, and his right in requesting, receiving and transmitting the information equally with others.

Article 8

The law guarantees for the person with special needs the necessary protection of his correspondences, medical records and personal matters. The executive bylaw of this law determines the regulations and mechanisms of the said protection.

Article 9

The ministry shall – in cooperation with the competent authorities- establish centers, establishments and institutions for taking care of and training the people with special needs and qualifying them. Such centers, establishments and institutions shall undertake the following tasks:

- A. To qualify the people with special needs to adapt themselves and integrate in the community.
- B. To provide the special education for people with special needs.
- C. To provide the professional training programs for the people with special needs.
- D. To train the families of people with special needs how to deal with them.

Section Two
Rights of People with Special Needs
Chapter One: Health and Rehabilitation Services
Article 10

Each UAE national person with special needs has the right to benefit from the health and rehabilitation services and the support services at the expense of the State, including:

- A. All surgeries whether resulting from a special need or not such as transplantation, treatment of ulcers, the anaplasty, the treatment in specialized centers... etc whether for intensive or normal treatments. This includes providing all the equipment and materials ...etc , and all the requirements for the success of the operation, whether permanent or temporary.
- B. To provide the medical examination and treatment at: general practitioners, specialists, consultants, dentists, the psychological evaluation, the audiography, radiography, lab tests, and medicines.
- C. Rehabilitation and Specialized Treatments: The internal and external, including : the physiotherapy, work therapy, phoniatics, treatment of hearing and the psychotherapy.

- D. The technical aids and the assisting equipment such as the mobile and fixed replacement equipment (limbs, audiphones, artificial oculus etc) corrective forms, movement aids (wheelchairs, walking sticks, canes and crutches), and for the prevention from ulcers and all the drugs used in the surgeries.

Article 11

Under a resolution by the council of ministers, a committee named “**The Specialized Committee For Health And Rehabilitation Services For People With Special Needs**” shall be established. Such committee shall be chaired by the undersecretary of the ministry of health with members representing the concerned authorities. The minister of health shall set forth the committee work system and meetings.

The committee shall specifically carry out the following functions:

1. Providing the diagnostic, treatment and rehabilitation services and developing the existing health programs and services to improve the conditions of the people with special needs.
2. Establishing the programs of early detection, diagnostics, raising awareness and health education, and providing the means of early and specialized intervention in the area of special needs.
3. Providing human cadres specialized in the field of different kinds of special needs and train and rehabilitate them.
4. Preparing the national studies to identify the reasons leading to the special needs, their consequences and the ways of prevention, and circulating such studies among the concerned authorities in the State.
5. Submitting periodic reports to the minister preparing the ground to present the same to the council of ministers to take the appropriate actions in this concern.

Chapter Two: Education

Article 12

The State guarantees for the person with special needs equal chances in education in all the educational and pedagogical institutions, the vocational qualification, teaching of adults, the continuous teaching in the regular classes or in special classes; if necessary, with providing the curriculum in the language of sign or Braille and any other methods as necessary.

The special needs do not constitute intrinsically an obstacle hindering from applying to enroll, join or enter any educational institution whether governmental or private.

Article (13)

The ministry of education and the ministry of higher education and scientific research shall take the appropriate procedures in cooperation with the concerned authorities to provide the pedagogical diagnosis, the curriculum, and the simplified means and techniques for the purposes of teaching. Moreover, it endeavors to provide alternative methods to communicate with people with special needs, and to establish alternative strategies for learning, and simplified material environment and other means necessary to guarantee the full participation of students with special needs.

Article 14

The ministry of education and the ministry of higher education and scientific research should – in cooperation with the concerned authorities- provide the academic specialties to prepare the employees working with people with special needs and their families whether in the areas of diagnosis, early discovery, the educational, social, psychological, medical or professional rehabilitation, and guarantee providing the training programs during the service to provide the employees with the modern knowledge and expertise.

Article 15

Under a resolution issued by the council of ministers, a committee named **“The Committee Specialized In The Education Of People With Special Needs”**. Such committee shall be chaired by the undersecretary of the

ministry of education, with members representing the concerned authorities. The minister of the education shall set forth the work system and meetings of the committee.

The committee shall specifically carry out the following functions:

1. Setting forth the executive programs to guarantee equal chances in the education for people with special needs since the early childhood in all the educational institutions in their regular classes or in the specialized educational units.
2. Developing the methodological structure of the educational programs and preparing the pedagogical plans which are in line with the contemporary time and the technical development and which are consistent with the growth and psychological features of people with special needs.
3. Organizing all the matters related to the education of the people with special needs such as the programs, procedures, methods and conditions of joining the regular classes and sit for examinations.
4. Laying down policies of rehabilitating and training the educational and teaching human cadres working in the area of people with special needs.
5. Providing advice and technological, technical and educational assistance to all the educational institutions which would like to receive people with special needs, and studying the financing requests related to the equipment and techniques and qualifying the educational institution environment.
6. Submitting periodic reports to the minister preparing the ground to present the same to the council of ministers to take the appropriate actions in this concern.

Chapter Three: Work

Article (16)

The UAE national person with special needs enjoys the right to work and occupy the public positions, for which the special needs , in themselves , do not constitute an obstacle hindering from applying and being selected for jobs. Special needs shall be taken into account upon undergoing the tests of competency to have the job for people concerned with the provisions of this law.

Article 17

The ministry may enter into contracts with other entities to execute projects for rehabilitation of people with special needs. The minister shall determine the terms, conditions and regulations necessary for that.

Article (18)

The legislations issued inside the country show the procedures to be taken to guarantee the person with special needs holding positions in the governmental and private sectors, the working hours, the vacations and the other terms related to the work of people with special needs, including the necessary regulations to terminate the services and the entitlement to the end of service benefits or the retirement pension.

The council of ministers determines –based on the minister’s proposal- the percentage of the jobs to be allocated for the people with special needs in both governmental and private sectors.

Article (19)

Under a resolution by the council of ministers, a committee named “**The Specialized Committee For The Employment Of The Person with Special Needs**”. Such committee shall be chaired by the undersecretary of the ministry, with members representing the concerned authorities. The minister shall set forth the committee work system and its meetings.

The committee shall specifically carry out the following functions :

1. To lay down the policies necessary for the employment of the person with special needs and the requirements to realize the optimal competence along with guaranteeing the continuity of the employment for the longest possible period.
2. To encourage and support people with special needs who are qualified to establish projects with economic profitability and feasibility, and to provide the information about the available donations and facilitated loans and how to obtain the same.
3. To provide the information about the labor market, the available vacancies and its prospective.
4. To prepare studies about the occupations and jobs in a manner consistent with the technological developments and the labor market needs.
5. To encourage and orient the private sector to train, qualify and employ people with special needs and to provide the appropriate support within the bounds of the available resources.
6. To propose the necessary procedures to protect people with special needs from all kinds of exploitation at the work.
7. To submit periodic reports to the minister preparing the ground to present the same to the council of ministers to take the appropriate actions in this concern.

Chapter Four: General and Cultural Life and Sports

Article (20)

The State shall take the necessary procedures to make the person with special needs participate in the cultural, sporting and entertainment life as follows:

1. To develop the creative, artistic and intellectual abilities of the person with special needs and to invest the same in order to enrich the community.
2. To provide the literary and cultural materials for the person with special needs in all available forms, including the electronic texts, the language of sign, the Braille, and in audio and multimedia formats etc.
3. To enable the person with special needs to benefit from the media programs and means, theatrical shows and all the cultural activities, and to enhance his participation therein, with the fees exemption rules.
4. To enhance the participation of the person with special needs in the sports activities organized on the national, regional and international levels.
5. To submit periodic reports to the minister preparing the ground to present the same to the council of ministers to take the appropriate actions in this concern.

Article 21

Under a resolution by the council of ministers, a committee named "**The Committee Specialized In Sports, Culture And Recreation For People With Special Needs**" shall be formed . Such a committee shall be chaired by the secretary general of the youth and sports authority with members representing the concerned authorities, The minister shall set forth the committee work system and its meetings.

The committee shall specifically carry out the following functions :

1. To lay down the policies which guarantee the integral development of the person with special needs and providing the opportunity to practice the sporting , cultural and recreational activities which are characterized with fun , safety and consistency with his abilities, and to provide the appropriate conditions to practice them basically like his peers having no special needs.

2. To expand the base of practicing the sporting, cultural and recreational activities among people with special needs and to ensure that the sport of people with special needs whether “ sport for people with mental special needs or people with physical and sensational special needs” is contained within the educational programs of the specialized institutions.
3. To set programs to prepare the human cadres qualified to work with people with special needs in the sporting, cultural and recreational fields.
4. To encourage integrating people with special needs with their healthy peers in the sporting and cultural centers, sporting clubs and camps and to provide the appropriate games and activities for them.
5. To submit periodic reports to the minister preparing the ground to present the same to the council of ministers to take the appropriate actions in this concern.

Chapter Five: The Qualified Environment

Article 22

Each person with special needs has the right to be in a qualified environment, and to reach the place where the others can reach.

Article 23

The concerned authorities shall – in coordination with each other- determine the engineering standards and specifications of the facilities and public utilities for which a resolution shall be issued by the council of ministers based on the proposal of the minister. Such resolution shall determine the necessary regulations to apply these standards and specifications and the exclusions mentioned in respect thereof. All this in relation to fitting the facilities to be used by the person with special needs, his need and the requirements of his safety and avoiding any harm against him.

The provisions of this resolution shall apply to both governmental and private sectors, except those excluded under a certain provision therein.

Article 24

The council of ministers shall issue the regulation and conditions to obtain a governmental house by the UAE national person with special needs, as well as the specifications of the house, the rules to own it and the other rules regulating the governmental house affairs.

Article 25

1. The necessary technical specifications should be observed in the roads, public vehicles, land, air and maritime means of transport in order to be used by the person with special needs.
2. Under a resolution, the council of ministers shall determine the requirements of obtaining a driving license by the person with special needs, and the regulations thereof. A new category concerning the people with special needs shall be added to the driving license categories mentioned in the traffic and driving law. The necessary description shall be mentioned therein as per the type of special needs.

Article 26

Each insurance company shall insure the vehicles owned by the person with special needs whenever he requests the same.

Section Three EXEMPTIONS

Article 27

The vehicle allocated for the use of the person with special needs shall be exempted from all taxes and fees, based on a handicap certificate issued by the ministry. This exemption may not be given for another vehicle unless after the elapse of five years from the previous exemption or the damage of the vehicle. In case of disposing of the vehicle during that period, the prescribed fees and taxes shall paid.

Article 28

The vehicles of the people with special needs shall be exempted from the prescribed Car Parking fees .

Article 29

The means of transport of the associations and centers of people with special needs specified by the council of ministers shall be exempted from the licensing fees.

Article (30)

The council of ministers shall specify the associations and the centers of people with special needs which shall be exempted from the fees imposed on the applications for building permits submitted by them for the construction of buildings for their use, based on a certificate issued by the ministry in this regard.

Article 31

The cases filed by people with special needs related to the implementation of the provisions hereof shall be exempted from the legal fees.

Article 32

All the correspondences of the person with special needs or the associations or centers of people with special needs specified by the council of ministers shall be exempted from the post fees and charges, including the books, newspapers and magazinesetc.

Section Four

PENALTIES

Article 33

Without prejudice to the any strictest punishment provided for under any other law, everyone using the card of the person with special needs without a

legal requirement shall be punished by fining him an amount not less than One Thousand Dirhams and not exceeding Five Thousand Dirhams, without prejudice to the civil responsibility whenever necessary. Such punishment shall be multiplied in case of repetition.

Section Five
FINAL PROVISIONS
Article 34

The ministry shall approve the logos of the people with special needs and circulate them to the authorities supervising the utilities or those which publish booklets and printed materials and prepare programs containing such logos.

Article 35

The person with special needs shall not be required to show any evidence of his special need except for the card issued by the ministry in this regard. The conditions to obtain such card shall be determined under a resolution issued by the minister.

Article 36

The ministry shall license the nongovernmental institutions which take care of educating, training and rehabilitating the people with special needs. No natural or corporate person may establish any of such institutions unless a license is obtained from the ministry.

The conditions, regulations and fees of licensing such institutions in addition to their obligations and the penalties imposed on them in case of violations as well as the other provisions regulating their business shall be determined by a resolution by the council of ministers.

Article 37

The minister shall issue the necessary bylaws and decisions to implement the provisions hereof.

Article 38

All the provisions contradictory to or in conflict with the provisions hereof shall be cancelled.

Article 39

This law shall be published in the official gazette and shall be applicable effective from date of its publication.

Khalifa Bin Zayed Al Nahyan
President of the United Arab Emirates

Issued at the Presidency Palace, Abu Dhabi:
On 19 Rajab 1427 H
Corresponding to 13/8/2006 **G.**

Appendix I

Assistive Technology Act of 2004 of the United States

Public Law 108-364
108th Congress

An Act

To amend the Assistive Technology Act of 1998 to support programs of grants to States to address the assistive technology needs of individuals with disabilities, and for other purposes.

Oct. 25, 2004
[H.R. 4278]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Assistive
Technology Act of
2004.
29 USC 3001
note.

SECTION 1. SHORT TITLE.

This Act may be cited as the “Assistive Technology Act of 2004”.

SEC. 2. AMENDMENT TO THE ASSISTIVE TECHNOLOGY ACT OF 1998.

The Assistive Technology Act of 1998 (29 U.S.C. 3001 et seq.) is amended to read as follows:

“SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

29 USC 3001
note.

“(a) **SHORT TITLE.**—This Act may be cited as the ‘Assistive Technology Act of 1998’.

“(b) **TABLE OF CONTENTS.**—The table of contents of this Act is as follows:

“Sec. 1. Short title; table of contents.

“Sec. 2. Findings and purposes.

“Sec. 3. Definitions.

“Sec. 4. State grants for assistive technology.

“Sec. 5. State grants for protection and advocacy services related to assistive technology.

“Sec. 6. National activities.

“Sec. 7. Administrative provisions.

“Sec. 8. Authorization of appropriations.

“SEC. 2. FINDINGS AND PURPOSES.

29 USC 3001.

“(a) **FINDINGS.**—Congress finds the following:

“(1) Over 54,000,000 individuals in the United States have disabilities, with almost half experiencing severe disabilities that affect their ability to see, hear, communicate, reason, walk, or perform other basic life functions.

“(2) Disability is a natural part of the human experience and in no way diminishes the right of individuals to—

“(A) live independently;

“(B) enjoy self-determination and make choices;

“(C) benefit from an education;

“(D) pursue meaningful careers; and

“(E) enjoy full inclusion and integration in the economic, political, social, cultural, and educational mainstream of society in the United States.

“(3) Technology is one of the primary engines for economic activity, education, and innovation in the Nation, and throughout the world. The commitment of the United States to the development and utilization of technology is one of the main factors underlying the strength and vibrancy of the economy of the United States.

“(4) As technology has come to play an increasingly important role in the lives of all persons in the United States, in the conduct of business, in the functioning of government, in the fostering of communication, in the conduct of commerce, and in the provision of education, its impact upon the lives of individuals with disabilities in the United States has been comparable to its impact upon the remainder of the citizens of the United States. Any development in mainstream technology will have profound implications for individuals with disabilities in the United States.

“(5) Substantial progress has been made in the development of assistive technology devices, including adaptations to existing devices that facilitate activities of daily living that significantly benefit individuals with disabilities of all ages. These devices, including adaptations, increase involvement in, and reduce expenditures associated with, programs and activities that facilitate communication, ensure independent functioning, enable early childhood development, support educational achievement, provide and enhance employment options, and enable full participation in community living for individuals with disabilities. Access to such devices can also reduce expenditures associated with early childhood intervention, education, rehabilitation and training, health care, employment, residential living, independent living, recreation opportunities, and other aspects of daily living.

“(6) Over the last 15 years, the Federal Government has invested in the development of comprehensive statewide programs of technology-related assistance, which have proven effective in assisting individuals with disabilities in accessing assistive technology devices and assistive technology services. This partnership between the Federal Government and the States provided an important service to individuals with disabilities by strengthening the capacity of each State to assist individuals with disabilities of all ages meet their assistive technology needs.

“(7) Despite the success of the Federal-State partnership in providing access to assistive technology devices and assistive technology services, there is a continued need to provide information about the availability of assistive technology, advances in improving accessibility and functionality of assistive technology, and appropriate methods to secure and utilize assistive technology in order to maximize the independence and participation of individuals with disabilities in society.

“(8) The combination of significant recent changes in Federal policy (including changes to section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d), accessibility provisions of the Help America Vote Act of 2002 (42 U.S.C. 15301 et seq.), and the amendments made to the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6301 et seq.) by the No Child Left Behind Act of 2001) and the rapid and unending evolution of technology require a Federal-State investment in

State assistive technology systems to continue to ensure that individuals with disabilities reap the benefits of the technological revolution and participate fully in life in their communities.

“(b) PURPOSES.—The purposes of this Act are—

“(1) to support State efforts to improve the provision of assistive technology to individuals with disabilities through comprehensive statewide programs of technology-related assistance, for individuals with disabilities of all ages, that are designed to—

“(A) increase the availability of, funding for, access to, provision of, and training about assistive technology devices and assistive technology services;

“(B) increase the ability of individuals with disabilities of all ages to secure and maintain possession of assistive technology devices as such individuals make the transition between services offered by educational or human service agencies or between settings of daily living (for example, between home and work);

“(C) increase the capacity of public agencies and private entities to provide and pay for assistive technology devices and assistive technology services on a statewide basis for individuals with disabilities of all ages;

“(D) increase the involvement of individuals with disabilities and, if appropriate, their family members, guardians, advocates, and authorized representatives, in decisions related to the provision of assistive technology devices and assistive technology services;

“(E) increase and promote coordination among State agencies, between State and local agencies, among local agencies, and between State and local agencies and private entities (such as managed care providers), that are involved or are eligible to be involved in carrying out activities under this Act;

“(F) increase the awareness and facilitate the change of laws, regulations, policies, practices, procedures, and organizational structures, that facilitate the availability or provision of assistive technology devices and assistive technology services; and

“(G) increase awareness and knowledge of the benefits of assistive technology devices and assistive technology services among targeted individuals and entities and the general population; and

“(2) to provide States with financial assistance that supports programs designed to maximize the ability of individuals with disabilities and their family members, guardians, advocates, and authorized representatives to obtain assistive technology devices and assistive technology services.

“SEC. 3. DEFINITIONS.

29 USC 3002.

“In this Act:

“(1) ADULT SERVICE PROGRAM.—The term ‘adult service program’ means a program that provides services to, or is otherwise substantially involved with the major life functions of, individuals with disabilities. Such term includes—

“(A) a program providing residential, supportive, or employment services, or employment-related services, to individuals with disabilities;

“(B) a program carried out by a center for independent living, such as a center described in part C of title VII of the Rehabilitation Act of 1973 (29 U.S.C. 796f et seq.);

“(C) a program carried out by an employment support agency connected to adult vocational rehabilitation, such as a one-stop partner, as defined in section 101 of the Workforce Investment Act of 1998 (29 U.S.C. 2801); and

“(D) a program carried out by another organization or vender licensed or registered by the designated State agency, as defined in section 7 of the Rehabilitation Act of 1973 (29 U.S.C. 705).

