



The Perceptions of Learning Disabilities Teachers Towards the Use of Assistive Technology in Saudi Arabia

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Abstract

Teachers in special needs education are vital because they are primarily responsible for directly educating the learning disabilities' students, and hence, their outlook and ideas are essential in the adaptation and implementation of assistive technology (Patten & Newhart, 2017). Therefore, the purpose of this study is to present a systematic literature review of the perception of learning disabilities teachers regarding the use of assistive technology in Saudi Arabia. These teachers' perceptions will be revealed after conducting this comprehensive research to determine the factors influencing the implementation of assistive technology in learning disabilities classes and how these teachers' perceptions play a part in the use of assistive technology in their classrooms. To achieve that, this study reviews previously published studies of the field of special needs education system in Saudi Arabia, specifically studies discussing the factors influencing teachers' perception on the implementation of assistive technology.

Keywords: *Assistive Technology in Saudi Arabia, Perceptions of Learning Disabilities Teachers and technology, Assistive Technology and universal design, Assistive Technology and special education, Technology research and practice, the Use of Assistive Technology in Saudi's school, the use of AT devices, and teacher's perceptions on technology.*

Introduction

The continued growth and globalization in technology have enhanced the importance of technology implementation in schools. The importance is seen worldwide by how the efficiency of education and continued performance improvements have been visualized by technological advancements. By integrating information technology in the education system, there are expectations of improved performance and experience of students (Yang et al, 2017). The world continues to make strides in developing education systems for improved efficiency and development. Saudi Arabia is a quickly developing country that has invested in improving the special needs education system to ensure they have access to quality education. For the study on perceptions of learning disabilities teachers towards the use of assistive technology in Saudi Arabia, there is a need for comprehensive research to determine the factors influencing the implementation of assistive technology and how the teachers' perceptions play a part in the use of assistive technology in their classrooms. Teachers in special needs education are vital because they are primarily responsible for directly educating the learning disabilities' students, and hence, their outlook and ideas are essential in the adaptation and implementation of assistive technology (Patten & Newhart, 2017).

Based on Caputo (2012), psychologically and in the intellectual sciences, perception is the process of gathering various types of information, selecting, interpreting, and organizing the sensory information in the correct form (Caputo, 2012). It incorporates the assortment of information from sense organs through to the translation made by the mind. Perception includes both base up and top-down data processing. Based on Grondin (2016), we frequently do not see improvements that remain generally consistent over delayed timeframes (Grodin, 2016). Despite the fact that our perceptions are created from sensations, not all sensations may lead to our perception. Think about the light beams entering your eyes, and the mind deals with this data to develop our psychological image of what is happening in the real world. Perception is significantly more than just the facts coming in. It is a functioning cycle. Therefore, through the perceptual cycle, we gain facts about the properties and components of the condition that are basic to our endurance. Perception does not only make our experience of our general surroundings, but it also permits us to act within our condition. In this study, "perception" refers to the understanding and ideology to integrate assistive technology in schools by special education teachers. The success of technological advancements will therefore be dependent on the implementation and understanding of the concept by these teachers.



Purpose

The purpose of this study is to present a systematic literature review of the perception of learning disabilities teachers regarding the use of assistive technology in Saudi Arabia. Particularly, this study is intended to develop an understanding and provide information on how Saudi teachers in special needs schools, especially teachers who teach students with learning disabilities in Saudi Arabia, perceive the development and introduction of technology to ensure that there is an efficient mode of education delivery. In fact, the introduction of assistive technology in schools also depends on the overall school management and how they support the development (Varier et al, 2017). The major purpose of adapting technological advancement is to ensure that they aid teachers in providing education to special needs children by using them as instructional tools. These new methods of instruction are more student-centered as opposed to teacher-centered, ensuring there is a better quality of education delivery and involvement by the students. Assistive learning ensures more efficient technical support and ensures that technology contributes to institutional success.

Research Questions

The main research questions guiding this systematic literature review are:

- 1- What are the perceptions of special needs teachers, especially teachers who teach students with learning disabilities, on the use of assistive technology in Saudi Arabia schools?
- 2- How do special needs teachers, especially teachers who teach students with learning disabilities, implement assistive technology in Saudi Arabian schools?
- 3- What does the literature say about the factors influencing these teachers' perceptions and implementation of assistive technology?

