Journal of Advanced Research in Applied Sciences and Engineering Technology

Journal homepage:
https://semarakilmu.com.my/journals/index.php/applied_sciences_eng_tech/index
ISSN: 2462-1943

A Study of Attitudes, Skills, and Barriers Among the Special Education Hearing Impairment Teachers in the Use of Assistive Technology in Teaching

Vestly Kong Liang Soon[1,*]

[1] Faculty of Human Development, Universiti Pendidikan Sultan Idris (UPSI), Tanjung Malim, Perak, Malaysia

ARTICLE INFO

Article history:
Received 27 July 2023
Received in revised form 24 November 2023
Accepted 2 December 2023
Available online 15 December 2023

Keywords:
Attitudes; skills; barriers; Special Education Hearing Impairment (SEHI) teachers; Assistive Technology (AT)

ABSTRACT

In the context of special education, most of the special education hearing impairment (SEHI) teachers understand that the use of assistive technology (AT) is a necessity in teaching and providing opportunities for SEHI students to control and improve their learning. However, the question of the acceptance of SEHI teachers use of AT in teaching is not much discussed. The objective of this study is to examine the attitudes, skills, and barriers of SEHI teachers to the use of AT in teaching. This study was conducted in special education secondary schools (SESS) in Selangor, Penang, Pahang, and Kedah. The sampling used was a purposive sampling of four respondents, consisting of two male teachers and two female teachers. The design of this study uses qualitative approaches, and interviews are the methods used as research instruments. The result of the study was an analysis of content (content analysis) by presenting the exact sentence of the respondent. The findings show the SEHI teachers have moderate attitudes and moderate skills towards the use of assistive technology in teaching, while the lack of cost, infrastructure, and resources for assistive technology is a barrier to the use of assistive technology in SESS. Discussions on the findings and recommendations to stakeholders have been raised to enhance the application of the assistive technology elements in the teaching of SEHI teachers in Malaysia.

1. Introduction

In the era of globalization, which is the driving force behind the monumental wave of change that is occurring today, various technological developments have emerged and transformed human patterns of communicating, working, and carrying out various activities that are part of daily life. The primary goal of incorporating technology into special education is to assist students in learning in ways that are tailored to their individual strengths and weaknesses. The act of exposing young people to is also extremely important. A greater measure of independence or autonomy. Reduced levels of stress According to the educational guidelines, all students, including those who have special requirements, should be given the opportunity to achieve their goals. They should have access to the

* *Corresponding author.*
E-mail address: vestly@fpm.upsi.edu.my

https://doi.org/10.37934/araset.35.1.121128

same educational and vocational opportunities that are available to children who do not have any impairments. The advancements that have been made in the field of information technology have resulted in the widespread availability of digital technologies, which can be put to good use in the process of broadening students' educational options.

This globalization challenge has a profound effect on the country's education system. Therefore, the Ministry of Education Malaysia (MOE) has designed a variety of policies and programs to structure the existing education system to be more diverse and meet the needs of the nation. Increased use of technology in education provides an opportunity to help SEHI students follow the process of teaching and learning effectively using assistive technology. SEHI teachers play a major role in realizing this effort. However, SEHI teachers need to proficient and master the use of assistive technology in the teaching of SEHI students.

1.1 Problem Statement

According to findings that were presented at the conference of the International Society for Technology in Education in recent years, the degree to which special education teachers participate in the decision-making process regarding technological advancements has a direct impact on the degree to which such educators can successfully integrate technology into the education of their students. Starks, who before the pandemic had worked as a special education teacher and a technology integrator, had some reservations about the use of virtual learning for instructors and students who had special requirements. Starks and her co-researcher, Stephanie Reich, wanted to find out the "enablers and impediments" to the use of technology by special educators from the perspective of those working in the field. This population is typically neglected in technological research and development. Starks and Reich wanted to find out why this is the case. The following difficulties were identified by educators working with students who have exceptional needs: (1) Students were unable to access the internet from their homes because either the hardware or the software was inaccessible. (2) Students' lack of familiarity with computers and other forms of technology. (3) The training that is given to teachers of special education is insufficient. (4) decisions made at the level of the school or district that did not take the requirements of students with disabilities into sufficient consideration.