“(2) AMERICAN INDIAN CONSORTIUM.—The term ‘American Indian consortium’ means an entity that is an American Indian Consortium (as defined in section 102 of Developmental Disabilities Assistance and Bill of Rights Act of 2000 (42 U.S.C. 15002)), and that is established to provide protection and advocacy services for purposes of receiving funding under subtitle C of title I of such Act (42 U.S.C. 15041 et seq.).

“(3) ASSISTIVE TECHNOLOGY.—The term ‘assistive technology’ means technology designed to be utilized in an assistive technology device or assistive technology service.

“(4) ASSISTIVE TECHNOLOGY DEVICE.—The term ‘assistive technology device’ means any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities.

“(5) ASSISTIVE TECHNOLOGY SERVICE.—The term ‘assistive technology service’ means any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device. Such term includes—

“(A) the evaluation of the assistive technology needs of an individual with a disability, including a functional evaluation of the impact of the provision of appropriate assistive technology and appropriate services to the individual in the customary environment of the individual;

“(B) a service consisting of purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices by individuals with disabilities;

“(C) a service consisting of selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, replacing, or donating assistive technology devices;

“(D) coordination and use of necessary therapies, interventions, or services with assistive technology devices, such as therapies, interventions, or services associated with education and rehabilitation plans and programs;

“(E) training or technical assistance for an individual with a disability or, where appropriate, the family members, guardians, advocates, or authorized representatives of such an individual;

“(F) training or technical assistance for professionals (including individuals providing education and rehabilitation services and entities that manufacture or sell assistive technology devices), employers, providers of employment and training services, or other individuals who provide

services to, employ, or are otherwise substantially involved in the major life functions of individuals with disabilities; and

“(G) a service consisting of expanding the availability of access to technology, including electronic and information technology, to individuals with disabilities.

“(6) CAPACITY BUILDING AND ADVOCACY ACTIVITIES.—The term ‘capacity building and advocacy activities’ means efforts that—

“(A) result in laws, regulations, policies, practices, procedures, or organizational structures that promote consumer-responsive programs or entities; and

“(B) facilitate and increase access to, provision of, and funding for, assistive technology devices and assistive technology services, in order to empower individuals with disabilities to achieve greater independence, productivity, and integration and inclusion within the community and the workforce.

“(7) COMPREHENSIVE STATEWIDE PROGRAM OF TECHNOLOGY-RELATED ASSISTANCE.—The term ‘comprehensive statewide program of technology-related assistance’ means a consumer-responsive program of technology-related assistance for individuals with disabilities, implemented by a State, and equally available to all individuals with disabilities residing in the State, regardless of their type of disability, age, income level, or location of residence in the State, or the type of assistive technology device or assistive technology service required.

“(8) CONSUMER-RESPONSIVE.—The term ‘consumer-responsive’—

“(A) with regard to policies, means that the policies are consistent with the principles of—

“(i) respect for individual dignity, personal responsibility, self-determination, and pursuit of meaningful careers, based on informed choice, of individuals with disabilities;

“(ii) respect for the privacy, rights, and equal access (including the use of accessible formats) of such individuals;

“(iii) inclusion, integration, and full participation of such individuals in society;

“(iv) support for the involvement in decisions of a family member, a guardian, an advocate, or an authorized representative, if an individual with a disability requests, desires, or needs such involvement; and

“(v) support for individual and systems advocacy and community involvement; and

“(B) with respect to an entity, program, or activity, means that the entity, program, or activity—

“(i) is easily accessible to, and usable by, individuals with disabilities and, when appropriate, their family members, guardians, advocates, or authorized representatives;

“(ii) responds to the needs of individuals with disabilities in a timely and appropriate manner; and

“(iii) facilitates the full and meaningful participation of individuals with disabilities (including individuals from underrepresented populations and rural populations) and their family members, guardians, advocates, and authorized representatives, in—

“(I) decisions relating to the provision of assistive technology devices and assistive technology services to such individuals; and

“(II) decisions related to the maintenance, improvement, and evaluation of the comprehensive statewide program of technology-related assistance, including decisions that affect capacity building and advocacy activities.

“(9) DISABILITY.—The term ‘disability’ means a condition of an individual that is considered to be a disability or handicap for the purposes of any Federal law other than this Act or for the purposes of the law of the State in which the individual resides.

“(10) INDIVIDUAL WITH A DISABILITY; INDIVIDUALS WITH DISABILITIES.—

“(A) INDIVIDUAL WITH A DISABILITY.—The term ‘individual with a disability’ means any individual of any age, race, or ethnicity—

“(i) who has a disability; and

“(ii) who is or would be enabled by an assistive technology device or an assistive technology service to minimize deterioration in functioning, to maintain a level of functioning, or to achieve a greater level of functioning in any major life activity.

“(B) INDIVIDUALS WITH DISABILITIES.—The term ‘individuals with disabilities’ means more than 1 individual with a disability.

“(11) INSTITUTION OF HIGHER EDUCATION.—The term ‘institution of higher education’ has the meaning given such term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)), and includes a community college receiving funding under the Tribally Controlled College or University Assistance Act of 1978 (25 U.S.C. 1801 et seq.).

“(12) PROTECTION AND ADVOCACY SERVICES.—The term ‘protection and advocacy services’ means services that—

“(A) are described in subtitle C of title I of the Developmental Disabilities Assistance and Bill of Rights Act of 2000 (42 U.S.C. 15041 et seq.), the Protection and Advocacy for Individuals with Mental Illness Act (42 U.S.C. 10801 et seq.), or section 509 of the Rehabilitation Act of 1973 (29 U.S.C. 794e); and

“(B) assist individuals with disabilities with respect to assistive technology devices and assistive technology services.

“(13) SECRETARY.—The term ‘Secretary’ means the Secretary of Education.

“(14) STATE.—

“(A) IN GENERAL.—Except as provided in subparagraph (B), the term ‘State’ means each of the 50 States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the United States Virgin Islands, Guam,

American Samoa, and the Commonwealth of the Northern Mariana Islands.

“(B) OUTLYING AREAS.—In section 4(b):

“(i) OUTLYING AREA.—The term ‘outlying area’ means the United States Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

“(ii) STATE.—The term ‘State’ does not include the United States Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

“(15) STATE ASSISTIVE TECHNOLOGY PROGRAM.—The term ‘State assistive technology program’ means a program authorized under section 4.

“(16) TARGETED INDIVIDUALS AND ENTITIES.—The term ‘targeted individuals and entities’ means—

“(A) individuals with disabilities of all ages and their family members, guardians, advocates, and authorized representatives;

“(B) underrepresented populations, including the aging workforce;

“(C) individuals who work for public or private entities (including centers for independent living described in part C of title VII of the Rehabilitation Act of 1973 (29 U.S.C. 796f et seq.), insurers, or managed care providers) that have contact, or provide services to, with individuals with disabilities;

“(D) educators at all levels (including providers of early intervention services, elementary schools, secondary schools, community colleges, and vocational and other institutions of higher education) and related services personnel;

“(E) technology experts (including web designers and procurement officials);

“(F) health, allied health, and rehabilitation professionals and hospital employees (including discharge planners);

“(G) employers, especially small business employers, and providers of employment and training services;

“(H) entities that manufacture or sell assistive technology devices;

“(I) entities that carry out community programs designed to develop essential community services in rural and urban areas; and

“(J) other appropriate individuals and entities, as determined for a State by the State.

“(17) TECHNOLOGY-RELATED ASSISTANCE.—The term ‘technology-related assistance’ means assistance provided through capacity building and advocacy activities that accomplish the purposes described in section 2(b).

“(18) UNDERREPRESENTED POPULATION.—The term ‘underrepresented population’ means a population that is typically underrepresented in service provision, and includes populations such as persons who have low-incidence disabilities, persons who are minorities, poor persons, persons with limited English proficiency, older individuals, or persons from rural areas.

“(19) UNIVERSAL DESIGN.—The term ‘universal design’ means a concept or philosophy for designing and delivering products and services that are usable by people with the widest possible range of functional capabilities, which include products and services that are directly accessible (without requiring assistive technologies) and products and services that are interoperable with assistive technologies.

29 USC 3003.

“SEC. 4. STATE GRANTS FOR ASSISTIVE TECHNOLOGY.

“(a) GRANTS TO STATES.—The Secretary shall award grants under subsection (b) to States to maintain comprehensive statewide programs of technology-related assistance to support programs that are designed to maximize the ability of individuals with disabilities across the human lifespan and across the wide array of disabilities, and their family members, guardians, advocates, and authorized representatives, to obtain assistive technology, and that are designed to increase access to assistive technology.

“(b) AMOUNT OF FINANCIAL ASSISTANCE.—

“(1) IN GENERAL.—From funds made available to carry out this section, the Secretary shall award a grant to each eligible State and eligible outlying area from an allotment determined in accordance with paragraph (2).

“(2) CALCULATION OF STATE GRANTS.—

“(A) BASE YEAR.—Except as provided in subparagraphs (B) and (C), the Secretary shall allot to each State and outlying area for a fiscal year an amount that is not less than the amount the State or outlying area received under the grants provided under section 101 of this Act (as in effect on the day before the date of enactment of the Assistive Technology Act of 2004) for fiscal year 2004.

“(B) RATABLE REDUCTION.—

“(i) IN GENERAL.—If funds made available to carry out this section for any fiscal year are insufficient to make the allotments required for each State and outlying area under subparagraph (A) for such fiscal year, the Secretary shall ratably reduce the allotments for such fiscal year.

“(ii) ADDITIONAL FUNDS.—If, after the Secretary makes the reductions described in clause (i), additional funds become available to carry out this section for the fiscal year, the Secretary shall ratably increase the allotments, until the Secretary has allotted the entire base year amount.

“(C) HIGHER APPROPRIATION YEARS.—Except as provided in subparagraph (D), for a fiscal year for which the amount of funds made available to carry out this section is greater than the base year amount, the Secretary shall—

“(i) make the allotments described in subparagraph (A);

“(ii) from a portion of the remainder of the funds after the Secretary makes the allotments described in clause (i), the Secretary shall—

“(I) from 50 percent of the portion, allot to each State or outlying area an equal amount; and

“(II) from 50 percent of the portion, allot to each State or outlying area an amount that bears the same relationship to such 50 percent as the

population of the State or outlying area bears to the population of all States and outlying areas, until each State has received an allotment of not less than \$410,000 and each outlying area has received an allotment of \$125,000 under clause (i) and this clause;

“(iii) from the remainder of the funds after the Secretary makes the allotments described in clause (ii), the Secretary shall—

“(I) from 80 percent of the remainder allot to each State an amount that bears the same relationship to such 80 percent as the population of the State bears to the population of all States; and

“(II) from 20 percent of the remainder, allot to each State an equal amount.

“(D) SPECIAL RULE FOR FISCAL YEAR 2005.—Notwithstanding subparagraph (C), if the amount of funds made available to carry out this section for fiscal year 2005 is greater than the base year amount, the Secretary may award grants on a competitive basis for periods of 1 year to States or outlying areas in accordance with the requirements of title III of this Act (as in effect on the day before the date of enactment of the Assistive Technology Act of 2004) to develop, support, expand, or administer an alternative financing program.

“(E) BASE YEAR AMOUNT.—In this paragraph, the term ‘base year amount’ means the total amount received by all States and outlying areas under the grants described in subparagraph (A) for fiscal year 2004.

“(c) LEAD AGENCY, IMPLEMENTING ENTITY, AND ADVISORY COUNCIL.—

“(1) LEAD AGENCY AND IMPLEMENTING ENTITY.—

“(A) LEAD AGENCY.—

“(i) IN GENERAL.—The Governor of a State shall designate a public agency as a lead agency—

“(I) to control and administer the funds made available through the grant awarded to the State under this section; and

“(II) to submit the application described in subsection (d) on behalf of the State, to ensure conformance with Federal and State accounting requirements.

“(ii) DUTIES.—The duties of the lead agency shall include—

“(I) preparing the application described in subsection (d) and carrying out State activities described in that application, including making programmatic and resource allocation decisions necessary to implement the comprehensive statewide program of technology-related assistance;

“(II) coordinating the activities of the comprehensive statewide program of technology-related assistance among public and private entities, including coordinating efforts related to entering into interagency agreements, and maintaining and evaluating the program; and

“(III) coordinating efforts related to the active, timely, and meaningful participation by individuals with disabilities and their family members, guardians, advocates, or authorized representatives, and other appropriate individuals, with respect to activities carried out through the grant.

“(B) IMPLEMENTING ENTITY.—The Governor may designate an agency, office, or other entity to carry out State activities under this section (referred to in this section as the ‘implementing entity’), if such implementing entity is different from the lead agency. The implementing agency shall carry out responsibilities under this Act through a subcontract or another administrative agreement with the lead agency.

“(C) CHANGE IN AGENCY OR ENTITY.—

“(i) IN GENERAL.—On obtaining the approval of the Secretary, the Governor may redesignate the lead agency, or the implementing entity, if the Governor shows to the Secretary good cause why the entity designated as the lead agency, or the implementing entity, respectively, should not serve as that agency or entity, respectively. The Governor shall make the showing in the application described in subsection (d).

“(ii) CONSTRUCTION.—Nothing in this paragraph shall be construed to require the Governor of a State to change the lead agency or implementing entity of the State to an agency other than the lead agency or implementing entity of such State as of the date of enactment of the Assistive Technology Act of 2004.

Establishment.

“(2) ADVISORY COUNCIL.—

“(A) IN GENERAL.—There shall be established an advisory council to provide consumer-responsive, consumer-driven advice to the State for, planning of, implementation of, and evaluation of the activities carried out through the grant, including setting the measurable goals described in subsection (d)(3).

“(B) COMPOSITION AND REPRESENTATION.—

“(i) COMPOSITION.—The advisory council shall be composed of—

“(I) individuals with disabilities that use assistive technology or the family members or guardians of the individuals;

“(II) a representative of the designated State agency, as defined in section 7 of the Rehabilitation Act of 1973 (29 U.S.C. 705) and the State agency for individuals who are blind (within the meaning of section 101 of that Act (29 U.S.C. 721)), if such agency is separate;

“(III) a representative of a State center for independent living described in part C of title VII of the Rehabilitation Act of 1973 (29 U.S.C. 796f et seq.);

“(IV) a representative of the State workforce investment board established under section 111 of the Workforce Investment Act of 1998 (29 U.S.C. 2821);

“(V) a representative of the State educational agency, as defined in section 9101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801); and

“(VI) representatives of other State agencies, public agencies, or private organizations, as determined by the State.

“(ii) MAJORITY.—

“(I) IN GENERAL.—A majority, not less than 51 percent, of the members of the advisory council, shall be members appointed under clause (i)(I).

“(II) REPRESENTATIVES OF AGENCIES.—Members appointed under subclauses (II) through (VI) of clause (i) shall not count toward the majority membership requirement established in subclause (I).

“(iii) REPRESENTATION.—The advisory council shall be geographically representative of the State and reflect the diversity of the State with respect to race, ethnicity, types of disabilities across the age span, and users of types of services that an individual with a disability may receive.

“(C) EXPENSES.—The members of the advisory council shall receive no compensation for their service on the advisory council, but shall be reimbursed for reasonable and necessary expenses actually incurred in the performance of official duties for the advisory council.

“(D) PERIOD.—The members of the State advisory council shall be appointed not later than 120 days after the date of enactment of the Assistive Technology Act of 2004.

Deadline.

“(E) IMPACT ON EXISTING STATUTES, RULES, OR POLICIES.—Nothing in this paragraph shall be construed to affect State statutes, rules, or official policies relating to advisory bodies for State assistive technology programs or require changes to governing bodies of incorporated agencies who carry out State assistive technology programs.

“(d) APPLICATION.—

“(1) IN GENERAL.—Any State that desires to receive a grant under this section shall submit an application to the Secretary, at such time, in such manner, and containing such information as the Secretary may require.

“(2) LEAD AGENCY AND IMPLEMENTING ENTITY.—The application shall contain information identifying and describing the lead agency referred to in subsection (c)(1)(A). The application shall contain information identifying and describing the implementing entity referred to in subsection (c)(1)(B), if the Governor of the State designates such an entity.

“(3) MEASURABLE GOALS.—The application shall include—

“(A) measurable goals, and a timeline for meeting the goals, that the State has set for addressing the assistive technology needs of individuals with disabilities in the State related to—

“(i) education, including goals involving the provision of assistive technology to individuals with disabilities who receive services under the Individuals with Disabilities Education Act (20 U.S.C. 1400 et seq.);

“(ii) employment, including goals involving the State vocational rehabilitation program carried out under title I of the Rehabilitation Act of 1973 (29 U.S.C. 720 et seq.);

“(iii) telecommunication and information technology; and

“(iv) community living; and

“(B) information describing how the State will quantifiably measure the goals to determine whether the goals have been achieved.

“(4) INVOLVEMENT OF PUBLIC AND PRIVATE ENTITIES.—The application shall describe how various public and private entities were involved in the development of the application and will be involved in the implementation of the activities to be carried out through the grant, including—

“(A) in cases determined to be appropriate by the State, a description of the nature and extent of resources that will be committed by public and private collaborators to assist in accomplishing identified goals; and

“(B) a description of the mechanisms established to ensure coordination of activities and collaboration between the implementing entity, if any, and the State.

“(5) IMPLEMENTATION.—The application shall include a description of—

“(A) how the State will implement each of the required activities described in subsection (e), except as provided in subsection (e)(6)(A); and

“(B) how the State will allocate and utilize grant funds to implement the activities, including describing proposed budget allocations and planned procedures for tracking expenditures for activities described in paragraphs (2) and (3) of subsection (e).

“(6) ASSURANCES.—The application shall include assurances that—

“(A) the State will annually collect data related to the required activities implemented by the State under this section in order to prepare the progress reports required under subsection (f);

“(B) funds received through the grant—

“(i) will be expended in accordance with this section; and

“(ii) will be used to supplement, and not supplant, funds available from other sources for technology-related assistance, including the provision of assistive technology devices and assistive technology services;

“(C) the lead agency will control and administer the funds received through the grant;

“(D) the State will adopt such fiscal control and accounting procedures as may be necessary to ensure proper disbursement of and accounting for the funds received through the grant;

“(E) the physical facility of the lead agency and implementing entity, if any, meets the requirements of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) regarding accessibility for individuals with disabilities;

“(F) a public agency or an individual with a disability holds title to any property purchased with funds received under the grant and administers that property;

“(G) activities carried out in the State that are authorized under this Act, and supported by Federal funds received under this Act, will comply with the standards established by the Architectural and Transportation Barriers Compliance Board under section 508 of the Rehabilitation Act of 1973 (20 U.S.C. 794d); and

“(H) the State will—

“(i) prepare reports to the Secretary in such form and containing such information as the Secretary may require to carry out the Secretary’s functions under this Act; and

“(ii) keep such records and allow access to such records as the Secretary may require to ensure the correctness and verification of information provided to the Secretary under this subparagraph.

Reports.
Records.

“(7) STATE SUPPORT.—The application shall include a description of the activities described in paragraphs (2) and (3) of subsection (e) that the State will support with State funds.