These research questions aim at collecting in-depth insights about the use of assistive technology in special needs schools by analyzing how teachers reacted to the use of assistive technology in their classrooms. The adaptation is crucial to teachers because they are responsible for their classrooms activities relating to offering education, and hence, they are in the frontlines of using assistive technology. Various factors could affect the perceptions of learning disabilities teachers which will be discussed in later sections, and the contributing factors will be analyzed to determine areas that need to be well-thought before undertaking the use of assistive technology for future teachers.

Methods

Selection Process

This systematic literature review examines special education Saudi teachers' perceptions on the use of assistive technology in their classrooms and the factors influencing their perceptions. For the purpose of this systematic literature review, I searched these electronic databases: USF Library, Saudi Digital Library, research gate, and Google Scholar. I have also established a set of inclusion and exclusion criteria. I chose these selection criteria based on the reviewed studies.

Due to more freedom in term combinations, I searched in Google Scholar with slightly different combination of terms. For example, I used terms such as these in my Google Scholar search: Devices in school or Technology and special education.

Inclusion and Exclusion Criteria

The inclusion and exclusion criteria are essential in setting parameters to be used in the study to ensure that there is a defined manner in which the study focus is analyzed objectively and uniformly. The need to select an appropriate study focus and group of people is essential in ensuring the collected studies are relevant to this systematic review focus. The sources of information included are primary and secondary sources that will provide relevant information to the study.

Coding of Data

The coding of data refers to the definition of data available for analysis. The coding process involves identifying and highlighting the vital data in the texts or other items in data collection. The coding method is essential as it enables accessibility of data by linking it to make it easier to retrieve. The method is also essential in easier analysis and examination of data (Patten & Newhart, 2017). For this study, the technique of data-driven coding was used, which relied on an analysis of the existent data to determine methods of creating code from the data patterns.

For this study, the coding tool I used Microsoft Excel Sheets. It is an effective program that is both efficient and reliable as a coding tool for this systematic literature review. It is vital in revealing and



producing output on relationships and definitions that make it easy for users to access their data. It also allows users to have a comprehensive insight into their data using this powerful coding process (Patten & Newhart, 2017). It is easy to use and available in different operating system platforms, making it a reliable source of data analysis. The user interface and ease of use make data analysis easy and effective, making it the best coding tool for the study. It also facilitates the use of multiple documents and other resources in the analysis. Excel is also versatile because it is compatible with documents from different languages.

In my coding book, I organized the collected studies as they respond to my systematic literature review 3 questions. For each study, I included its citation, research questions, definition of key terms (especially ones that match with my focus), research design, sample size and demographics, assistive technology types, implementation of assistive technology, factors influencing assistive technology use and perception, effects of these factors, of study results, and the study's final finding. The next few paragraphs will provide an overview of each of my research questions' coding.

The research questions in the ten studies were categorized, showing that the provided information is rich and offers a valuable background on the topic. For example, in Al-Qahtani's (2013) study, a question was posed about teachers' level of knowledge regarding assistive technology, whereas Al-Harbi's (2020) study formulated the question differently, focusing on the extent of teachers' awareness and usage of this technology.

Regarding sample size, the studies included samples ranging from 10 to 127 participants, with an average of 52. Each study described its process for determining sample size, providing valuable insights into how sample sizes can be selected in future research.

The first research question, the perceptions of special education teachers about the use of assistive technology in Saudi schools were explored. The findings showed that these perceptions varied and reflected teachers' diverse experiences.

For the second research question, an analysis was conducted on how teachers implement assistive technology in classrooms. The studies indicated that multiple challenges hinder teachers in this manner, affecting the effectiveness of implementation.

The third research question examined the factors influencing teachers' perceptions and implementation of assistive technology. Several factors were identified, including education level, access to technology, and technological support, all of which significantly impact how teachers use this technology.