1.2 Objective

Hence, this qualitative study was conducted to examine the attitude, skill, and barriers of SEHI teachers in the use of assistive technology in the teaching of SEHI students in SESS.

1.3 Literature Review

According to the Assistive Technology Act, defines assistive technology involving goods, equipment or product systems used to enhance, maintain, or improve the ability of a disabled person to function. Every public agency is obliged to ensure that the assistive technology and services is provided and supplied to children with disabilities in education [1-3]. The drafting of these two acts is important because it guarantees the rights and needs of education for individuals with various disabilities.

Assistive technology is a tool that helps students with hearing impairments improve learning performance while teaching technology is a tool used to improve the teaching process of SEHI teachers [4,5]. Assistive technology focus on hearing problems and access to communication.

Implementation of assistive technology in hearing impairment is essential for the learning and academic needs of SEHI students [6,7].

According to the Wisconsin Assistive Technology Initiative, the use of assistive technology for hearing- impaired students can be categorized into three types of technologies, namely hearing technology, alerting devices and communication support technology [8]. The purpose of this assistive technology is to support the ability to present important information to hearing- impaired students. The use of aid technology among hearing impaired students depends on the factors of need, when and how the use of the assistive technology will be used and assisted in their daily lives. Nowadays, many assistive technologies have emerged and developed for the use of special needs hearing impairments.

It is without a shadow of a doubt that the success of the incorporation of assistive technology into any educational system is contingent on the caliber and number of teachers who serve as the primary implementers of the educational program. This is especially true when considering the numerous advantages that are associated with the utilization of assistive technology in the education of students who have special needs [9]. In this context, the attitudes, and strategies that educators take toward the utilization of technology are of critical importance. It follows that when teachers have a favorable view of a particular kind of assistive technology, they are more likely to make concerted efforts to successfully incorporate it into the classroom. This is because of the positive impact that it can have on students with disabilities [10,11].

If teachers have a negative attitude toward assistive technology in general, it is less likely that they will implement it in their own classrooms. Because of this, it is possible that it will influence how effectively they are able to utilize technology of this kind. According to psychologists, the "primary guiding factor" (CGF) that underlies all human actions is an individual's attitude. Gordon Allport regarded as one of the most knowledgeable authorities in the field of psychology, defined attitude as "a mental and neurological state of readiness, structured by experience, having a directive or dynamic impact upon the individual's behavior to all objects and circumstances with which it is associated" (attitude: a mental and neurological state of readiness, structured by experience) [12].

In his definition, Allport’s emphasizes the significance of two points: first, that attitudes are personal, and second, that attitudes are acquired through experience and then arranged according to that experience. To phrase it another way, people do not necessarily have a positive or pessimistic outlook on life by default. On the other hand, a person's disposition is something that can be learned through the process of their socialization. In this sense, attitude is not a fixed concept; rather, it plays a proactive role in the process of shaping how individuals behave in a variety of contexts. As a result, one's state of mind is seen to have a direct impact on the actions that they take [13,14].

Therefore, it stands to reason that teachers of special education must have a solid understanding of these three fields to be able to adequately address the six facets that are at the core of the incorporation of assistive technology in special education. Williamson-Henriques, emphasized, in line with the, that educators who are well-versed in the use of assistive technology are well-equipped to operate and incorporate such tools into their pedagogical practices. This is consistent with what was previously stated.

It is essential to recognize that the demographic characteristics of special needs instructors are major factors in determining the level of teachers' expertise and attitude toward the application of assistive technology. Consequently, research on the role that demographic factors like gender and years of experience in the classroom have in shaping educators' perspectives and comfort levels with the implementation of auxiliary aids and technologies (AT) is warranted. Gender is one of the demographic variables that could be studied.