“(e) USE OF FUNDS.—

“(1) IN GENERAL.—

“(A) REQUIRED ACTIVITIES.—Except as provided in subparagraph (B) and paragraph (6), any State that receives a grant under this section shall use a portion of the funds made available through the grant to carry out activities described in paragraphs (2) and (3).

“(B) STATE OR NON-FEDERAL FINANCIAL SUPPORT.—A State shall not be required to use a portion of the funds made available through the grant to carry out the category of activities described in subparagraph (A), (B), (C), or (D) of paragraph (2) if, in that State—

“(i) financial support is provided from State or other non-Federal resources or entities for that category of activities; and

“(ii) the amount of the financial support is comparable to, or greater than, the amount of the portion of the funds made available through the grant that the State would have expended for that category of activities, in the absence of this subparagraph.

“(2) STATE-LEVEL ACTIVITIES.—

“(A) STATE FINANCING ACTIVITIES.—The State shall support State financing activities to increase access to, and funding for, assistive technology devices and assistive technology services (which shall not include direct payment for such a device or service for an individual with a disability but may include support and administration of a program to provide such payment), including development of systems to provide and pay for such devices and services, for targeted individuals and entities described in section 3(16)(A), including—

“(i) support for the development of systems for the purchase, lease, or other acquisition of, or payment for, assistive technology devices and assistive technology services; or

“(ii) support for the development of State-financed or privately financed alternative financing systems of subsidies (which may include conducting an initial 1-year feasibility study of, improving, administering, operating, providing capital for, or collaborating with an entity with respect to, such a system) for the provision of assistive technology devices, such as—

“(I) a low-interest loan fund;

“(II) an interest buy-down program;

“(III) a revolving loan fund;

“(IV) a loan guarantee or insurance program;

“(V) a program providing for the purchase, lease, or other acquisition of assistive technology devices or assistive technology services; or

“(VI) another mechanism that is approved by the Secretary.

“(B) DEVICE REUTILIZATION PROGRAMS.—The State shall directly, or in collaboration with public or private entities, carry out assistive technology device reutilization programs that provide for the exchange, repair, recycling, or other reutilization of assistive technology devices, which may include redistribution through device sales, loans, rentals, or donations.

“(C) DEVICE LOAN PROGRAMS.—The State shall directly, or in collaboration with public or private entities, carry out device loan programs that provide short-term loans of assistive technology devices to individuals, employers, public agencies, or others seeking to meet the needs of targeted individuals and entities, including others seeking to comply with the Individuals with Disabilities Education Act (20 U.S.C. 1400 et seq.), the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.), and section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794).

“(D) DEVICE DEMONSTRATIONS.—

“(i) IN GENERAL.—The State shall directly, or in collaboration with public and private entities, such as one-stop partners, as defined in section 101 of the Workforce Investment Act of 1998 (29 U.S.C. 2801), demonstrate a variety of assistive technology devices and assistive technology services (including assisting individuals in making informed choices regarding, and providing experiences with, the devices and services), using personnel who are familiar with such devices and services and their applications.

“(ii) COMPREHENSIVE INFORMATION.—The State shall directly, or through referrals, provide to individuals, to the extent practicable, comprehensive information about State and local assistive technology vendors, providers, and repair services.

“(3) STATE LEADERSHIP ACTIVITIES.—

“(A) IN GENERAL.—A State that receives a grant under this section shall use a portion of not more than 40 percent of the funds made available through the grant to carry out the activities described in subparagraph (B). From that portion, the State shall use at least 5 percent of the portion for activities described in subparagraph (B)(i)(III).

“(B) REQUIRED ACTIVITIES.—

“(i) TRAINING AND TECHNICAL ASSISTANCE.—

“(I) IN GENERAL.—The State shall directly, or provide support to public or private entities with demonstrated expertise in collaborating with public or private agencies that serve individuals with disabilities, to develop and disseminate training materials, conduct training, and provide technical assistance, for individuals from local settings statewide, including representatives of State and local educational agencies, other State and local agencies, early intervention programs, adult service programs, hospitals and other health care facilities, institutions of higher education, and businesses.

“(II) AUTHORIZED ACTIVITIES.—In carrying out activities under subclause (I), the State shall carry out activities that enhance the knowledge, skills, and competencies of individuals from local settings described in subclause (I), which may include—

“(aa) general awareness training on the benefits of assistive technology and the Federal, State, and private funding sources available to assist targeted individuals and entities in acquiring assistive technology;

“(bb) skills-development training in assessing the need for assistive technology devices and assistive technology services;

“(cc) training to ensure the appropriate application and use of assistive technology devices, assistive technology services, and accessible technology for e-government functions;

“(dd) training in the importance of multiple approaches to assessment and implementation necessary to meet the individualized needs of individuals with disabilities; and

“(ee) technical training on integrating assistive technology into the development and implementation of service plans, including any education, health, discharge, Olmstead, employment, or other plan required under Federal or State law.

“(III) TRANSITION ASSISTANCE TO INDIVIDUALS WITH DISABILITIES.—The State shall directly, or provide support to public or private entities to, develop and disseminate training materials, conduct training, facilitate access to assistive technology, and provide technical assistance, to assist—

“(aa) students with disabilities, within the meaning of the Individuals with Disabilities Education Act (20 U.S.C. 1400 et seq.), that receive transition services; and

“(bb) adults who are individuals with disabilities maintaining or transitioning to community living.

“(ii) PUBLIC-AWARENESS ACTIVITIES.—

“(I) IN GENERAL.—The State shall conduct public-awareness activities designed to provide information to targeted individuals and entities relating to the availability, benefits, appropriateness, and costs of assistive technology devices and assistive technology services, including—

“(aa) the development of procedures for providing direct communication between providers of assistive technology and targeted individuals and entities, which may include partnerships with entities in the statewide and local workforce investment systems established under the Workforce Investment Act of 1998 (29 U.S.C. 2801 et seq.), State vocational rehabilitation centers, public and private employers, or elementary and secondary public schools;

“(bb) the development and dissemination, to targeted individuals and entities, of information about State efforts related to assistive technology; and

“(cc) the distribution of materials to appropriate public and private agencies that provide social, medical, educational, employment, and transportation services to individuals with disabilities.

“(II) COLLABORATION.—The State shall collaborate with entities that receive awards under paragraphs (1) and (3) of section 6(b) to carry out public-awareness activities focusing on infants, toddlers, children, transition-age youth, employment-age adults, seniors, and employers.

“(III) STATEWIDE INFORMATION AND REFERRAL SYSTEM.—

“(aa) IN GENERAL.—The State shall directly, or in collaboration with public or private (such as nonprofit) entities, provide for the continuation and enhancement of a statewide information and referral system designed to meet the needs of targeted individuals and entities.

“(bb) CONTENT.—The system shall deliver information on assistive technology devices, assistive technology services (with specific data regarding provider availability within the State), and the availability of resources, including funding through public and private sources, to obtain assistive technology devices and assistive technology services. The system shall also deliver information on the benefits of assistive technology devices and assistive technology services with respect to enhancing the capacity of individuals with disabilities of all ages to perform activities of daily living.

“(iii) COORDINATION AND COLLABORATION.—The State shall coordinate activities described in paragraph

(2) and this paragraph, among public and private entities that are responsible for policies, procedures, or funding for the provision of assistive technology devices and assistive technology services to individuals with disabilities, service providers, and others to improve access to assistive technology devices and assistive technology services for individuals with disabilities of all ages in the State.

“(4) INDIRECT COSTS.—Not more than 10 percent of the funds made available through a grant to a State under this section may be used for indirect costs.

“(5) PROHIBITION.—Funds made available through a grant to a State under this section shall not be used for direct payment for an assistive technology device for an individual with a disability.

“(6) STATE FLEXIBILITY.—

“(A) IN GENERAL.—Notwithstanding paragraph (1)(A) and subject to subparagraph (B), a State may use funds that the State receives under a grant awarded under this section to carry out any 2 or more of the activities described in paragraph (2).

“(B) SPECIAL RULE.—Notwithstanding paragraph (3)(A), any State that exercises its authority under subparagraph (A)—

“(i) shall carry out each of the required activities described in paragraph (3)(B); and

“(ii) shall use not more than 30 percent of the funds made available through the grant to carry out the activities described in paragraph (3)(B).

“(f) ANNUAL PROGRESS REPORTS.—

“(1) DATA COLLECTION.—States shall participate in data collection as required by law, including data collection required for preparation of the reports described in paragraph (2).

“(2) REPORTS.—

“(A) IN GENERAL.—Each State shall prepare and submit to the Secretary an annual progress report on the activities funded under this Act, at such time, and in such manner, as the Secretary may require.

“(B) CONTENTS.—The report shall include data collected pursuant to this section. The report shall document, with respect to activities carried out under this section in the State—

“(i) the type of State financing activities described in subsection (e)(2)(A) used by the State;

“(ii) the amount and type of assistance given to consumers of the State financing activities described in subsection (e)(2)(A) (who shall be classified by type of assistive technology device or assistive technology service financed through the State financing activities, and geographic distribution within the State), including—

“(I) the number of applications for assistance received;

“(II) the number of applications approved and rejected;

“(III) the default rate for the financing activities;

“(IV) the range and average interest rate for the financing activities;

“(V) the range and average income of approved applicants for the financing activities; and

“(VI) the types and dollar amounts of assistive technology financed;

“(iii) the number, type, and length of time of loans of assistive technology devices provided to individuals with disabilities, employers, public agencies, or public accommodations through the device loan program described in subsection (e)(2)(C), and an analysis of the individuals with disabilities who have benefited from the device loan program;

“(iv) the number, type, estimated value, and scope of assistive technology devices exchanged, repaired, recycled, or reutilized (including redistributed through device sales, loans, rentals, or donations) through the device reutilization program described in subsection (e)(2)(B), and an analysis of the individuals with disabilities that have benefited from the device reutilization program;

“(v) the number and type of device demonstrations and referrals provided under subsection (e)(2)(D), and an analysis of individuals with disabilities who have benefited from the demonstrations and referrals;

“(vi)(I) the number and general characteristics of individuals who participated in training under subsection (e)(3)(B)(i) (such as individuals with disabilities, parents, educators, employers, providers of employment services, health care workers, counselors, other service providers, or vendors) and the topics of such training; and

“(II) to the extent practicable, the geographic distribution of individuals who participated in the training;

“(vii) the frequency of provision and nature of technical assistance provided to State and local agencies and other entities;

“(viii) the number of individuals assisted through the public-awareness activities and statewide information and referral system described in subsection (e)(3)(B)(ii);

“(ix) the outcomes of any improvement initiatives carried out by the State as a result of activities funded under this section, including a description of any written policies, practices, and procedures that the State has developed and implemented regarding access to, provision of, and funding for, assistive technology devices, and assistive technology services, in the contexts of education, health care, employment, community living, and information technology and telecommunications, including e-government;

“(x) the source of leveraged funding or other contributed resources, including resources provided through subcontracts or other collaborative resource-sharing agreements, from and with public and private

entities to carry out State activities described in subsection (e)(3)(B)(iii), the number of individuals served with the contributed resources for which information is not reported under clauses (i) through (ix) or clause (xi) or (xii), and other outcomes accomplished as a result of such activities carried out with the contributed resources; and

“(xi) the level of customer satisfaction with the services provided.

“SEC. 5. STATE GRANTS FOR PROTECTION AND ADVOCACY SERVICES 29 USC 3004.
RELATED TO ASSISTIVE TECHNOLOGY.

“(a) GRANTS.—

“(1) IN GENERAL.—The Secretary shall make grants under subsection (b) to protection and advocacy systems in each State for the purpose of enabling such systems to assist in the acquisition, utilization, or maintenance of assistive technology devices or assistive technology services for individuals with disabilities.

“(2) GENERAL AUTHORITIES.—In providing such assistance, protection and advocacy systems shall have the same general authorities as the systems are afforded under subtitle C of title I of the Developmental Disabilities Assistance and Bill of Rights Act of 2000 (42 U.S.C. 15041 et seq.), as determined by the Secretary.

“(b) GRANTS.—

“(1) RESERVATION.—For each fiscal year, the Secretary shall reserve such sums as may be necessary to carry out paragraph (4).

“(2) POPULATION BASIS.—From the funds appropriated under section 8(b) for a fiscal year and remaining after the reservation required by paragraph (1) has been made, the Secretary shall make a grant to a protection and advocacy system within each State in an amount bearing the same ratio to the remaining funds as the population of the State bears to the population of all States.

“(3) MINIMUMS.—Subject to the availability of appropriations, the amount of a grant to a protection and advocacy system under paragraph (2) for a fiscal year shall—

“(A) in the case of a protection and advocacy system located in American Samoa, Guam, the United States Virgin Islands, or the Commonwealth of the Northern Mariana Islands, not be less than \$30,000; and

“(B) in the case of a protection and advocacy system located in a State not described in subparagraph (A), not be less than \$50,000.

“(4) PAYMENT TO THE SYSTEM SERVING THE AMERICAN INDIAN CONSORTIUM.—

“(A) IN GENERAL.—The Secretary shall make grants to the protection and advocacy system serving the American Indian Consortium to provide services in accordance with this section.

“(B) AMOUNT OF GRANTS.—The amount of such grants shall be the same as the amount provided under paragraph (3)(A).

“(c) DIRECT PAYMENT.—Notwithstanding any other provision of law, the Secretary shall pay directly to any protection and advocacy system that complies with this section, the total amount

of the grant made for such system under this section, unless the system provides otherwise for payment of the grant amount.

“(d) CERTAIN STATES.—

“(1) GRANT TO LEAD AGENCY.—Notwithstanding any other provision of this section, with respect to a State that, on November 12, 1998, was described in section 102(f)(1) of the Technology-Related Assistance for Individuals With Disabilities Act of 1988, the Secretary shall pay the amount of the grant described in subsection (a), and made under subsection (b), to the lead agency designated under section 4(c)(1) for the State.

“(2) DISTRIBUTION OF FUNDS.—A lead agency to which a grant amount is paid under paragraph (1) shall determine the manner in which funds made available through the grant will be allocated among the entities that were providing protection and advocacy services in that State on the date described in such paragraph, and shall distribute funds to such entities. In distributing such funds, the lead agency shall not establish any additional eligibility or procedural requirements for an entity in the State that supports protection and advocacy services through a protection and advocacy system. Such an entity shall comply with the same requirements (including reporting and enforcement requirements) as any other entity that receives funding under this section.

“(3) APPLICATION OF PROVISIONS.—Except as provided in this subsection, the provisions of this section shall apply to the grant in the same manner, and to the same extent, as the provisions apply to a grant to a system.

“(e) CARRYOVER.—Any amount paid to an eligible system for a fiscal year under this section that remains unobligated at the end of such fiscal year shall remain available to such system for obligation during the subsequent fiscal year. Program income generated from such amount shall remain available for 2 additional fiscal years after the year in which such amount was paid to an eligible system and may only be used to improve the awareness of individuals with disabilities about the accessibility of assistive technology and assist such individuals in the acquisition, utilization, or maintenance of assistive technology devices or assistive technology services.

“(f) REPORT TO SECRETARY.—An entity that receives a grant under this section shall annually prepare and submit to the Secretary a report that contains such information as the Secretary may require, including documentation of the progress of the entity in—

“(1) conducting consumer-responsive activities, including activities that will lead to increased access, for individuals with disabilities, to funding for assistive technology devices and assistive technology services;

“(2) engaging in informal advocacy to assist in securing assistive technology devices and assistive technology services for individuals with disabilities;

“(3) engaging in formal representation for individuals with disabilities to secure systems change, and in advocacy activities to secure assistive technology devices and assistive technology services for individuals with disabilities;

“(4) developing and implementing strategies to enhance the long-term abilities of individuals with disabilities and their

family members, guardians, advocates, and authorized representatives to advocate the provision of assistive technology devices and assistive technology services to which the individuals with disabilities are entitled under law other than this Act;

“(5) coordinating activities with protection and advocacy services funded through sources other than this Act, and coordinating activities with the capacity building and advocacy activities carried out by the lead agency; and

“(6) effectively allocating funds made available under this section to improve the awareness of individuals with disabilities about the accessibility of assistive technology and assist such individuals in the acquisition, utilization, or maintenance of assistive technology devices or assistive technology services.

“(g) REPORTS AND UPDATES TO STATE AGENCIES.—An entity that receives a grant under this section shall prepare and submit to the lead agency of the State designated under section 4(c)(1) the report described in subsection (f) and quarterly updates concerning the activities described in subsection (f).

“(h) COORDINATION.—On making a grant under this section to an entity in a State, the Secretary shall solicit and consider the opinions of the lead agency of the State with respect to efforts at coordination of activities, collaboration, and promoting outcomes between the lead agency and the entity that receives the grant under this section.

“SEC. 6. NATIONAL ACTIVITIES.

29 USC 3005.

“(a) IN GENERAL.—In order to support activities designed to improve the administration of this Act, the Secretary, under subsection (b)—

“(1) may award, on a competitive basis, grants, contracts, and cooperative agreements to entities to support activities described in paragraphs (1) and (2) of subsection (b); and

“(2) shall award, on a competitive basis, grants, contracts, and cooperative agreements to entities to support activities described in paragraphs (3), (4), and (5) of subsection (b).

“(b) AUTHORIZED ACTIVITIES.—

“(1) NATIONAL PUBLIC-AWARENESS TOOLKIT.—

“(A) NATIONAL PUBLIC-AWARENESS TOOLKIT.—The Secretary may award a 1-time grant, contract, or cooperative agreement to an eligible entity to support a training and technical assistance program that—

“(i) expands public-awareness efforts to reach targeted individuals and entities;

“(ii) contains appropriate accessible multimedia materials to reach targeted individuals and entities, for dissemination to State assistive technology programs; and

“(iii) in coordination with State assistive technology programs, provides meaningful and up-to-date information to targeted individuals and entities about the availability of assistive technology devices and assistive technology services.

“(B) ELIGIBLE ENTITY.—To be eligible to receive the grant, contract, or cooperative agreement, an entity shall develop a partnership that—

“(i) shall consist of—

“(I) a lead agency or implementing entity for a State assistive technology program or an organization or association that represents implementing entities for State assistive technology programs;

“(II) a private or public entity from the media industry;

“(III) a private entity from the assistive technology industry; and

“(IV) a private employer or an organization or association that represents private employers;

“(ii) may include other entities determined by the Secretary to be necessary; and

“(iii) may include other entities determined by the applicant to be appropriate.

“(2) RESEARCH AND DEVELOPMENT.—

“(A) IN GENERAL.—The Secretary may award grants, contracts, or cooperative agreements to eligible entities to carry out research and development of assistive technology that consists of—

“(i) developing standards for reliability and accessibility of assistive technology, and standards for interoperability (including open standards) of assistive technology with information technology, telecommunications products, and other assistive technology; or

“(ii) developing assistive technology that benefits individuals with disabilities or developing technologies or practices that result in the adaptation, maintenance, servicing, or improvement of assistive technology devices.