Results

In this systematic literature review, I have collected around ten articles. These were drawn from a pool of resources creatively selected and crafted to unravel critical information about the topic of research "The Perceptions of Learning Disabilities Teacher perception towards the use of assistive technology in Saudi Arabia". The articles chosen for the systematic literature review assessed different aspects of the topic. In this section, I will present all the findings and results of the 10 studies in respect to this systematic literature review research questions:

- 1- What are the perceptions of special needs teachers, especially teachers who teach students with learning disabilities, on the use of assistive technology in Saudi Arabia schools?
- 2- How do special needs teachers, especially teachers who teach students with learning disabilities, implement assistive technology in Saudi Arabian schools?
- 3- What does the literature say about the factors influencing these teachers' perceptions and implementation of assistive technology?

1. Research Question 1 Results

In respect to RQ1 What are the perceptions of special needs teachers, especially teachers who teach students with learning disabilities, on the use of assistive technology in Saudi Arabia schools?, I reviewed the 10 studies coding and results. As mentioned above, the following subsections were examined: citation, research questions, definition of key terms (especially ones that match with my focus), research design, sample size and demographics, assistive technology types, implementation of assistive technology, factors influencing assistive technology use and perception, effects of these factors, of study results, and the study's final finding (see table 1 below). However, in this section, I will only present research questions, sample size, research design, definition of key terms, study findings on the perceptions of special needs teachers, especially teachers who teach students with learning disabilities, on the use of assistive technology in Saudi Arabia schools.



1.1 Research Questions

My perception on the 10 articles based on the research questions is that while they are not directly related, the articles are relevant and well related. I find the information enriching as it provides more background information regarding the research questions. Also, the articles provided critical perspectives that helped in highlighting the way the questions could have been answered in alternative researches. In fact, those studies research questions ranged in their wording. For example, in Alkahtani (2013) study, the authors asked what is the level of knowledge about assistive technologies in Saudi Arabia? As for Alharbi (2020) study, they had the same focus as the previous study, but worded their questions as follows: To what extent is teacher's knowledge and use of Assistive technology in Saudi Arabia?

1.2 Sample Size and Age

In respect to the sample size, I found that the 10 articles have different sample sizes. Sample size ranged from 10 to 127 participants, with an average of 52 participants. Of importance, each one of these studies described the process of coming up with a sample size, which makes it apparent that they offer a good insight on how to determine a sample size for this research. For this reason, the perceptions offered by the articles on the sample size are really helpful. As for the ages of the participants, these studies have recruited various numbers of participants (students, teachers, and parents) between the ages 9 to 38 years old.

Research design

These articles provided a descriptive backgrounds on their research design. Most of the articles used and based their research on a single design; one that this research has also taken. The articles had used a range of research designs: Empirical review, Case Study, Survey, and a descriptive study. After close observation, it can be seen that most studies on assistive technology have used empirical review Research design as it allows for a better understanding of the perceptions and the use of assistive technologies in the field of learning disabilities. A detailed description of all the 10-studies research design is provided in Table 1 below, along with the research questions guiding each study.

Table 1: Studies and their Research Design

Article's number	Primary author/s (year of publication)	Research Question(s)	The type of Research Design
1	Aldabas, R. (2015).	What is the history of special education in Saudi Arabia?	Empirical review
2	Alfaraj, A., & Kuyini, A. (2014).	What type of technology is used to support down syndrome in Saudi Arabia?	Case Study
3	Alharbi, S. (2020).	To what extent is teachers knowledge and use of Assistive technology in Saudi Arabia?	Case study using an interview methods
4	Alkahtani, K. (2013).	What is the level of knowledge about assistive technologies in Saudi Arabia?	Case study using survey methods
5	Alnahdi, G. (2014).	How does Assistive technology affect universal learning?	Descriptive Literature review
6	Alquraini, T. (2011).	What are the dynamics of special educations?	Empirical review
7	Tsuei, M., & Hsu, Y.-Y. (2019).	What are the parents perception on technology integration?	Case study using survey methods
8	Vatanartiran, S., & Karadeniz, S. (2015).	What is the need for technology integrations?	Empirical review
9	Yang, R., Yang, J., Yuan, H. R., & Lee. J. (2017).	What is the impact of techno-stress?	Case study using survey methods
10	Varier, D., Dumke, E. K., Abrams, L. M., Conklin, S. B., Barnes, J. S., & Hoover, N. R. (2017).	What are the teachers and students experience of one-to-one technologies in the classroom?	Empirical review



1.3 Definition of key terms

The key terms section is comprised of the key aspects and ideas in the research. Apparently, these terms also encompass the ideas that are discussed in these articles the most. In other words, the articles offered insightful information that can be used to define and explain these terms. In fact, most of these articles provided the definitions of these key terms: perspective, perception, knowledge.