The use of assistive technology in the classroom helps to improve teachers' teaching and learning processes to SEHI students. More specialized teaching by SEHI teachers and SEHI students can do more effectively without the help of others. According to Ofiesh *et al.,* [15] in the context of special education most teachers of SEHI need to understand how the use of assistive technology can give students the opportunity to controlling and improving their learning. Ali [16] stated that the use of assistive technology by SEHI teachers could increase the level of functionality of SEHI students and increase their confidence level. SEHI students have the space to self-study effectively and to create cooperative learning among SEHI students.

SEHI students need specific approaches and technology assistance to their inability to support their learning process [17]. In other words, SEHI teachers should not only use the assistive technology based on the characteristics of an inability only but should be based on the level of functionality and characteristics of the student itself. According to Ardis [18], the main purpose of the use of assistive technology is to improve the cognitive aspect and the level of learning of special education students. Recognizing that, as teachers of SEHI we need to recognize the disability level of SEHI students so that the provided and used assistive technology materials can have a positive impact on their learning.

According to Marschark [6], special education teachers have a responsibility to select appropriate materials for their students with special needs to work with and assist these students in effectively following the learning and teaching process. When selecting a form of assistive technology, the student who will be utilizing the tool should be the primary focus of consideration. The use of assistive technology should consider both the abilities and the limitations of students who are enrolled in special education. The appropriateness of the materials should be considered by educators, in accordance with a set of criteria for the selection of appropriate materials. Teachers of students receiving special education have a responsibility to define the aid technology materials that their students use by taking into consideration several the most important determinants and issues.

Therefore, SEHI teachers should collaborate with members of the various perspectives and disciplines such as SEHI students, parents, assistive technology specialists, speech therapists, school administrators, student assistant assistants and parties concerned with SEHI students to select assistive technological materials that can provide services and meet the educational needs of students of SEHI [19].

People who are hard of hearing or deaf use a range of assistive technology to increase their accessibility in a number of settings. The majority of gadgets offer enhanced audio or other methods of seeing and/or feeling information through vibration or vision [20]. These technologies fall into three broad categories: warning devices, communication assistance, and hearing technology. Subcategories based on distinct goals or target users of the technology may exist within each primary category. The greater accessibility of information—which most people obtain through their hearing—is the overarching aim of all these devices.

The objective of the following tool descriptions (Figure 1) is to give the reader a better knowledge of these tools, as well as when and how they might be used. Assistive technologies may be necessary for deaf and hard of hearing individuals, depending on their needs in particular settings. These assistive technologies may occasionally be used in tandem. Many technologies designed for hard-of-hearing people may also be helpful to people who do not have hearing loss; however, this knowledge is outside the purview of this chapter. For the goal of giving the reader a general overview of assistive technology that is frequently used by deaf or hard of hearing people, the material supplied is deemed thorough. However, not every resource, manufacturer, or gadget can be realized due to technology changed.