“(B) ELIGIBLE ENTITIES.—Entities eligible to receive a grant, contract, or cooperative agreement under this paragraph shall include—

“(i) providers of assistive technology services and assistive technology devices;

“(ii) institutions of higher education, including University Centers for Excellence in Developmental Disabilities Education, Research, and Service authorized under subtitle D of title I of the Developmental Disabilities Assistance and Bill of Rights Act of 2000 (42 U.S.C. 15061 et seq.), or such institutions offering rehabilitation engineering programs, computer science programs, or information technology programs;

“(iii) manufacturers of assistive technology devices; and

“(iv) professionals, individuals, organizations, and agencies providing services or employment to individuals with disabilities.

“(C) COLLABORATION.—An entity that receives a grant, contract, or cooperative agreement under this paragraph shall, in developing and implementing the project carried out through the grant, contract, or cooperative agreement coordinate activities with the lead agency for the State assistive technology program (or a national organization that represents such programs) and the State advisory council described in section 4(c)(2) (or a national organization that represents such councils).

“(3) STATE TRAINING AND TECHNICAL ASSISTANCE.—

“(A) TRAINING AND TECHNICAL ASSISTANCE EFFORTS.—
The Secretary shall award a grant, contract, or cooperative agreement to an entity to support a training and technical assistance program that—

Grant.
Contract.

“(i) addresses State-specific information requests concerning assistive technology from entities funded under this Act and public entities not funded under this Act, including—

“(I) requests for information on effective approaches to Federal-State coordination of programs for individuals with disabilities, related to improving funding for or access to assistive technology devices and assistive technology services for individuals with disabilities of all ages;

“(II) requests for state-of-the-art, or model, Federal, State, and local laws, regulations, policies, practices, procedures, and organizational structures, that facilitate, and overcome barriers to, funding for, and access to, assistive technology devices and assistive technology services;

“(III) requests for information on effective approaches to developing, implementing, evaluating, and sustaining activities described in sections 4 and 5 and related to improving funding for or access to assistive technology devices and assistive technology services for individuals with disabilities of all ages, and requests for assistance in developing corrective action plans;

“(IV) requests for examples of policies, practices, procedures, regulations, or judicial decisions that have enhanced or may enhance access to funding for assistive technology devices and assistive technology services for individuals with disabilities;

“(V) requests for information on effective approaches to the development of consumer-controlled systems that increase access to, funding for, and awareness of, assistive technology devices and assistive technology services; and

“(VI) other requests for training and technical assistance from entities funded under this Act and public and private entities not funded under this Act;

“(ii) assists targeted individuals and entities by disseminating information about—

“(I) Federal, State, and local laws, regulations, policies, practices, procedures, and organizational structures, that facilitate, and overcome barriers to, funding for, and access to, assistive technology devices and assistive technology services, to promote fuller independence, productivity, and inclusion in society for individuals with disabilities of all ages; and

“(II) technical assistance activities undertaken under clause (i);

“(iii) provides State-specific, regional, and national training and technical assistance concerning assistive technology to entities funded under this Act, other entities funded under this Act, and public and private entities not funded under this Act, including—

“(I) annually providing a forum for exchanging information concerning, and promoting program and policy improvements in, required activities of the State assistive technology programs;

“(II) facilitating onsite and electronic information sharing using state-of-the-art Internet technologies such as real-time online discussions, multipoint video conferencing, and web-based audio/video broadcasts, on emerging topics that affect State assistive technology programs;

“(III) convening experts from State assistive technology programs to discuss and make recommendations with regard to national emerging issues of importance to individuals with assistive technology needs;

“(IV) sharing best practice and evidence-based practices among State assistive technology programs;

“(V) maintaining an accessible website that includes a link to State assistive technology programs, appropriate Federal departments and agencies, and private associations and developing a national toll-free number that links callers from a State with the State assistive technology program in their State;

“(VI) developing or utilizing existing (as of the date of the award involved) model cooperative volume-purchasing mechanisms designed to reduce the financial costs of purchasing assistive technology for required and discretionary activities identified in section 4, and reducing duplication of activities among State assistive technology programs; and

“(VII) providing access to experts in the areas of banking, microlending, and finance, for entities funded under this Act, through site visits, teleconferences, and other means, to ensure access to information for entities that are carrying out new programs or programs that are not making progress in achieving the objectives of the programs; and

“(iv) includes such other activities as the Secretary may require.

“(B) ELIGIBLE ENTITIES.—To be eligible to receive a grant, contract, or cooperative agreement under this paragraph, an entity shall have (directly or through grant or contract)—

“(i) experience and expertise in administering programs, including developing, implementing, and administering the required and discretionary activities described in sections 4 and 5, and providing technical assistance; and

“(ii) documented experience in and knowledge about banking, finance, and microlending.

“(C) COLLABORATION.—In developing and providing training and technical assistance under this paragraph, including activities identified as priorities, a recipient of a grant, contract, or cooperative agreement under this paragraph shall collaborate with other organizations, in particular—

“(i) organizations representing individuals with disabilities;

“(ii) national organizations representing State assistive technology programs;

“(iii) organizations representing State officials and agencies engaged in the delivery of assistive technology;

“(iv) the data-collection and reporting providers described in paragraph (5); and

“(v) other providers of national programs or programs of national significance funded under this Act.

“(4) NATIONAL INFORMATION INTERNET SYSTEM.—

“(A) IN GENERAL.—The Secretary shall award a grant, contract, or cooperative agreement to an entity to renovate, update, and maintain the National Public Internet Site established under this Act (as in effect on the day before the date of enactment of the Assistive Technology Act of 2004).

Grant.
Contract.

“(B) FEATURES OF INTERNET SITE.—The National Public Internet Site shall contain the following features:

“(i) AVAILABILITY OF INFORMATION AT ANY TIME.—The site shall be designed so that any member of the public may obtain information posted on the site at any time.

“(ii) INNOVATIVE AUTOMATED INTELLIGENT AGENT.—The site shall be constructed with an innovative automated intelligent agent that is a diagnostic tool for assisting users in problem definition and the selection of appropriate assistive technology devices and assistive technology services resources.

“(iii) RESOURCES.—

“(I) LIBRARY ON ASSISTIVE TECHNOLOGY.—The site shall include access to a comprehensive working library on assistive technology for all environments, including home, workplace, transportation, and other environments.

“(II) INFORMATION ON ACCOMMODATING INDIVIDUALS WITH DISABILITIES.—The site shall include access to evidence-based research and best practices concerning how assistive technology can be used to accommodate individuals with disabilities in the areas of education, employment, health care, community living, and telecommunications and information technology.

“(III) RESOURCES FOR A NUMBER OF DISABILITIES.—The site shall include resources relating to the largest possible number of disabilities, including resources relating to low-level reading skills.

“(iv) LINKS TO PRIVATE-SECTOR RESOURCES AND INFORMATION.—To the extent feasible, the site shall be linked to relevant private-sector resources and information, under agreements developed between the recipient of the grant, contract, or cooperative agreement and cooperating private-sector entities.

“(v) LINKS TO PUBLIC-SECTOR RESOURCES AND INFORMATION.—To the extent feasible, the site shall be linked to relevant public-sector resources and information, such as the Internet sites of the Office of Special Education and Rehabilitation Services of the Department of Education, the Office of Disability Employment Policy of the Department of Labor, the Small Business Administration, the Architectural and Transportation Barriers Compliance Board, the Technology Administration of the Department of Commerce, the Jobs Accommodation Network funded by the Office of Disability Employment Policy of the Department of Labor, and other relevant sites.

“(vi) MINIMUM LIBRARY COMPONENTS.—At a minimum, the site shall maintain updated information on—

“(I) State assistive technology program demonstration sites where individuals may try out assistive technology devices;

“(II) State assistive technology program device loan program sites where individuals may borrow assistive technology devices;

“(III) State assistive technology program device reutilization program sites;

“(IV) alternative financing programs or State financing systems operated through, or independently of, State assistive technology programs, and other sources of funding for assistive technology devices; and

“(V) various programs, including programs with tax credits, available to employers for hiring or accommodating employees who are individuals with disabilities.

“(C) ELIGIBLE ENTITY.—To be eligible to receive a grant, contract, or cooperative agreement under this paragraph, an entity shall be a nonprofit organization, for-profit organization, or institution of higher education, that—

“(i) emphasizes research and engineering;

“(ii) has a multidisciplinary research center; and

“(iii) has demonstrated expertise in—

“(I) working with assistive technology and intelligent agent interactive information dissemination systems;

“(II) managing libraries of assistive technology and disability-related resources;

“(III) delivering to individuals with disabilities education, information, and referral services, including technology-based curriculum-development services for adults with low-level reading skills;

“(IV) developing cooperative partnerships with the private sector, particularly with private-sector computer software, hardware, and Internet services entities; and

“(V) developing and designing advanced Internet sites.

“(5) DATA-COLLECTION AND REPORTING ASSISTANCE.—

“(A) IN GENERAL.—The Secretary shall award grants, contracts, and cooperative agreements to entities to assist the entities in carrying out State assistive technology programs in developing and implementing effective data-collection and reporting systems that—

Grants.
Contracts.

“(i) focus on quantitative and qualitative data elements;

“(ii) measure the outcomes of the required activities described in section 4 that are implemented by the States and the progress of the States toward achieving the measurable goals described in section 4(d)(3);

“(iii) provide States with the necessary information required under this Act or by the Secretary for reports described in section 4(f)(2); and

“(iv) help measure the accrued benefits of the activities to individuals who need assistive technology.

“(B) ELIGIBLE ENTITIES.—To be eligible to receive a grant, contract, or cooperative agreement under this paragraph, an entity shall have personnel with—

“(i) documented experience and expertise in administering State assistive technology programs;

“(ii) experience in collecting and analyzing data associated with implementing required and discretionary activities;

“(iii) expertise necessary to identify additional data elements needed to provide comprehensive reporting of State activities and outcomes; and

“(iv) experience in utilizing data to provide annual reports to State policymakers.

“(c) APPLICATION.—To be eligible to receive a grant, contract, or cooperative agreement under this section, an entity shall submit an application to the Secretary at such time, in such manner, and containing such information as the Secretary may require.

“(d) INPUT.—With respect to the activities described in subsection (b) to be funded under this section, including the national and regionally based training and technical assistance efforts carried out through the activities, in designing the activities the Secretary shall consider, and in providing the activities providers shall include, input of the directors of comprehensive statewide programs of technology-related assistance, directors of alternative financing programs, and other individuals the Secretary determines to be appropriate, especially—

“(1) individuals with disabilities who use assistive technology and understand the barriers to the acquisition of such technology and assistive technology services;

“(2) family members, guardians, advocates, and authorized representatives of such individuals;

“(3) individuals employed by protection and advocacy systems funded under section 5;

- “(4) relevant employees from Federal departments and agencies, other than the Department of Education;
- “(5) representatives of businesses; and
- “(6) vendors and public and private researchers and developers.

29 USC 3006.

“SEC. 7. ADMINISTRATIVE PROVISIONS.**“(a) GENERAL ADMINISTRATION.—**

“(1) IN GENERAL.—Notwithstanding any other provision of law, the Assistant Secretary for Special Education and Rehabilitative Services of the Department of Education, acting through the Rehabilitation Services Administration, shall be responsible for the administration of this Act.

“(2) COLLABORATION.—The Assistant Secretary for Special Education and Rehabilitative Services shall consult with the Office of Special Education Programs, the Rehabilitation Services Administration, and the National Institute on Disability and Rehabilitation Research in the Office of Special Education and Rehabilitative Services, and appropriate Federal entities in the administration of this Act.

“(3) ADMINISTRATION.—In administering this Act, the Rehabilitation Services Administration shall ensure that programs funded under this Act will address the needs of individuals with disabilities of all ages, whether the individuals will use the assistive technology to obtain or maintain employment, to obtain education, or for other reasons.

“(4) ORDERLY TRANSITION.—

“(A) IN GENERAL.—The Secretary shall take such steps as the Secretary determines to be appropriate to provide for the orderly transition to, and implementation of, programs authorized by this Act, from programs authorized by the Assistive Technology Act of 1998, as in effect on the day before the date of enactment of the Assistive Technology Act of 2004.

Termination
date.

“(B) CESSATION OF EFFECTIVENESS.—Subparagraph (A) ceases to be effective on the date that is 6 months after the date of enactment of the Assistive Technology Act of 2004.

“(b) REVIEW OF PARTICIPATING ENTITIES.—

“(1) IN GENERAL.—The Secretary shall assess the extent to which entities that receive grants under this Act are complying with the applicable requirements of this Act and achieving measurable goals that are consistent with the requirements of the grant programs under which the entities received the grants.

“(2) PROVISION OF INFORMATION.—To assist the Secretary in carrying out the responsibilities of the Secretary under this section, the Secretary may require States to provide relevant information, including the information required under subsection (d).

“(c) CORRECTIVE ACTION AND SANCTIONS.—

“(1) CORRECTIVE ACTION.—If the Secretary determines that an entity that receives a grant under this Act fails to substantially comply with the applicable requirements of this Act, or to make substantial progress toward achieving the measurable goals described in subsection (b)(1) with respect to the grant program, the Secretary shall assist the entity, through

technical assistance funded under section 6 or other means, within 90 days after such determination, to develop a corrective action plan.

“(2) SANCTIONS.—If the entity fails to develop and comply with a corrective action plan described in paragraph (1) during a fiscal year, the entity shall be subject to 1 of the following corrective actions selected by the Secretary:

“(A) Partial or complete termination of funding under the grant program, until the entity develops and complies with such a plan.

“(B) Ineligibility to participate in the grant program in the following year.

“(C) Reduction in the amount of funding that may be used for indirect costs under section 4 for the following year.

“(D) Required redesignation of the lead agency designated under section 4(c)(1) or an entity responsible for administering the grant program.

“(3) APPEALS PROCEDURES.—The Secretary shall establish appeals procedures for entities that are determined to be in noncompliance with the applicable requirements of this Act, or have not made substantial progress toward achieving the measurable goals described in subsection (b)(1).

“(4) SECRETARIAL ACTION.—As part of the annual report required under subsection (d), the Secretary shall describe each such action taken under paragraph (1) or (2) and the outcomes of each such action.

“(5) PUBLIC NOTIFICATION.—The Secretary shall notify the public, by posting on the Internet website of the Department of Education, of each action taken by the Secretary under paragraph (1) or (2). As a part of such notification, the Secretary shall describe each such action taken under paragraph (1) or (2) and the outcomes of each such action.

“(d) ANNUAL REPORT TO CONGRESS.—

“(1) IN GENERAL.—Not later than December 31 of each year, the Secretary shall prepare, and submit to the President and to the Committee on Education and the Workforce of the House of Representatives and the Committee on Health, Education, Labor, and Pensions of the Senate, a report on the activities funded under this Act to improve the access of individuals with disabilities to assistive technology devices and assistive technology services.

“(2) CONTENTS.—Such report shall include—

“(A) a compilation and summary of the information provided by the States in annual progress reports submitted under section 4(f); and

“(B) a summary of the State applications described in section 4(d) and an analysis of the progress of the States in meeting the measurable goals established in State applications under section 4(d)(3).

“(e) CONSTRUCTION.—Nothing in this section shall be construed to affect the enforcement authority of the Secretary, another Federal officer, or a court under part D of the General Education Provisions Act (20 U.S.C. 1234 et seq.) or other applicable law.

“(f) EFFECT ON OTHER ASSISTANCE.—This Act may not be construed as authorizing a Federal or State agency to reduce medical

- or other assistance available, or to alter eligibility for a benefit or service, under any other Federal law.
- Applicability. “(g) RULE.—The Assistive Technology Act of 1998 (as in effect on the day before the date of enactment of the Assistive Technology Act of 2004) shall apply to funds appropriated under the Assistive Technology Act of 1998 for fiscal year 2004.
- 29 USC 3007. **“SEC. 8. AUTHORIZATION OF APPROPRIATIONS.**
- “(a) STATE GRANTS FOR ASSISTIVE TECHNOLOGY AND NATIONAL ACTIVITIES.—
- “(1) IN GENERAL.—There are authorized to be appropriated to carry out sections 4 and 6 such sums as may be necessary for each of fiscal years 2005 through 2010.
- “(2) RESERVATION.—
- “(A) DEFINITION.—In this paragraph, the term ‘higher appropriation year’ means a fiscal year for which the amount appropriated under paragraph (1) and made available to carry out section 4 is at least \$665,000 greater than the amount that—
- “(i) was appropriated under section 105 of this Act (as in effect on October 1, 2003) for fiscal year 2004; and
- “(ii) was not reserved for grants under section 102 or 104 of this Act (as in effect on such date) for fiscal year 2004.
- “(B) AMOUNT RESERVED FOR NATIONAL ACTIVITIES.—Of the amount appropriated under paragraph (1) for a fiscal year—
- “(i) not more than \$1,235,000 may be reserved to carry out section 6, except as provided in clause (ii); and
- “(ii) for a higher appropriation year—
- “(I) not more than \$1,900,000 may be reserved to carry out section 6; and
- “(II) of the amount so reserved, the portion exceeding \$1,235,000 shall be used to carry out paragraphs (1) and (2) of section 6(b).
- “(b) STATE GRANTS FOR PROTECTION AND ADVOCACY SERVICES RELATED TO ASSISTIVE TECHNOLOGY.—There are authorized to be appropriated to carry out section 5 \$4,419,000 for fiscal year 2005 and such sums as may be necessary for each of fiscal years 2006 through 2010.”.
- SEC. 3. CONFORMING AMENDMENTS.**
- (a) DEVELOPMENTAL DISABILITIES ASSISTANCE AND BILL OF RIGHTS ACT OF 2000.—The Developmental Disabilities Assistance and Bill of Rights Act of 2000 (42 U.S.C. 15001 et seq.) is amended—
- 42 USC 15024. (1) in section 124(c)(3)(B), by striking “section 101 or 102 of the Assistive Technology Act of 1998 (29 U.S.C. 3011, 3012)” and inserting “section 4 or 5 of the Assistive Technology Act of 1998”;
- 42 USC 15025. (2) in section 125(c)(5)(G)(i), by striking “section 101 or 102 of the Assistive Technology Act of 1998 (29 U.S.C. 3011, 3012)” and inserting “section 4 or 5 of the Assistive Technology Act of 1998”;
- 42 USC 15043. (3) in section 143(a)(2)(D)(ii), by striking “section 101 or 102 of the Assistive Technology Act of 1998 (29 U.S.C. 3011,

3012)” and inserting “section 4 or 5 of the Assistive Technology Act of 1998”; and

(4) in section 154(a)(3)(E)(ii)(VI), by striking “section 101 or 102 of the Assistive Technology Act of 1998 (29 U.S.C. 3011, 3012)” and inserting “section 4 or 5 of the Assistive Technology Act of 1998”. 42 USC 15064.

(b) REHABILITATION ACT OF 1973.—The Rehabilitation Act of 1973 (29 U.S.C. 701 et seq.) is amended—

(1) in section 203, by striking subsection (e) and inserting the following: 29 USC 763.

“(e) In this section—

“(1) the terms ‘assistive technology’ and ‘universal design’ have the meanings given the terms in section 3 of the Assistive Technology Act of 1998; and

“(2) the term ‘targeted individuals’ has the meaning given the term ‘targeted individuals and entities’ in section 3 of the Assistive Technology Act of 1998.”;

(2) in section 401(c)(2), by striking “targeted individuals” and inserting “targeted individuals and entities”; and 29 USC 781.