1.4 Study findings on the perceptions of special needs teachers, especially teachers who teach students with learning disabilities, on the use of assistive technology in Saudi Arabia schools.

The study findings on special needs teachers are satisfactory but not robust. This is because they offer a true and fair view regarding the issues and not a wishful one. To be precise, the study findings are not the same throughout the research. Each one of them offers its own perception and its own discoveries. These discoveries play a key role in driving how educators use assistive technology in Saudi Arabia. These studies confirmed that the use of assistive technology does exist in Saudi and it faces many challenges. A more detailed description of these discoveries will be discussed in the discussion of findings section of this paper. However, a summary of the main findings of each study is included in Table 2 below.

Table 2: Studies and their findings

Article's number	Primary author/s (year of publication)	Findings on the perceptions of special needs teachers
1	Aldabas, R. (2015).	While there is significant progress, more needs to be done to ensure fully special education reforms In Saudi Arabia.
2	Alfaraj, A., & Kuyini, A. (2014).	Technology enhances learning among people with disability
3	Alharbi, S. (2020).	Assistive technology helps students with special needs to learn better
4	Alkahtani, K. (2013).	Teachers knowledge about assistive technology enhanced student learning
5	Alnahdi, G. (2014).	Assistive technology help to advance universal learning
6	Alquraini, T. (2011).	While there is progress in terms of delivery, special education faces various challenges
7	Tsuei, M., & Hsu, Y.-Y. (2019).	Parents are adamant for the integration of technology on student learning
8	Vatanartiran, S., & Karadeniz, S. (2015).	Various things necessitate the integration
9	Yang, R., Yang, J., Yuan, H. R., & Lee. J. (2017).	Techno stresses affect the impact of technology in teaching students with disabilities.
10	Variar, D., Dumke, E. K., Abrams, L. M., Conklin, S. B., Barnes, J. S., & Hoover, N. R. (2017).	The teachers and students experience of one-to-one technologies in the classroom

2. Research Question 2 Results

In respect to RQ2 How do special needs teachers, especially teachers who teach students with learning disabilities, implement assistive technology in Saudi Arabian schools?, I reviewed the 10 studies coding and results. As mentioned above, all of the included 10 studies revealed that the use of assistive technology differs from a teacher to another. In this section, I will present the types assistive technology, and the implementation of Learning Technology.

2.1 Types Assistive Technology

Upon closer observation and analysis, the literature revealed that the type's assistive technologies are similar in the ways they are used in teaching students with learning disabilities. The types of learning technologies reported in this systematic literature review are described into three major categories.



The first category includes assistive smartphones application that help special needs teachers to pass their content to students. The next category includes computers software used by students in their quest of learning. The last category includes smartphones application and the computers that linking the two categories in same articles.

2.2 Implementation of Learning Technology

Implementation of learning technology is the process of putting in place the aspects of technology to aid learning. This is a process of either changing or modifying the existing systems to have technological aspects. In fact, in the reviewed studies, the implementation of assistive technology was done in these following ways: learning technology might involve making the whole process of learning extremely digitized or completely technology dependent.

3. Research Question 3 Results

As for RQ3, What does the literature say about the factors influencing these teachers' perceptions and implementation of assistive technology?, I reviewed the 10 studies coding and results. As mentioned above, all of the included 10 studies revealed that there are factors influencing the teachers' perceptions and implementation of assistive technology in their classrooms. In this section, I will present the types of influencing factors and the effects of these factors on teachers' perceptions and implementation of assistive technology.