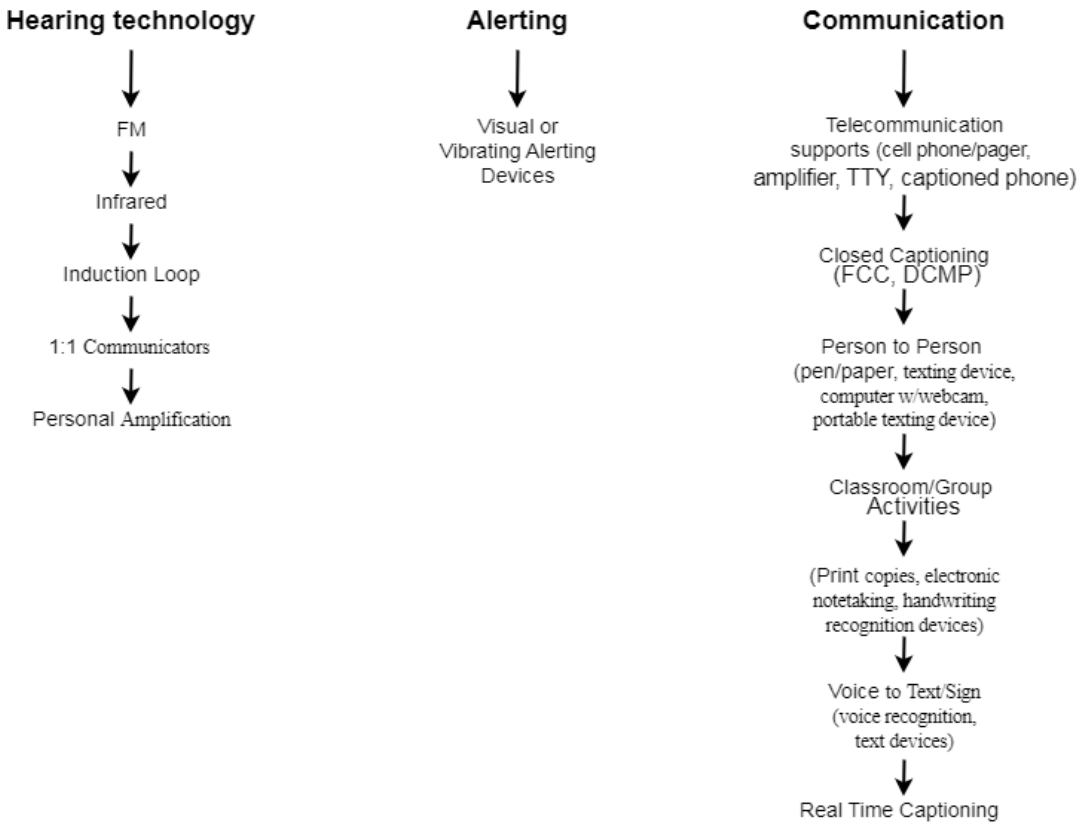

Fig. 1. A Continuum of Considerations for Assistive Technology for Individuals who are Deaf or Hard of Hearing [17]

2. Methodology

This study uses a qualitative study design that is partially structured to interview SEHI teachers. A purposive sampling was used to collect the information of this study. Four respondents were selected for each two male teachers and two female teachers. The number of respondents is said to be sufficient to obtain rich data for qualitative studies. The names of the respondents in this study are not announced, instead of being nominated Respondents A to D to maintain ethical research subjects must be protected to avoid any interference, threats, and misinterpretations against them.

The respondents who were chosen all have prior experience as SEHI educators and are currently working in SESS. The states of Selangor, Pahang, Kedah, and Penang served as the sites for the research that was carried out there. This election was held because of the SESS that took place in the states. The content analysis method was utilized when examining the results of the study. The research question was dissected and arranged into relevant categories based on the findings of the content analysis method, which is the process of compiling and reporting written data. A method of thematic analysis was used throughout the course of the research to continually refine each of the themes that had been identified.

3. Results

The results of the findings are summarized to the specific themes and codes that are the attitude of SEHI teachers towards the use of assistive technology in teaching, SEHI teacher skills on the use of assistive technology in the teaching and barriers of SEHI teachers towards the use of assistive technology in teaching. The following is the findings of the study theme.

3.1 SEHI Teacher's Attitude toward the Use of Assistive Technology in Teaching in SESS

The majority of respondents stated exactly and clearly about the attitude of SESS teachers towards the use of assistive technology in teaching in SESS. The overall findings of interview analysis are shown in Table 1.

Table 1
SEHI Teacher's Attitude on the Use of Assistive Technology in Teaching

Respondents	Interview Summary
A	Assistive technology is not available and is not used in schools. Pupils are encouraged to use their own hearing aid. The teacher's smartphone is just for personal use. Teachers are less likely to use e-dictionary than print dictionary.
B	Not using assistive technology due to lack of resources as there is no Internet facility.
C	Teacher less using special assistive technology.
D	Teachers and students love using the assistive technology provided. LCD projectors, laptops, Adobe Illustrators, Photoshop are often used in teaching. VLE Frog is less favourable because it takes a long time to "load".

Based on this interview, it can be concluded that the attitude of SEHI teachers towards the use of assistive technology in SESS is less satisfactory. This is because only one respondent stated that teachers and students would like to use the help technology provided. However, other respondents failed to use them on the factor of teacher's attitude and the lack of help technology in SESS.