(3) in section 502(d), by striking “targeted individuals” and inserting “targeted individuals and entities”. 29 USC 792.

Approved October 25, 2004.

LEGISLATIVE HISTORY—H.R. 4278:

HOUSE REPORTS: No. 108–514 (Comm. on Education and the Workforce).
CONGRESSIONAL RECORD, Vol. 150 (2004):

June 14, considered and passed House.

Sept. 30, considered and passed Senate, amended.

Oct. 8, House concurred in Senate amendment.



Appendix J

BUiD Ethics Form

Research and Grant Office

Research Ethics Form Research Candidate Self-Assessment

Application for Approval of Research Activity involving Human Participants, Human Data, or Human Material

This application form is to be used by researchers seeking approval from the Research Ethics Committee. All research associated with the British University in Dubai must not begin until ethical approval have been obtained.

Section I is a general research identification table.

Section II is the details of the ethical matters your research might involve and the necessary steps you are planning to take to address them.

Section III is an ethics checklist that will help you identify your research risk level. If you answer 'Yes' to at least any one of the high risk statements, then your research is High Risk. If you answer 'Yes' to at least any one of the medium risk statements, and 'No' to all high risk statements, then your research is Medium Risk. If you answer 'No' to all high risk and medium risk statements, then your research is Low Risk.

If you have documents related to the ethical considerations of the research such as, for example: a consent letter, evidence of external approval, questionnaire samples or interview questions, you can enclose them with this form before submission.

I. Research Identification

Research Candidate Name	Abdulla Mohammed Salem Alsoori Alzaabi
Faculty/Programme	Faculty of Education / Information and Communication Technology
Research Candidate Contact Number	0505414148
Research Candidate Email	20184458@student.buid.ac.ae
Research Type	<input type="checkbox"/> Research Project <input checked="" type="checkbox"/> Doctoral/Masters Research <input type="checkbox"/> Module Assignment
Research Title	Assess the Technology Effects on Academic Performance for Students with Disabilities: an Investigation study at Higher Education Institutions in the UAE
Submission Date	15 November 2020
Submitted to (Name)	<input type="checkbox"/> Faculty Nominated Member (Research Projects): <input type="checkbox"/> Director of Studies (Doctoral Research): <input checked="" type="checkbox"/> Dissertation Supervisor (Masters Research): Dr. Tendai Charles <input type="checkbox"/> Module Coordinator (Module Assignment):

II. Research Ethics Details

Background and rationale for study (This should be sufficient to justify the proposed research). Aims and objectives of the research (or the research question/s) and Potential benefits of proposed research: Limit to 500 words
<p>The purpose of this study is to evaluate the current provisions of Assistive Technology (AT) in order to support and develop the academic performance of students with disabilities (SWDs) in the higher education institutions in the UAE. The study investigates existing system and policy in the higher education sector of utilizing AT to improve quality of teaching and learning for SWDs in the UAE, that help them acquiring sufficient resources of learning materials, tools, and devices, which facilitate their ability to access learning objectives efficiently with comprehensive content of the curriculum to enhance SWDs interact with class activities successfully. This study discusses how this technology can provide potential benefits in their comfortable pace.</p> <p>Research Questions:</p> <p>Question 1: How does Assistive Technology assist Students with Disabilities at higher education institutions in terms of their academic performance?</p> <p>Question 2: What are the challenges of applying Assistive Technology for Students with Disabilities at higher education institutions?</p> <p>Question 3: How does the provision of Assistive Technology center in each campus improve Students with Disabilities academic performance?</p>
Main Ethical Consideration(s) of the Research (The ethical matters your research may involve)
<p>The researcher expects potential ethical issues during collecting the data, such as participants' privacy and misunderstand the nature of the research objectives.</p> <p>Consequently, the researcher of this study will send the consent letter that received from BUID, participant consent form and questionnaire, as well as the interview questions to the selected site administration to obtain permission to conduct the research. Then the researcher will start to collect the data after gaining the approval from Institutional Review Boards (IRB) at selected higher education institutions.</p> <p>Before collecting any data, the researcher will be sending the consent form to the participants in order to introduce himself and provide the main purpose explanation of the study. Moreover, the participant will be given a right of participation withdrawal at any time and protect their privacy by emphasizing confidentiality and anonymity of the participant. However, the questionnaire includes a brief introduction of the study aims and confirmations of participant confidentiality.</p>
Methods of data collection: Please outline in detail how data will be collected and attach a copy of any questionnaires, interview schedules or observation guidelines to be used. Limit = 400 words.
<p>The study would use mixed methods: the qualitative and the quantitative research methods to investigate the current AT provisions offered to SWDs in the UAE higher education institutions. Thus, received data from questionnaires would be analyzed quantitatively, whereas the collected data from (interview and documents) would be analyzed qualitatively. Moreover, The questionnaire data will collect from teachers and students with disabilities at selected higher education institutions while the interview will conduct with specialist staff responsible for students with disabilities in the higher education institution.</p>
Recruitment of participants: Please outline the number and type (it may be considered vulnerable) of participants involved; give details of how potential participants will be identified and invited to take part in the study, and how informed consent will be obtained. Limit = 300 words
<p>To start collecting data, the researcher need to obtain permissions from each related sites. The participants will select from Higher Education Institutions according to the convenience of SWDs in each campus and their coordinators. As well as selected participants from the universities specialist staff. Moreover, before start questionnaire with SWDs, interviewing with their coordinators and specialist staff, the researcher would inform each site, then the collected information would be provided with the study in the form of a table for each, and this information consists of the number of participants, their age, their gender, disabilities type and interview details (date, time and location). The researcher will collect required data from the selected participants through using different methods, and that include interviews and questionnaires. Besides, the participation in the study will be considered as voluntary work. Hence, participants can withdraw from the study at any time.</p> <p><i>Please attach a copy of your information sheet(s), draft materials such as interview questions etc. and consent form as well as indication of planned time of issue/use. If you are not using a consent form, please explain why.</i></p> <p>✓ Attached</p>

<p>Potential adverse effects on participants and steps to deal with them:</p> <p>Please outline if you anticipate any potential harm or negative consequences including psychological stress, anxiety or upset which may be induced by the study and the steps to be taken to address them.</p> <p>There is none issues that will harm related participants.</p>
<p>Steps to be taken to ensure confidentiality of data:</p> <p>Please outline steps if you are required to ensure confidentiality, privacy and anonymity of data during collection, storage and publication. Please specifically identify any confidential or personal information, and /or any other party's protected intellectual property which you need to use and safeguard.</p> <p>All the provided information given by each participant will be confidential, and it will not be shared with anyone. Lastly, the researcher will keep all the collected data safely in one hard drive, this drive will only be going to access by the study researcher, and after gathering all the collected data, the researcher must destroy everything at the end.</p>
<p>Steps to be taken to ensure financial and commercial propriety:</p> <p>Please specifically identify if any external funding or significant third-party financial involvement with the research.</p> <p>There is no financial and commercial propriety issues.</p>
<p>Other plans to address a particular ethical matter not mentioned:</p> <p>There is no other plans.</p>

III. Research Ethics Checklist

If you answer 'Yes' to at least any one of the high risk statements, then your research is High Risk. If you answer 'Yes' to at least any one of the medium risk statements, and 'No' to all high risk statements, then your research is Medium Risk. If you answer 'No' to all high risk and medium risk statements, then your research is Low Risk.

High Risk	
Will consent possibly be coerced out of participants by those whom would likely benefit from the research?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will it be necessary for participants to take part in the study without their knowledge and consent at the time?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will the study involve some form of invasion of privacy?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Is discomfort or harmful impact to participants likely to result from the study?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Is there a possibility that the safety of the researcher may be in question?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will the research require the researcher to be deceptive or dishonest to the participants?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will the research have negative intrusive physical or psychological effects on the participants?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will the names of the participants or the institution appear in the research?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Medium Risk	
Will the research involve governmental institutions or participants such as, for example, the army or the judiciary?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will the study involve discussion of sensitive or potentially sensitive topics and issues?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Does the research involve potentially vulnerable participants (for e.g. children, prisoners, or people with disabilities)?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Does the research involve participants that are unable to give consent?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will the research involve administrative or secure data that requires permission from the appropriate authorities before use?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Will research involve the sharing of data or confidential information beyond the initial consent given?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Risk Level Identified	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High

Declaration by the Researcher:

Having read the University's Research Policy I declare that the information contained herein, is to the best of my knowledge and belief, accurate.

I am satisfied that I have attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my obligations as researcher and the rights of participants. I am satisfied that all researchers (including myself) working on the project have the appropriate qualifications, experience and facilities to conduct the research set out in the attached document and that I, as the lead researcher take full responsibility for the ethical conduct of the research in accordance with subject-specific and University Ethical Guidelines (Policies and Procedures Manual), as well as any other condition laid down by the BUd Ethics Committee. I am fully aware of the timelines and content for participant's information and consent.

Print name: Abdulla Mohammed Salem Alsoori Alzaabi

Signature:  Date: 29/3/2020

FOR OFFICE USE ONLY
LOW RISK RESEARCH

Staff	
Chair of Ethics Committee	
Name:	Approved
Date:	Disapproved
Signature:	

Students	
Dean of Faculty	
Name:	X Approved
Date:	Disapproved
Signature:	

Authorisation for conducting research (only if approval is obtained):

The Committee has confirmed that this project fits within the University's Policies for Research and I authorise the low risk research proposal on behalf of BUD's Research Ethics Committee.

Print name: _____

Signature: _____ Date: _____
(Chair of the Research Ethics Committee)

Appendix K

Data Collection Consent Letter

16th June 2020

RE: Data Collection Consent Letter

To Whom It May Concern,

Abdulla Alzaabi is a postgraduate student at the British University in Dubai, studying on our Masters in Education degree course. He is currently at the final phase of the course, working on his dissertation research project. For this assignment, students are expected to collect data from a real-world context. I would like to ask permission for this student to collect data from your institution.

All of the data collected will only be used for the completion of his dissertation, and will not be used for any research publication. Furthermore, the data will be anonymised; therefore, the name of your institute will not be stated anywhere, nor will the names of teachers or students who participate. Additionally, teachers and students who participate have the right to withdraw from the study at any time. This entire process is simply a learning experience for our students.

If these terms are acceptable to you, please permit Abdulla to proceed with his research.



Dr. Tendai Charles
Assistant Professor

Dr. Tendai Charles, Faculty of Education, British University in Dubai, Dubai International Academic City,
Block 11, Dubai, PO Box 345015, United Arab Emirates | +97142791443 | tendai.charles@buid.ac.ae

Appendix L

An E-mail of the IRBs Clearance from a Selected Site

FW: Survey for Graduate Student in Dubai Inbox x



Ma. Anna Carolina Opinaldo Ortiz <anna.ortiz@aurak.ac.ae>

Jul 12, 2020, 9:12 AM



to me, Ali ▾

Dear Mr. Abdulla,

Good day.

On behalf of the Institutional Review Board (IRB) at the American University of Ras Al Khaimah and the Chair Dr. Ali Maalaoui, please be informed that the IRB approved the survey entitled 'Assistive Technology Effect on the Academic Performance of Students with Disabilities: An Investigation Study at Higher Education Institutions in the UAE'.

Kind regards,



Anna Carolina Ortiz
Coordinator – VP OEFM
Division of Operational Excellence & Financial Management

American University of Ras Al Khaimah

Dir: +971 7 2468901

Fax: +971 7 2210300

Email: anna.ortiz@aurak.ac.ae

Web: www.aurak.ac.ae

P.O.Box: 10021, Ras Al Khaimah, U.A.E.



Appendix M

Consent Form



Participant Consent Form

The study's details are outlined below:

Research title: Assistive Technology Effect on the Academic Performance of Students with Disabilities: An Investigation Study at Higher Education Institutions in the UAE.

Researcher Name: Abdulla Mohammed Alsoori Alzaabi

Purpose of the study: Evaluate the current provisions of Assistive Technology (AT) in order to support and develop the academic performance of Students with Disabilities (SWDs) in the higher education institutions in the UAE.

Methods: The researcher will use mixed methods approach (Qualitative and Quantitative) and collect data through interviews and questionnaires. Participation is voluntary and the participant can withdraw from the study at any time. As well as, all information provided by participant for this study will be treated confidentially and original audio recordings will be destroyed, while participant identity will remain anonymous.

I confirm that I have read and understood the information sheet dated [... /... /...] for the above study

Signature of participant:

Signature of researcher: 

Date:

Appendix N

Data Collected from SWDs Questionnaire

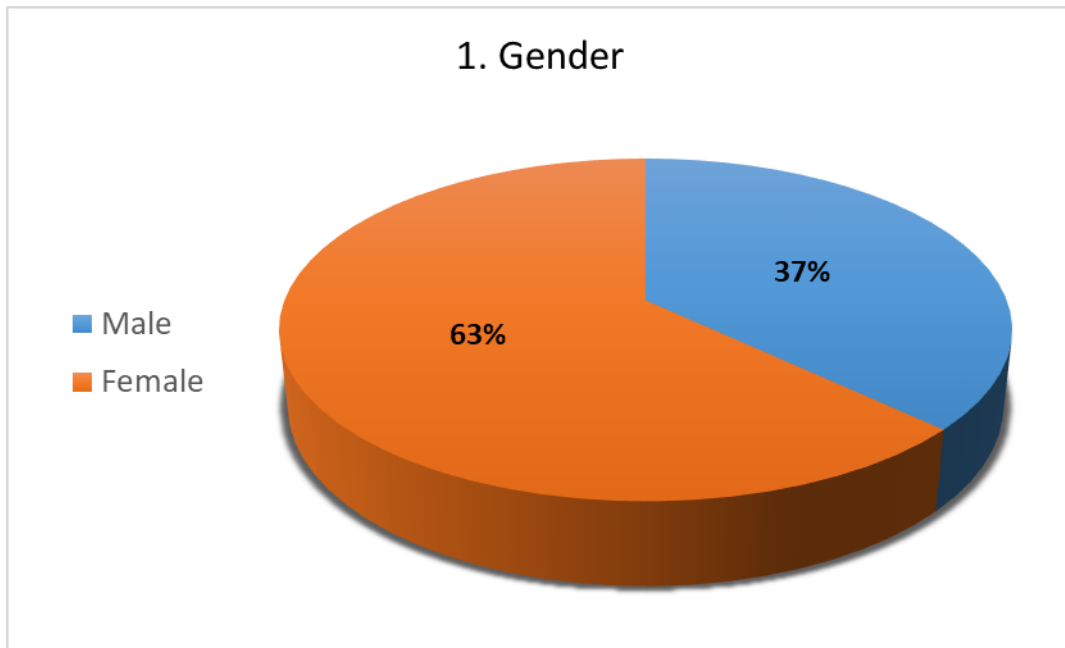


Figure 1: Participants Gender

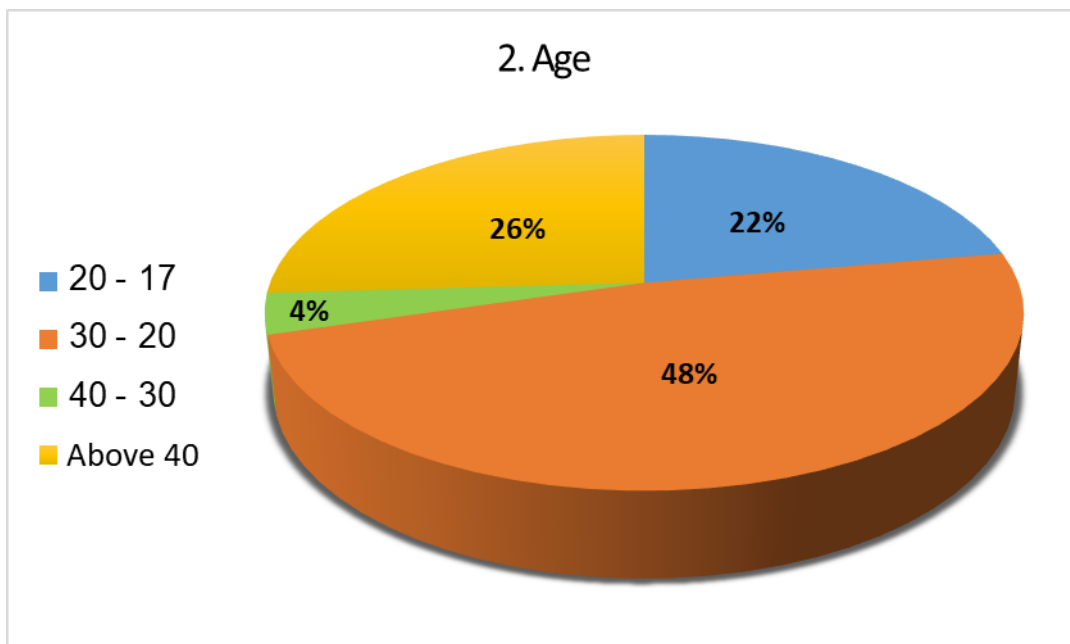


Figure 2: Participants Age

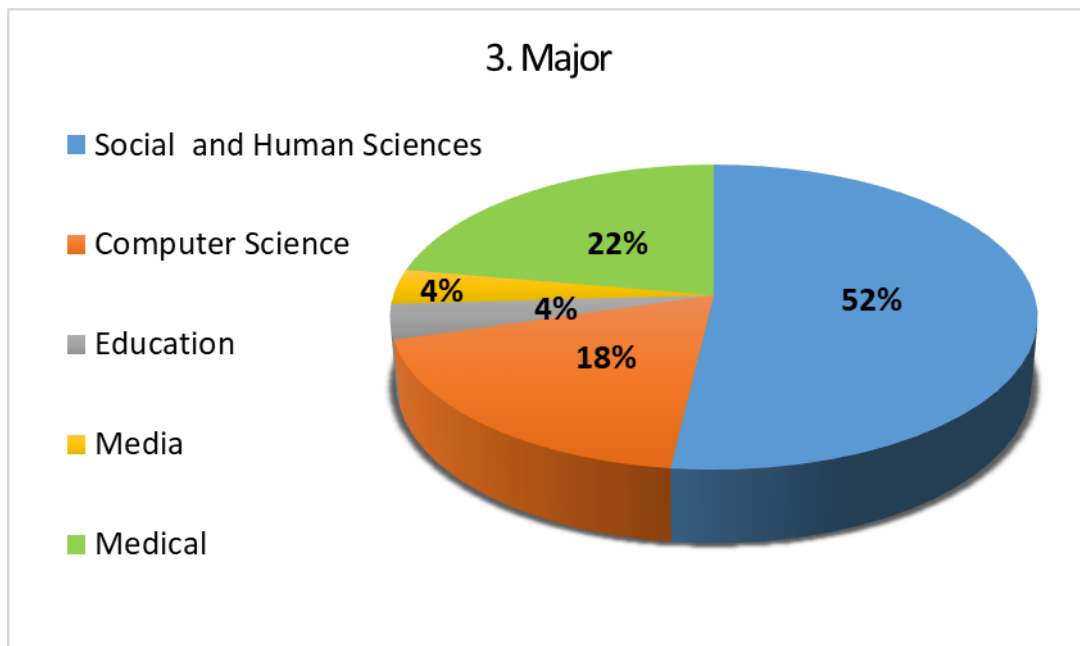


Figure 3: Participants Major's

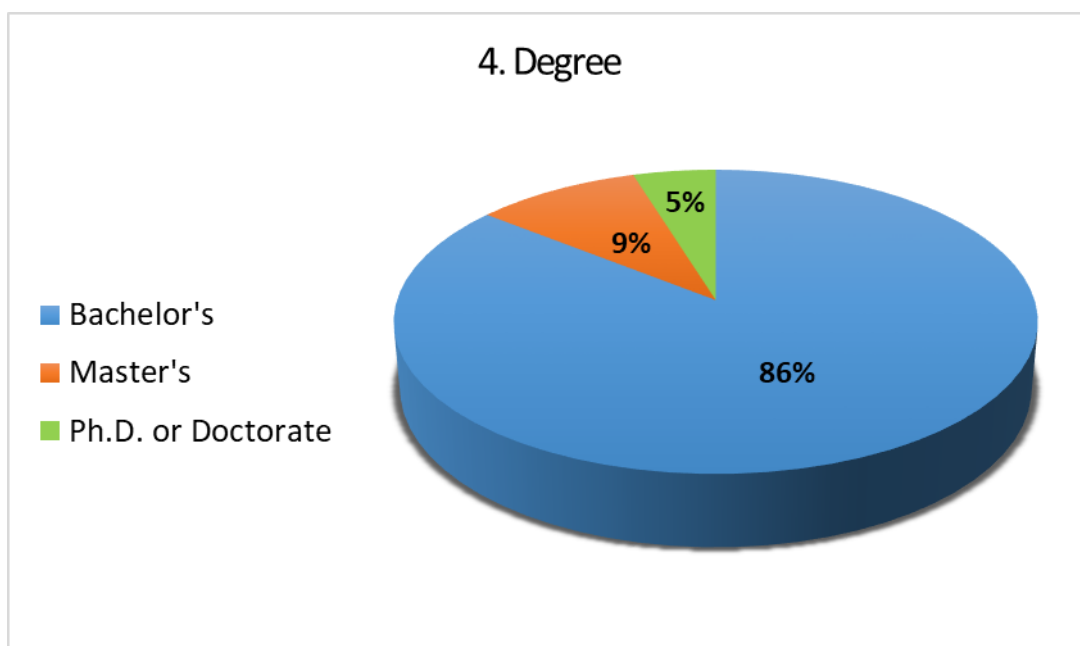


Figure 4: Participants Degree

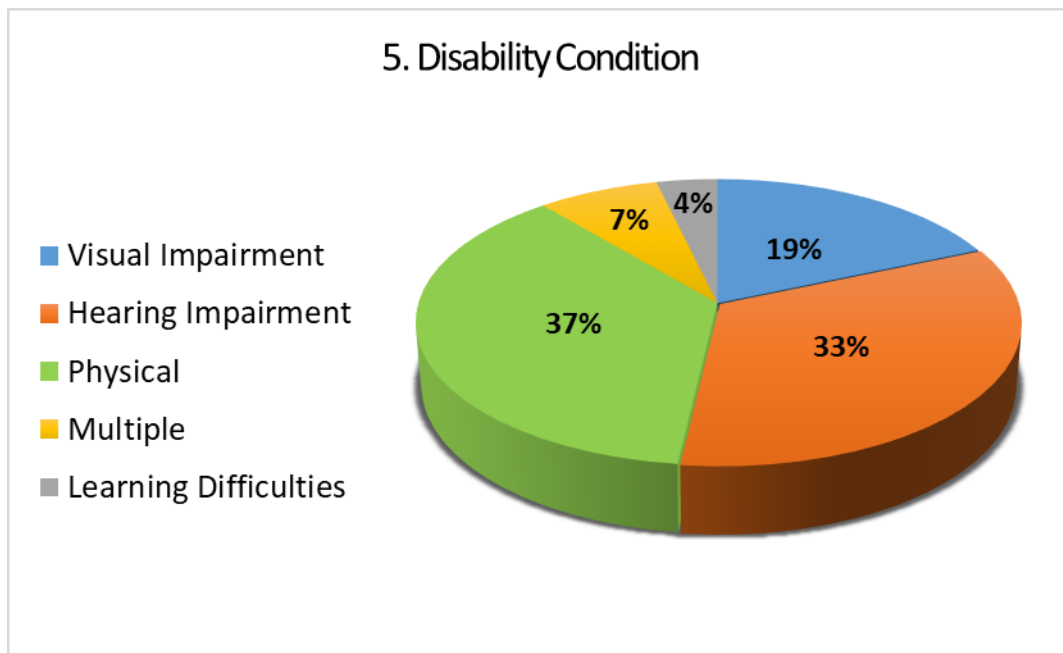


Figure 5: Participants Disability Conditions

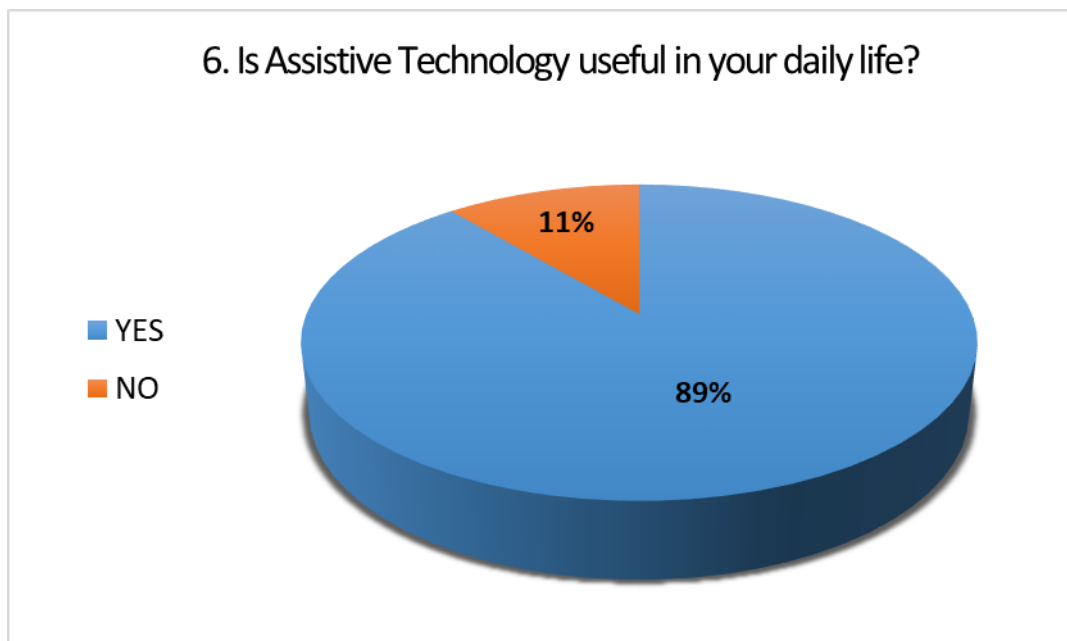


Figure 6: Benefits of Assistive Technology Use in Daily Life

7. Did you use Assistive Technology during your study?

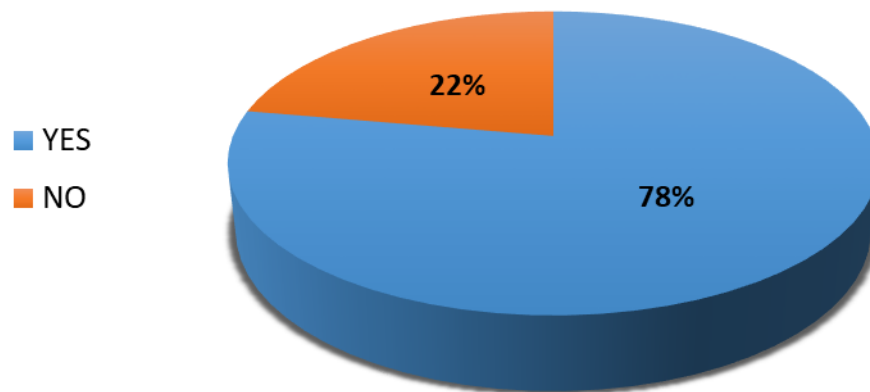


Figure 7: Using Assistive Technology During Study

8. Does your institution provide any workshops or awareness sessions related to AT for SWDs?

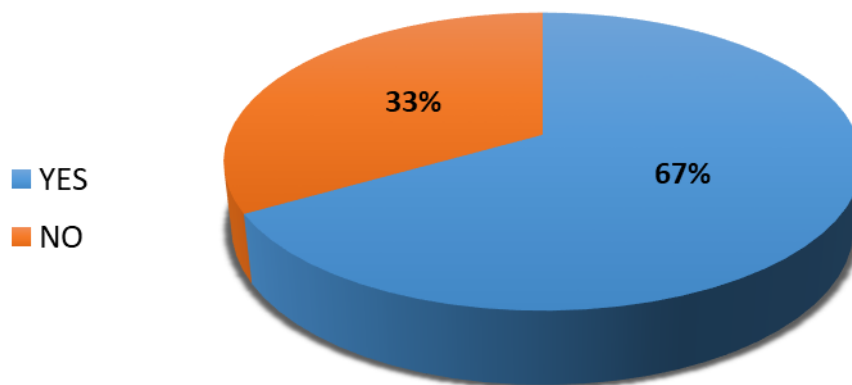


Figure 8: Availability of Assistive Technology Workshops and Awareness Sessions for Students with Disabilities

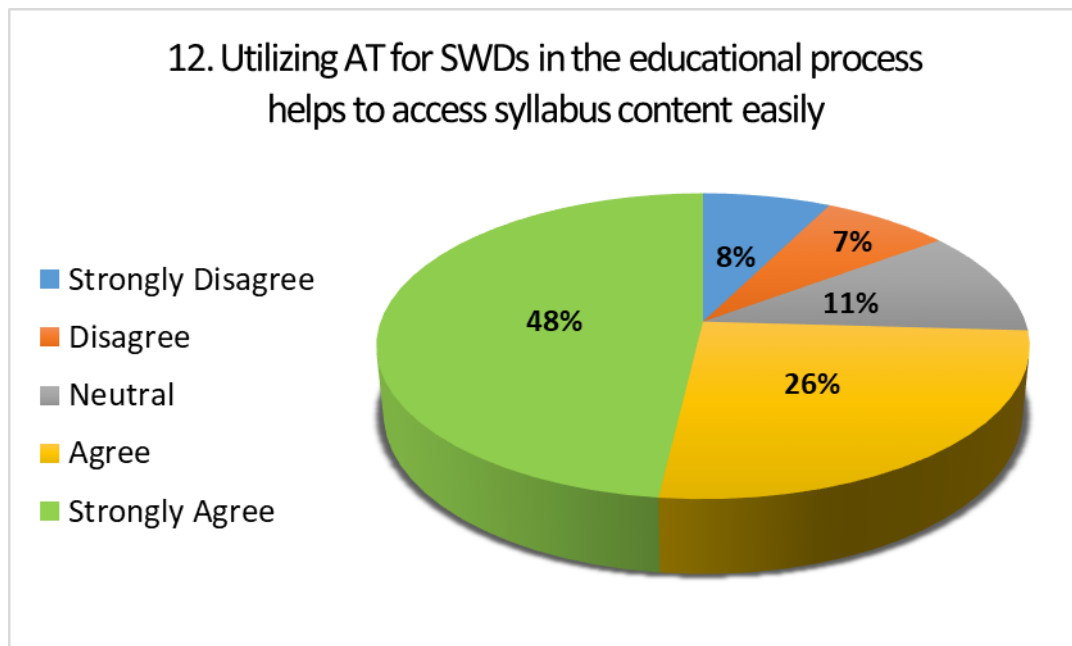


Figure 9: The Importance of Assistive Technology to Access Syllabus Content

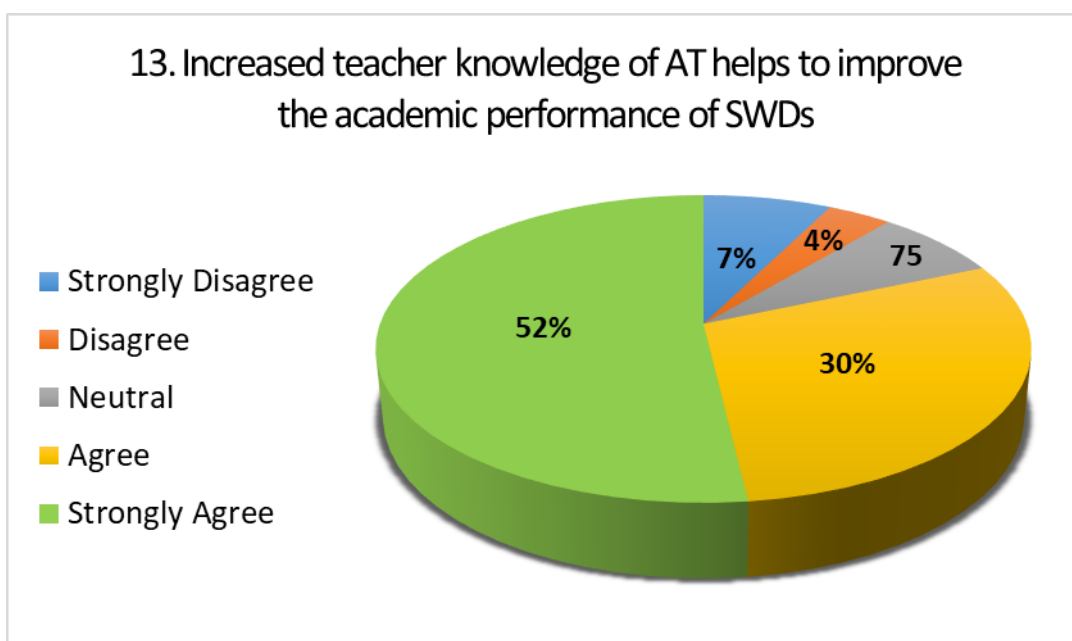


Figure 10: The Importance of Increased Teachers Knowledge of Assistive Technology

14. Raising awareness of AT at higher education institutions helps SWDs and faculty understanding the importance of implementing AT policy

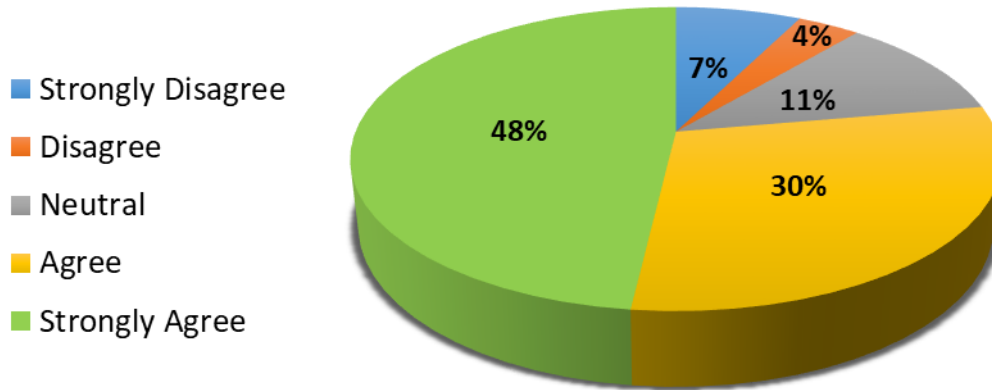


Figure 11: The Importance of Assistive Technology Awareness

15. Provision of AT services on the campus plays an important role in facilitating access to AT for SWDs

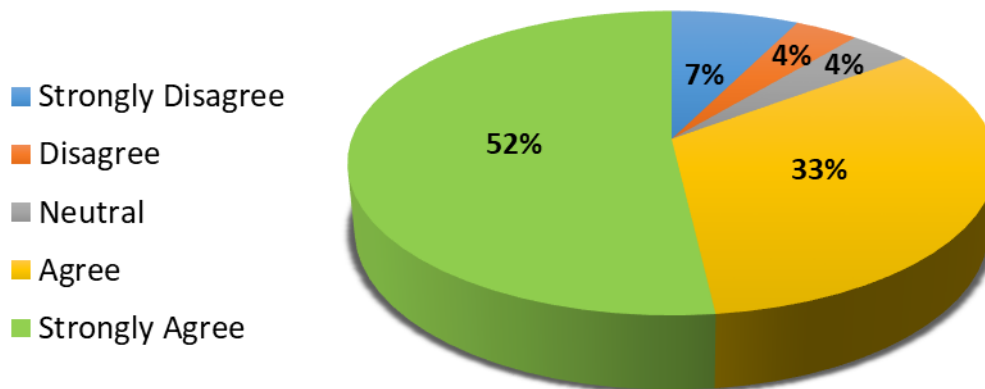


Figure 12: The Provision of Assistive Technology Services

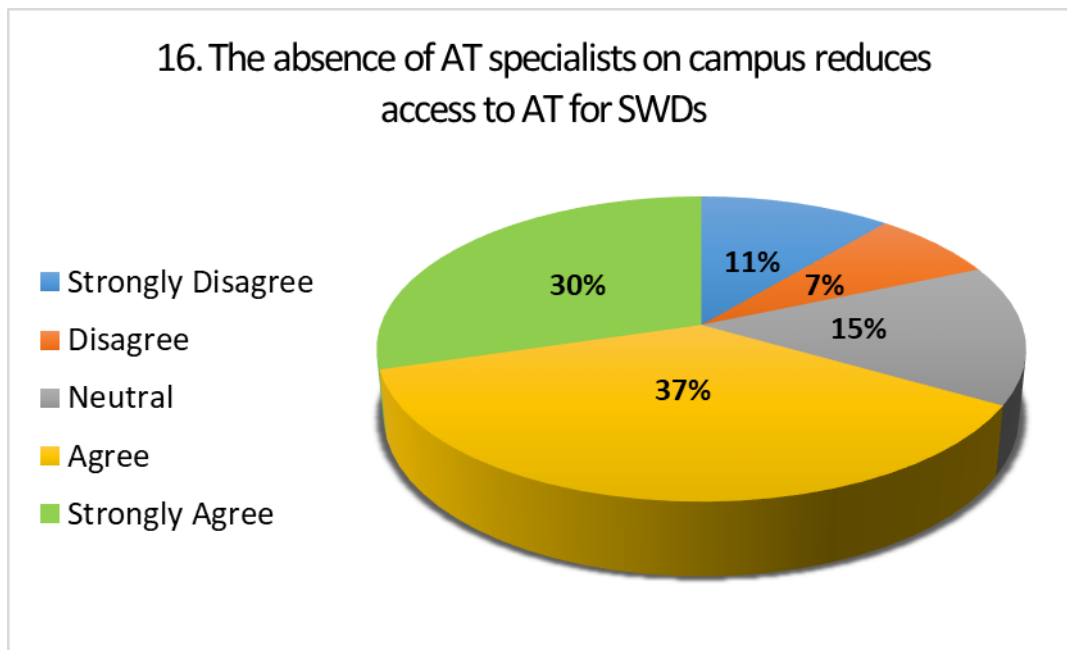


Figure 13: The Importance of Assistive Technology Specialists

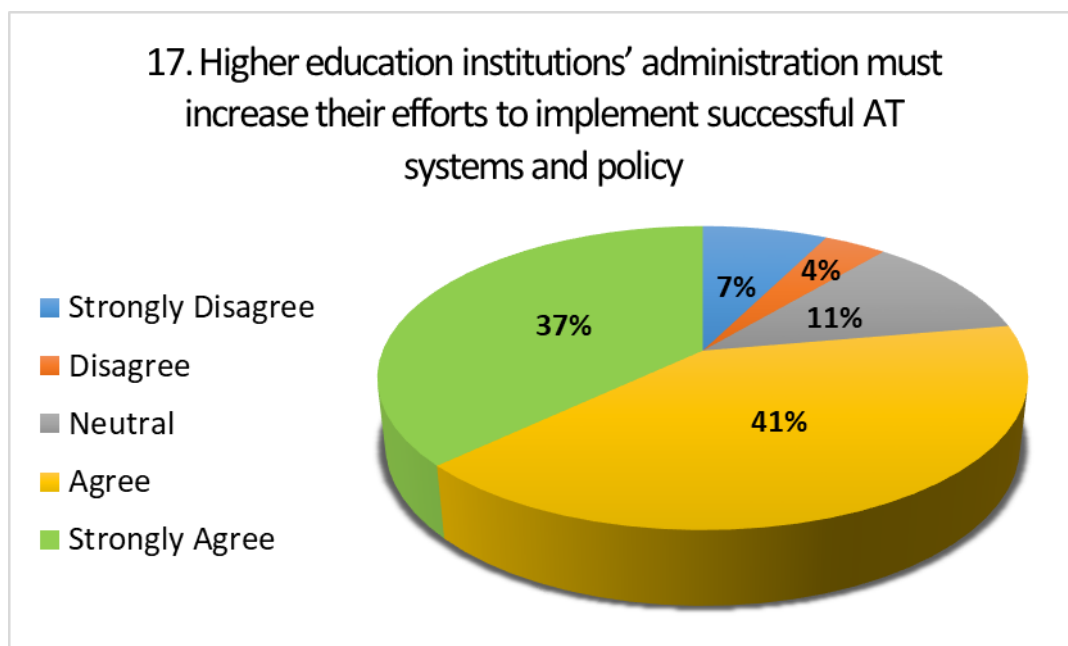


Figure 14: The Role of Institutions Administration of Assistive Technology Implementation