3.1 Types of influencing factors

There are various types' factors influencing teachers' perceptions of assistive technologies. One of which is the cost of assistive technology. This factor affects the teachers' ability to acquire and use the technology in the classroom. Also, the literature discussed environment factors. These are a wide range of factors influencing the adoption and use of technology.

3.2 Effects of these factors on teachers' perceptions and implementation of assistive technology

Looking at literature review, it showed that the effects would be depending on the nature of the factors affecting the teachers, their abilities, and the learning environment as a whole. These factors may ace or inhibit the teachers' perception in the implementation of the assistive technology.

Discussion of Findings

The implementation of assistive technology in special needs schools will be essential in determining the progress and continued development of education in Saudi Arabia. As the world continues to witness continuous progress in technological advancements, the use of assistive learning is turning out to be a necessity. The teacher's perceptions have been determined as essential in the implementation of assistive learning, and hence, action should be taken to ensure they embrace the importance of assistive learning in enhancing improved performance in schools. The stakeholders like principles, parents, and the government will also play a huge role in ensuring that there is the progress made in implementing assistive learning in schools.

Two of the articles addressed the various sources that provide insights into assistive technology and how it is essential to the development of special needs education. These two articles have also further analyzed the importance of learning disabilities teachers in implementing assistive technology in the schools. On one hand, Alfaraj and Kuyini (2014) reviewed the teachers' opinion in Saudi Arabia and how they recognize the essence of assistive technology; in their article, they have called for customized assistive learning to cater to disability learners. Moreover, Alquraini (2011) stated that teachers recommend the availability of sufficient computers, terming them the best device for assistive learning. According to Aldabas (2015), Saudi Arabia has seen a huge transformation on how technology is being applied in Saudi Arabia. The researcher notes that as of now, Saudi Arabia is among the leading countries that has well integrated technologies to aid special education. This view is well supported by Alfaraj and Kuyini (2014) whose research narrows down to Down's Syndrome. From their research, they conclude that Saudi Arabia has shown immense resilience when integrating using technology into special education learning.

The literature then looked at the benefits of using assistive technologies. Alharbi (2020) notes that there are various issues and matters affecting technology usage to aid special education. This article lists cultural aspects, high costs of learning, and an unwilling community to embrace technology. Apparently, this is a research gap that was identified by Alfaraj and Kuyini (2014). Much more, the article notes that there is lack of the technical know-how. Albeit implicitly, Alharbi (2020) makes it clear that while technologies are now available, there is the gap between teacher and tool use. The same



aspects are echoed by Alkahtani (2013) whose article 'Teachers' Knowledge and Use of Assistive Technology for Students with Special Educational Needs', details that while there is tremendous progress of teachers using assistive technologies in Saudi Arabia, more needs to be done. The same thoughts are echoed by Alnahdi (2014) whose design exploration recommends teachers consideration.

Pedagogical Implications

Teachers who teach students with learning disabilities are experiencing a lot of challenges in their day to day practice. From a proper framework to enable the introduction of assistive technologies to lack of policy in implementing these, learning disabilities teachers are at a significant disadvantage. It is needless to note that this literature research presents critical pedagogical implications. First, there is a clear indication that all stakeholders need proper and commonplace involvement. The essence of this is to ensure that a far-reaching consensus is reached before any move to implement assistive technologies.

Another apparent implication will be the increased linking of the classroom content and the outside world. Technology alone is not enough to increase the value of the provided education. Going the extra mile to link the knowledge learned to the outside world's content will play a massive role in ensuring that learning disabilities teaches are abreast of what is needed in the real world and what is being offered. Lastly, there will be apparent increased reflections and discussions. This search opens the avenues for more comprehensive discussions that can lead to a broader understanding of the full spectrum topic.

Conclusion

In conclusion, the literature search offers exciting insights into the level of assistive technologies by learning disability teachers in Saudi Arabia. In any case, the examination makes it bare that many reasonable steps have been made so far in terms of the use of assistive technologies. Nonetheless, more can be done, and these can only be achieved if the continuous emphasis is given on the topic. It is essential to mention that more research on emerging technological applications needs to be done.

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