3.2 SEHI Teacher's Skill toward the Use of Assistive Technology in Teaching in SESS

In this study, it is clear that the majority of the respondents correctly and clearly explain the skills of SEHI teachers towards the use of assistive technology in teaching in SESS. The findings of interview analysis are shown in Table 2.

Table 2
SEHI Teacher's Skill on the Use of Assistive Technology in Teaching

Respondents	Interview Summary
A	An assistive technology is used entirely by teachers, but it is simply supporting teaching and is not exhaustive.
B	Skilled in the use of assistive technology but is experiencing constraints due to lack of internet facilities.
C	Teacher is less skilful and does not use assistive technology because it is not available at school.
D	Teacher skilfully using sign language and multimedia technology. The use of other assistive technologies is still inadequate.

Inferred from the interview, the majority of teachers have a modest skill in the use of assistive technology. Due to infrastructure constraints, they cannot use the assistive technology at school.

3.3 SEHI Teacher's Barriers to the Use of Assistive Technology in Teaching in SESS

The study explains the majority of the respondents clearly talk about the barriers of SEHI teachers towards the use of assistive technology in teaching in SESS. In detail, this analysis can be referenced in Table 3.

Table 3
SEHI Teacher's Barriers to the Use of Assistive Technology in Teaching

Respondents	Interview Summary
A	A technology device tool is quite expensive for students and is not allowed to carry and use it at school because it is feared to bring other problems like theft.
B	Less infrastructure, resource materials and no internet access facilities at school.
C	There is no assistive technology in the school because it is expensive.
D	No suitable teaching material.
	The use of VLE Frog is less productive as it takes too long to use it.

Through this interview, the researcher was able to identify the various problems faced by SEHI teachers in applying the use of assistive technology in teaching in SESS. The findings show that cost deficit, infrastructure and assistive technology are the barrier

Factor in the implementation of assistive technology among SEHI instructors working in SESS Some of the assistive technologies that are available to teachers and students at SEHI come at a significant financial investment. The institution of higher learning does not provide any infrastructure facilities, such as internet access or material resources. In addition, not all assistive technologies are fully compatible with one another and cannot be used to their full potential by SEHI students when instructing in SESS.

4. Conclusions

In conclusion, the findings show that teachers at SEHI have a satisfactory attitude and moderate skill to the use of assistive technology in teaching, whereas teachers at SESS face challenges in terms of cost, infrastructure, and the availability of resources related to assistive technology. Therefore, the Ministry of Education and the Special Education Division should take note of these issues to facilitate the expansion of the use of this assistance technology for the benefit of teachers and students of SEHI in Malaysia. As a result, it is essential to encourage and incentivize teachers to expand their knowledge of and proficiency in the use of assistive technology for children who suffer from communication disorders, sensory impairments, motor impairments, cognitive disabilities, and emotional and behavioural issues. In a similar vein, it has been suggested that improvised manufacturing of assistive devices could make use of the abundant raw materials and skilled labour force in Malaysia. This would be in keeping with the previous point. It's possible that schools in different State that cater to students with special needs don't have the financial means to purchase assistive technology that was developed outside of the country, but this could be of great assistance. Finally, it is of the utmost importance that pre-service special education teachers and educational technologists in Malaysia have access to a comprehensive teacher education programme. This programme should concentrate on the development of essential skills that are required for the creation, implementation, evaluation, and improvement of assistive technologies in the special education system of the country.

References

[1] U.S. Department of Education. "Individuals with Disabilities Education Act (IDEA 2004)." *U.S. Department of Education*. Accessed on April 7, 2022. https://legcounsel.house.gov/Comps/Individuals%20With%20Disabilities%20Education%20Act.pdf.

[2] Allen, Thomas E., M. Diane Clark, Alex Del Giudice, Daniel Koo, Amy Lieberman, Rachel Mayberry, and Paul Miller. "Phonology and reading: A response to Wang, Trezek, Luckner, and Paul." *American Annals of the Deaf* 154, no. 4 (2009): 338-345. https://doi.org/10.1353/aad.0.0109

[3] Abd Mukti, Norhayati, and Siew Pei Hwa. "Malaysian perspective: Designing interactive multimedia learning environment for moral values education." Journal of Educational Technology & Society 7, no. 4 (2004): 143-152.