18. Availability of AT tools and services in each institution increases the opportunity to achieve inclusive education

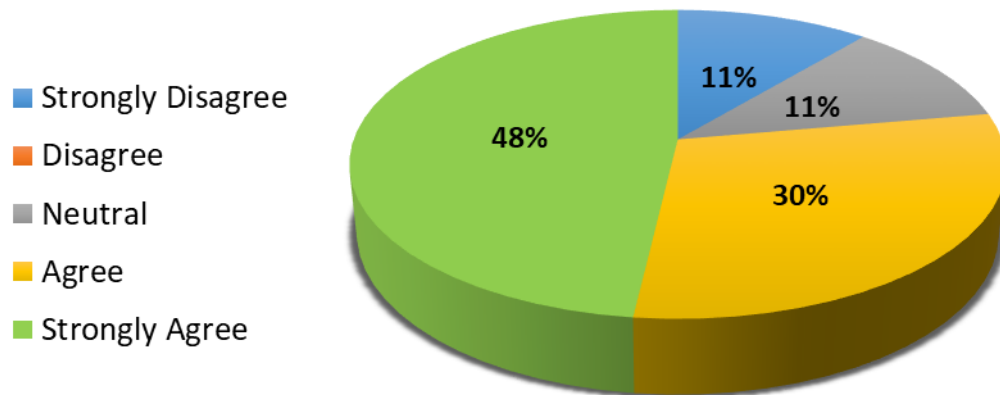


Figure 15: The Relationship between Assistive Technology and Inclusive Education

19. Utilizing AT for SWDs facilitates E-learning processes during crisis (Covid-19 an example)

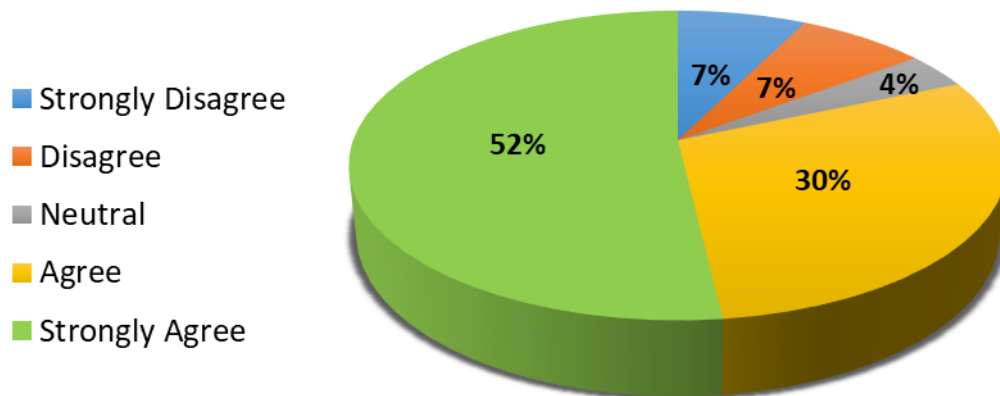


Figure 16: The Importance of Assistive Technology in Facilitating E-learning Process

Appendix O

Data Collected from Teachers Questionnaire

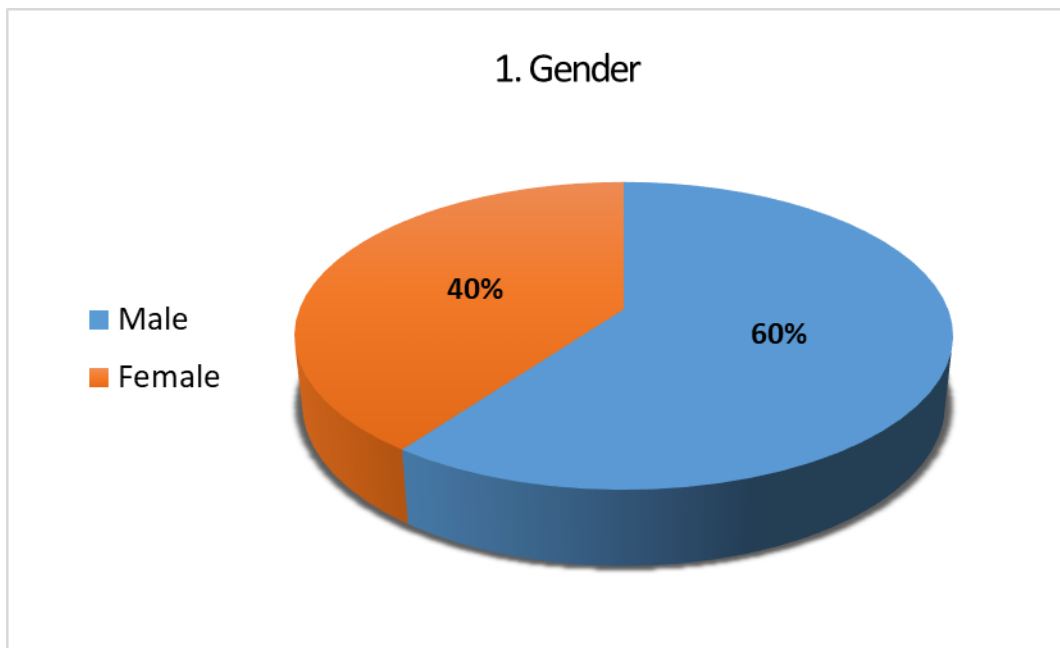


Figure 1: Participants Gender

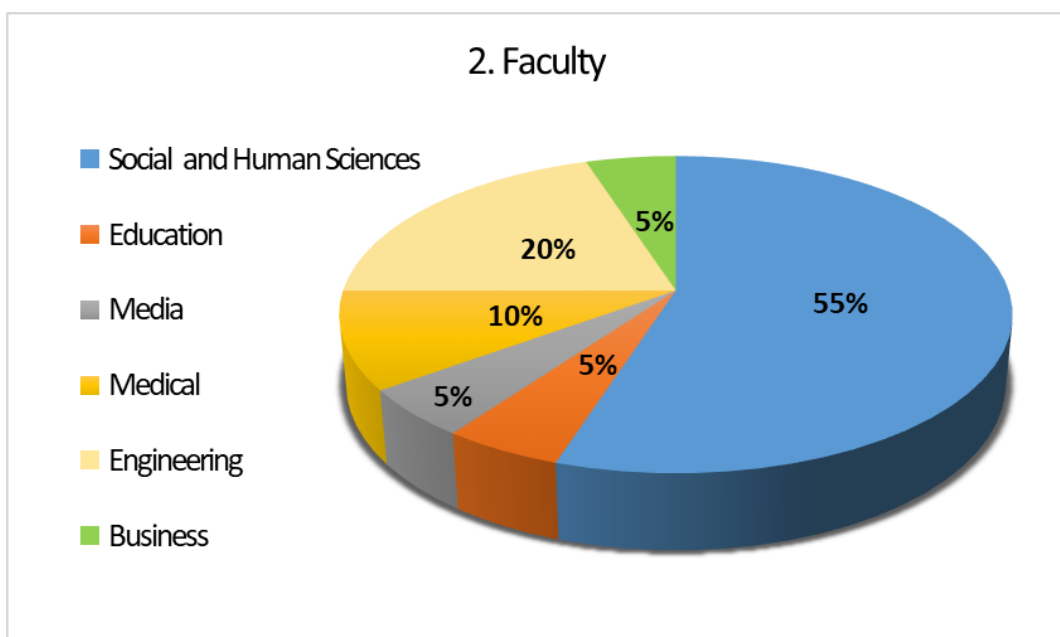


Figure 2: The Faculty of Participants

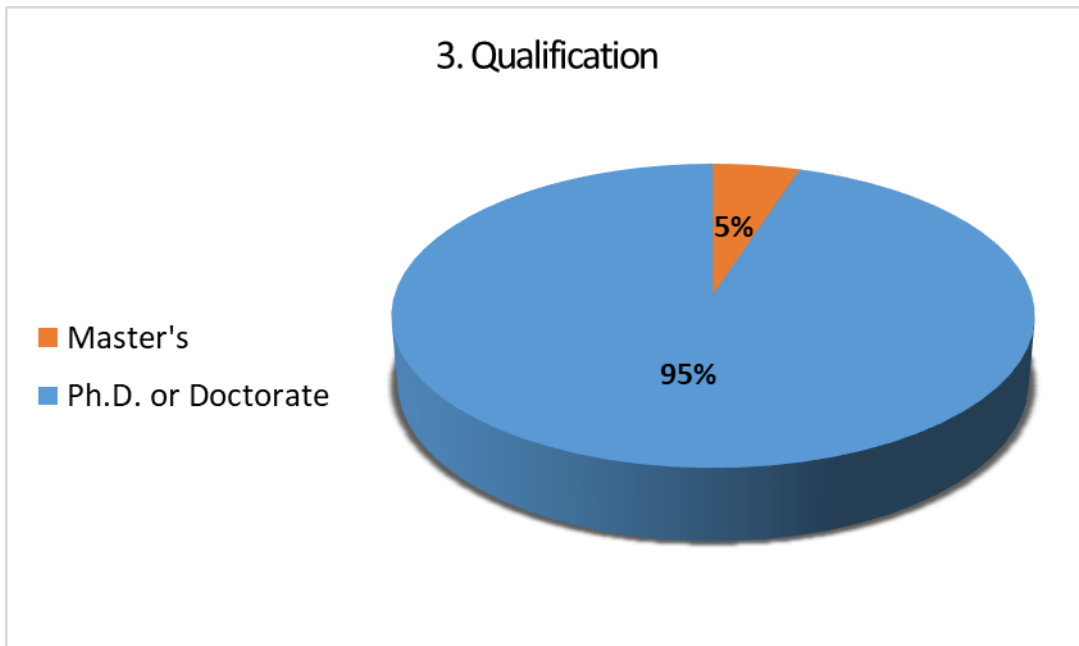


Figure 3: Participants Qualifications

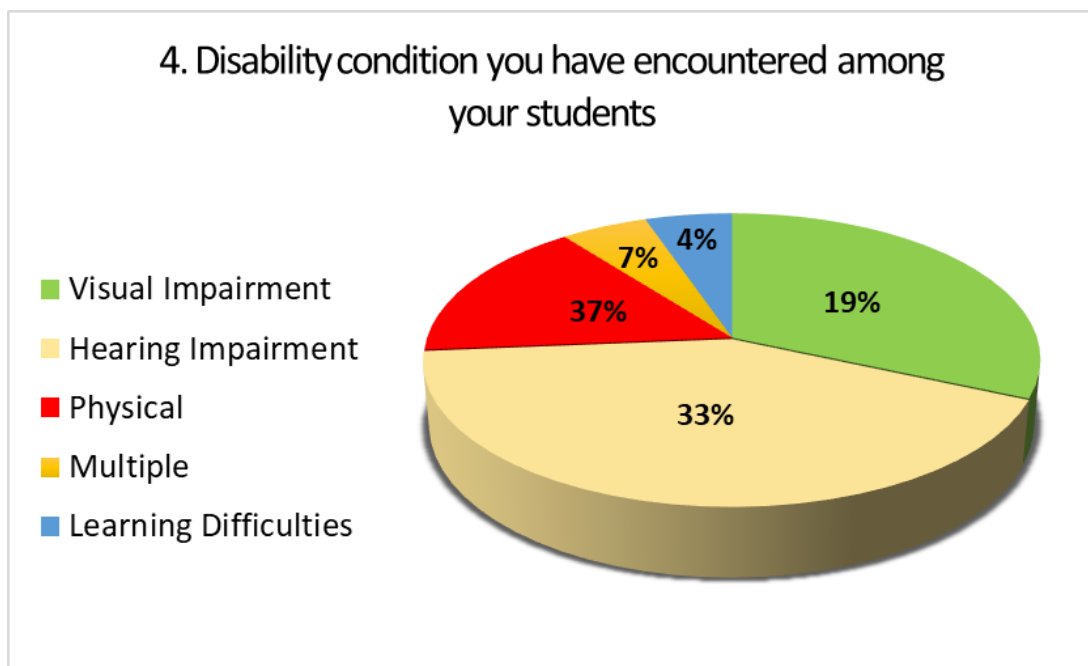


Figure 4: Teachers Experience with Students Disabilities

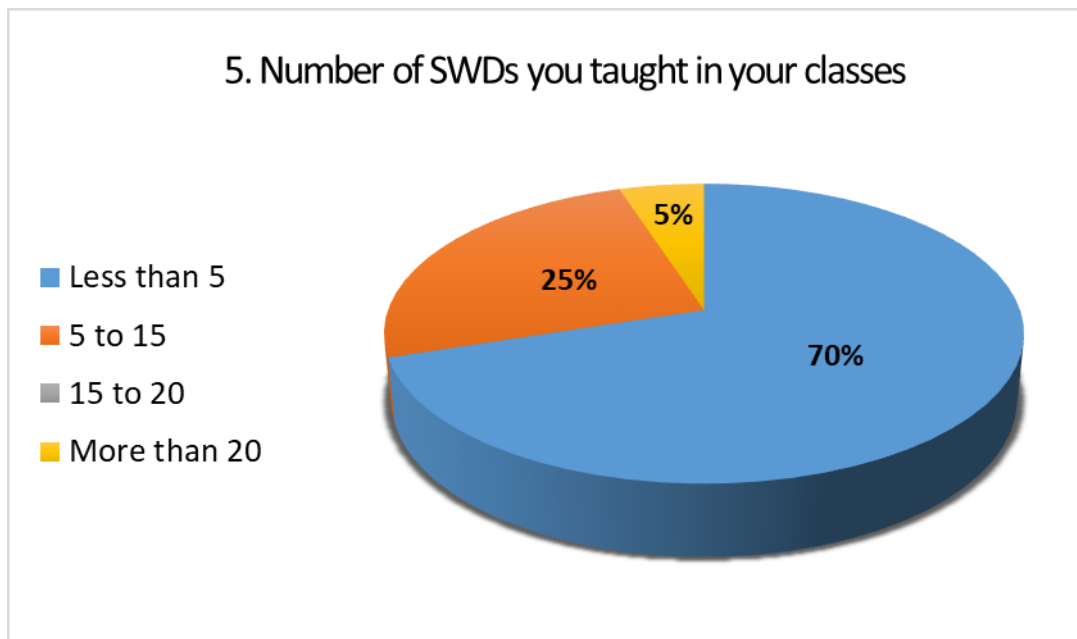


Figure 5: Numbers of Students with Disabilities Taught by Participants

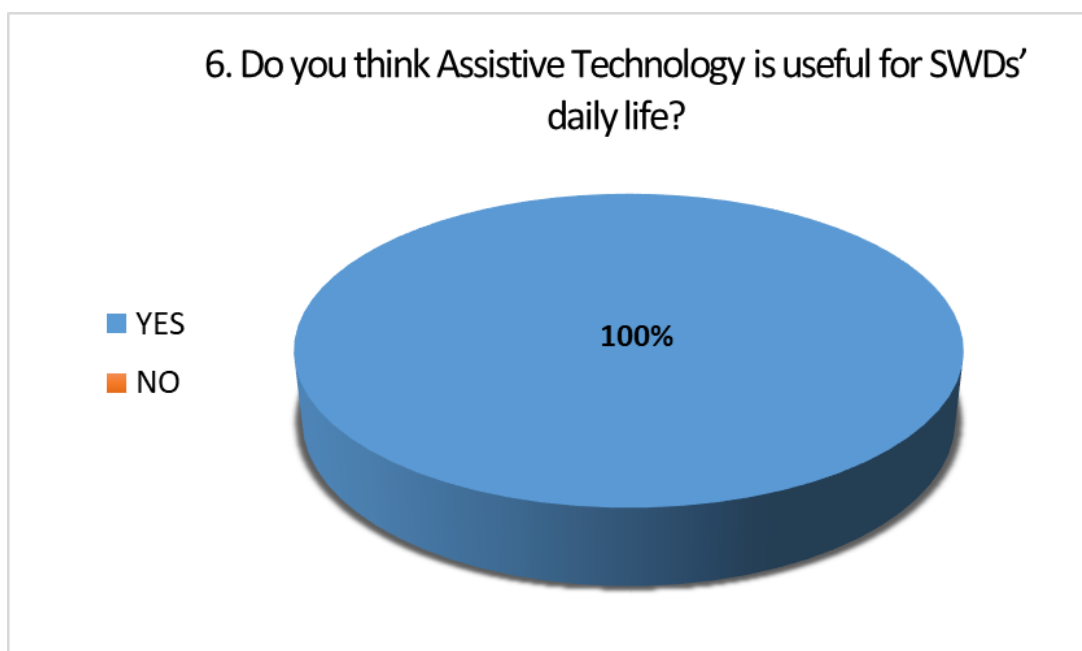


Figure 6: The Effect of Assistive Technology on Students with Disabilities Life

7. Did you use any Assistive Technology for SWDs during the class?

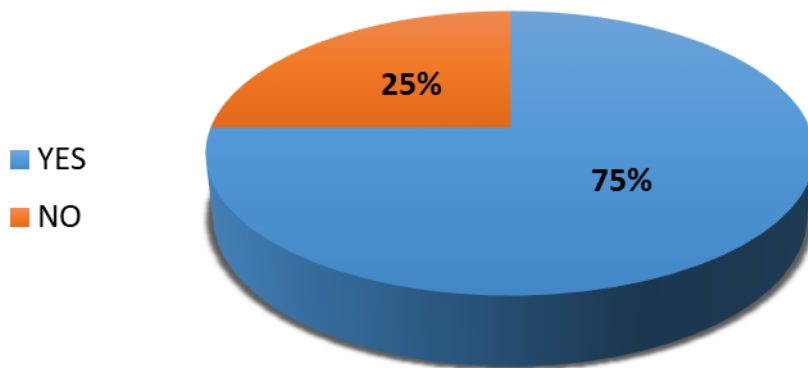


Figure 7: Using Assistive Technology by Teachers During the Class

8. Does your institution provide any workshops or awareness sessions related to AT for teachers?

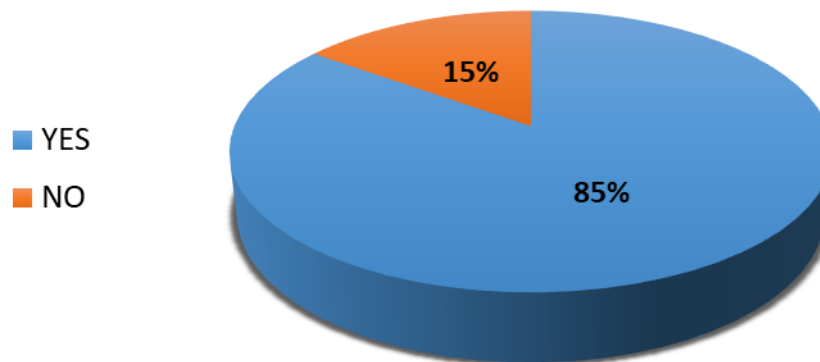


Figure 8: Availability of Assistive Technology Workshops and Awareness Sessions for Teachers

9. Have you had any training in how to deal with SWDs?

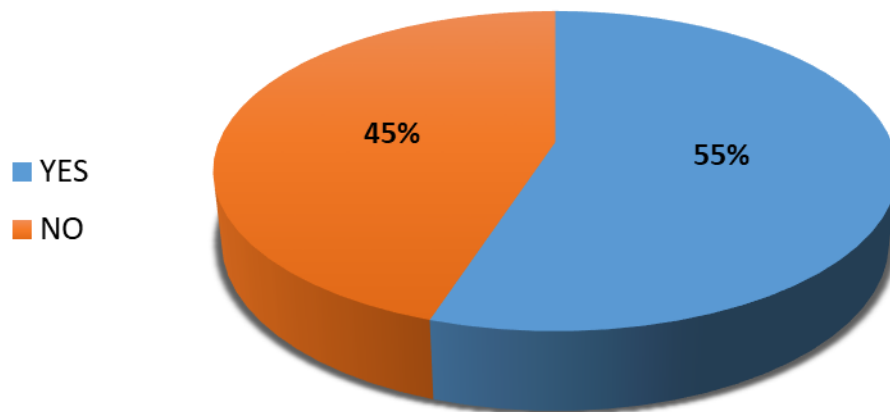


Figure 9: The Importance of Training Teachers to Deal with Students' Disabilities

13. Utilizing AT for SWDs in the educational process helps faculty facilitate the pedagogical approaches and improve curriculum content

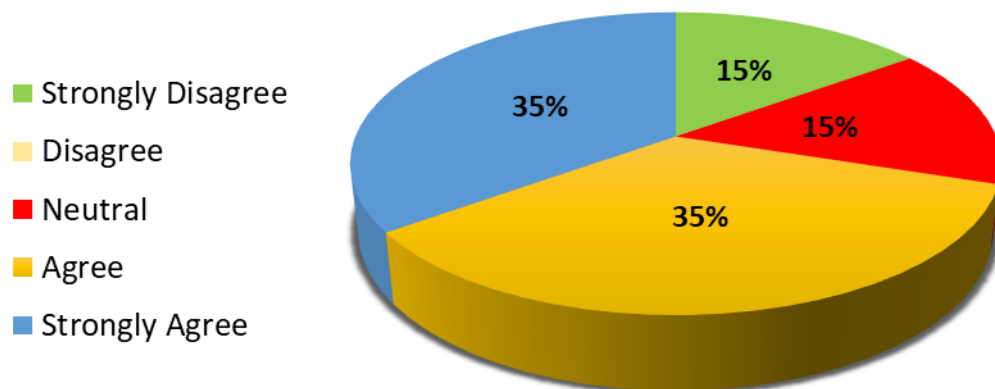


Figure 10: The Importance of Assistive Technology to Facilitate Pedagogical Approaches

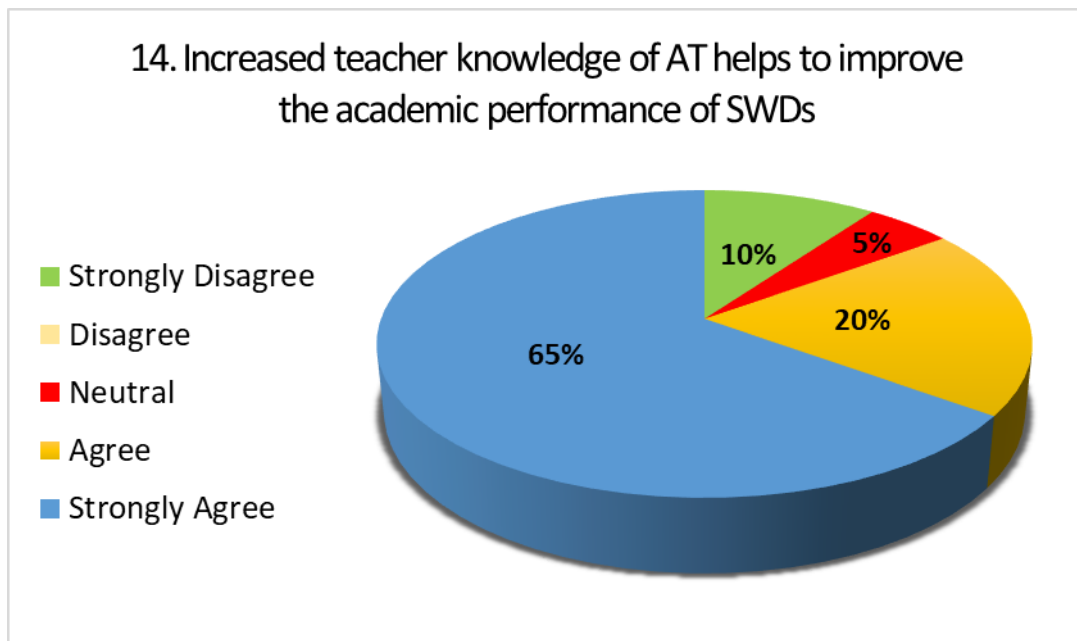


Figure 11: The Importance of Increased Teachers Knowledge of Assistive Technology

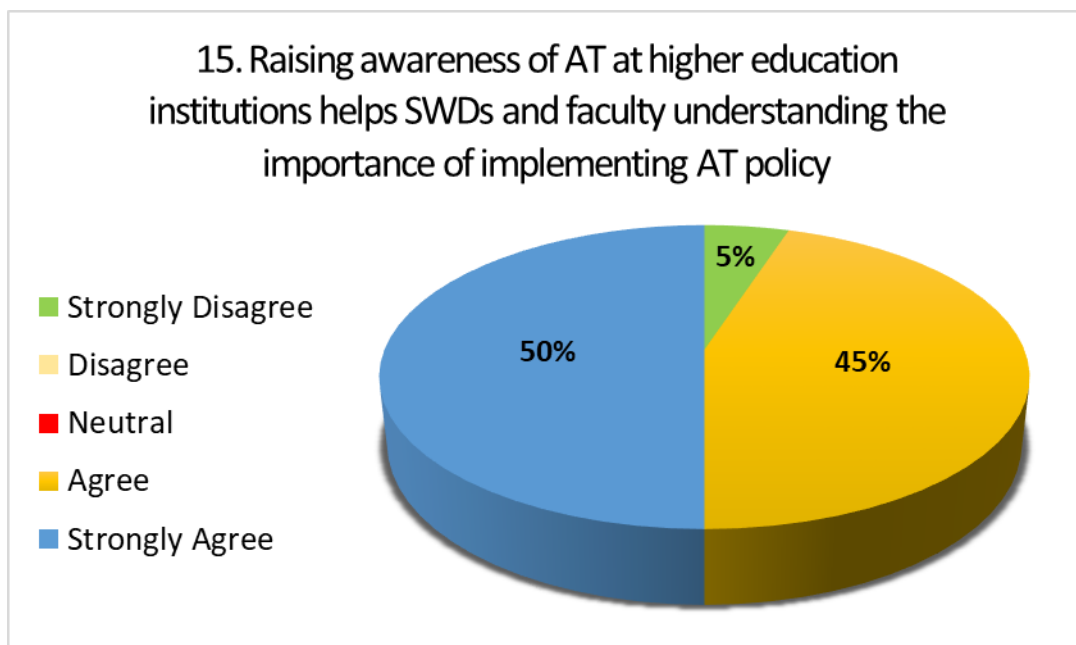


Figure 12: The Importance of Assistive Technology Awareness

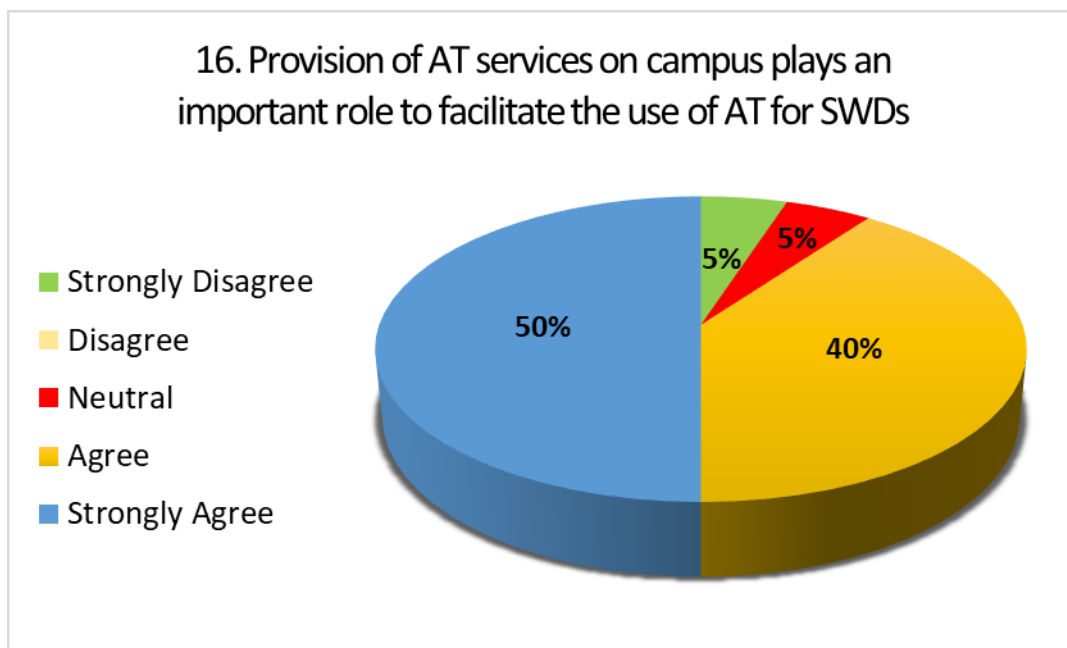


Figure 13: The Importance of Assistive Technology Services to Facilitate Accessibility

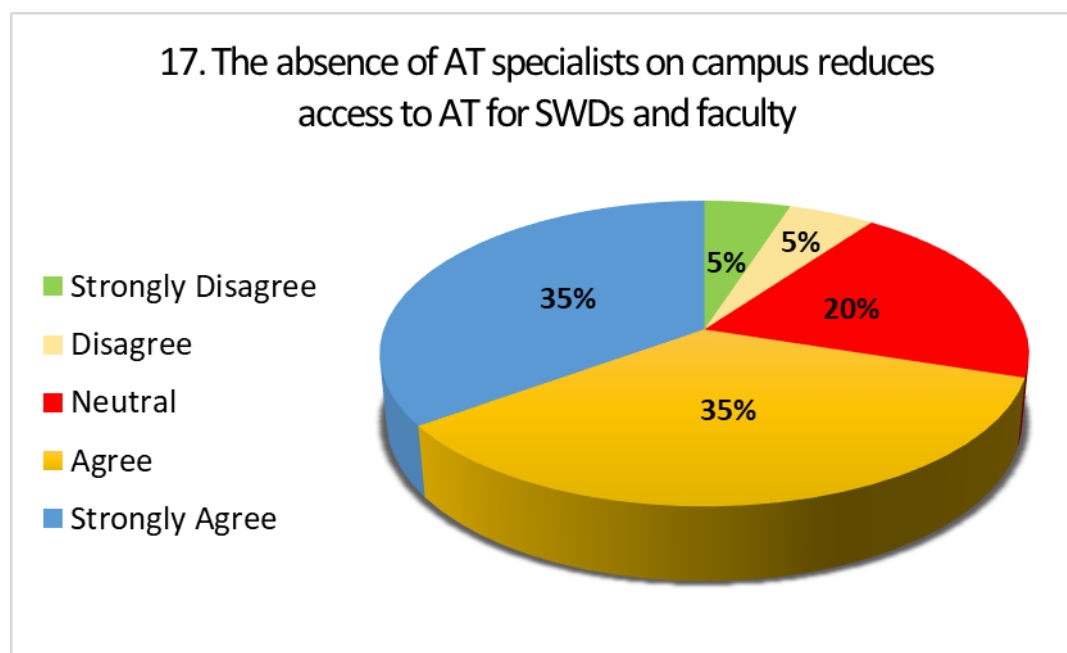


Figure 14: The Importance of Assistive Technology Specialists

18. Higher education institutions' administration must increase their efforts to implement successful AT systems and policy

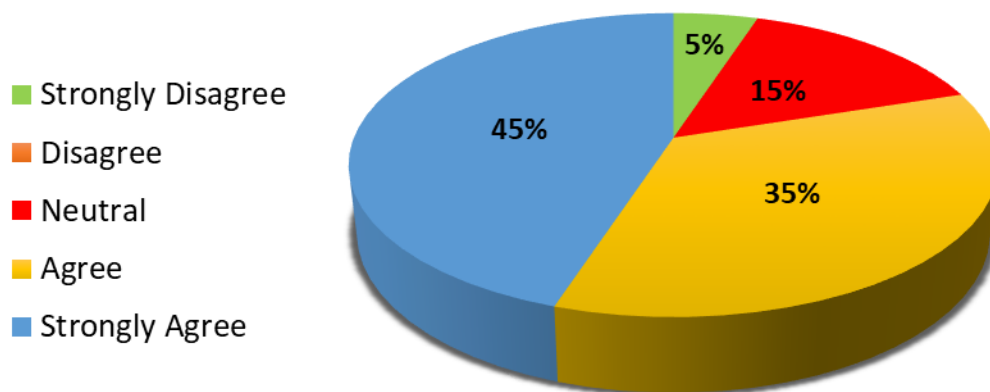


Figure 15: The Role of Institutions Administration of Assistive Technology Implementation

19. Availability of AT tools and services in each institution increases the opportunity to achieve inclusive education

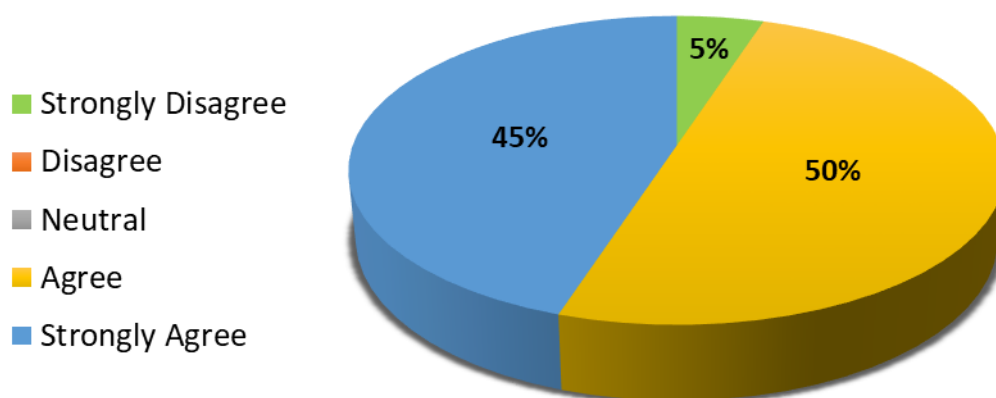


Figure 16: The Importance of Assistive Technology to Achieve Inclusive Education

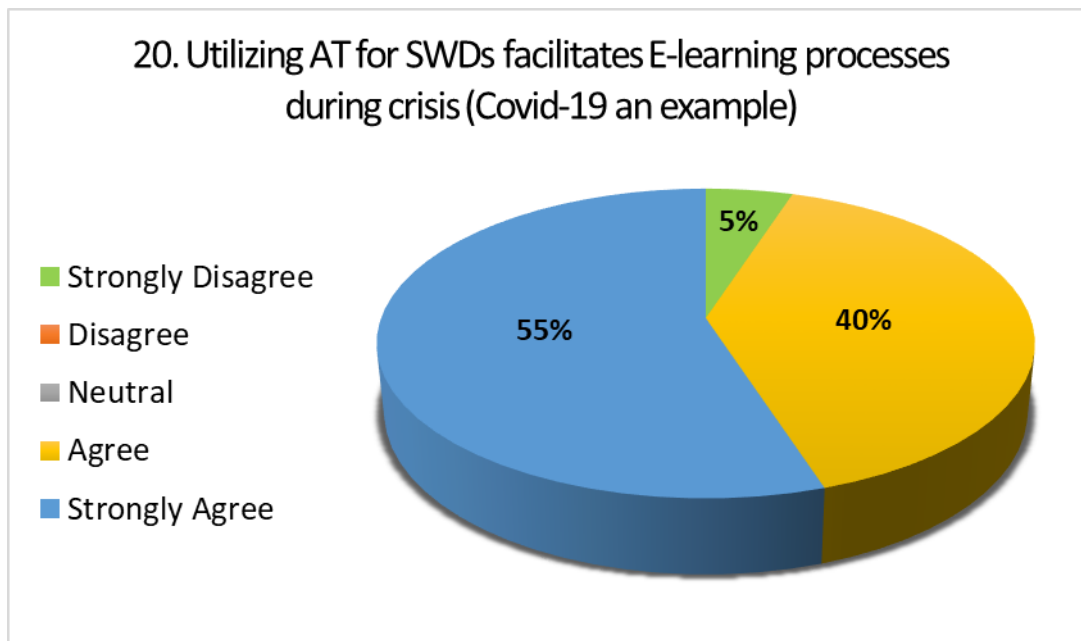


Figure 17: The Importance of Assistive Technology in Facilitating E-learning Process