[4] Budyakova, Arina. "Use Of Assistive Technology in Inclusive Education: Making Room for Diverse Learning Needs." In *Recent Scientific Investigation*, pp. 22-26. 2021.

[5] Smith, Richard Norton. The Colonel: The Life and Legend of Robert R. McCormick, 1880-1955. Northwestern University Press, 2003.

[6] Marschark, Marc. "Cognitive functioning in Deaf." *Oxford handbook of deaf studies, language, and education* (2003): 464.

[7] Wah, Lee Lay. "Development of multimedia learning resources for children with learning disabilities in an undergraduate special education technology course." *Malaysian Education Dean's Council (MEDC)* 1 (2007): 29-36.

[8] Boothroyd, Arthur. "Hearing aid accessories for adults: The remote FM microphone." *Ear and Hearing* 25, no. 1 (2004): 22-33. https://doi.org/10.1097/01.AUD.0000111260.46595.EC

[9] Edyburn, Dave L. *Inclusive technologies: Tools for helping diverse learners achieve academic success*. Bridgepoint Education, Incorporated, 2013.

[10] Mohamad, Hazwan Faisal. " OKU gigih usahakan bakeri sendiri." *Berita Harian Online*. December 10, 2016. https://www.bharian.com.my/bhplus-old/2016/12/222155/oku-gigih-usahakan-bakeri-sendiri.

[11] Larsen, Dennis Øland. "Design of DC-DC Converters for Rechargeable Hearing Aids." *PhD diss., Technical University of Denmark* (2018).

[12] Kratz, Hilary E., Aubyn Stahmer, Ming Xie, Steven C. Marcus, Melanie Pellecchia, Jill Locke, Rinad Beidas, and David S. Mandell. "The effect of implementation climate on program fidelity and student outcomes in autism support classrooms." *Journal of Consulting and Clinical Psychology* 87, no. 3 (2019): 270. https://doi.org/10.1037/ccp0000368

[13] Dogan, Bulent. "Educational use of digital storytelling: Research results of an online digital storytelling contest." In *Society for Information Technology & Teacher Education International Conference*, pp. 1061-1066. Association for the Advancement of Computing in Education (AACE), 2010.

[14] Zanzali, Noor Azlan Ahmad, and Lim Wee Mei. "Bimbingan oleh guru pembimbing kepada guru pelatih UTM." *Journal of Educational Psychology and Counseling* 1 (2011): 59-76.

[15] Ofiesh, Nicole S., Craig J. Rice, Ellen M. Long, Deborah C. Merchant, and Anna H. Gajar. "Service delivery for postsecondary students with disabilities: A survey of assistive technology use across disabilities." *College Student Journal* 36, no. 1 (2002): 94-109.

[16] Ali, Manisah Mohd. "Knowledge and Profile of Criterion Selection of Assistive Technology." In *International Conference on the Challenge of Learning and Teaching in a Brave New World*. Pearson Education, 2002.

[17] Bryant, Diane Pedrotty, Jane Erin, Robin Lock, James M. Allan, and Paul E. Resta. "Infusing a teacher preparation program in learning disabilities with assistive technology." *Journal of Learning Disabilities* 31, no. 1 (1998): 55-66. https://doi.org/10.1177/002221949803100106

[18] Ardis, S. "Assistive Technology." *Resource Materials & Technology Center: Deaf/Hard of Hearing (RMTC), St. Augustine, FL*. Accessed on April 15, 2022. http://www.Deafed.net/PublishedDocs/Assistive%20Technology.ppt.

[19] Marschark, Marc, and Patricia Elizabeth Spencer. *The Oxford handbook of deaf studies, language, and education, vol. 2*. Oxford University Press, 2010. https://doi.org/10.1093/oxfordhb/9780199750986.001.0001

[20] Hayes, Heather, Ann E. Geers, Rebecca Treiman, and Jean Sachar Moog. "Receptive vocabulary development in deaf children with cochlear implants: Achievement in an intensive auditory-oral educational setting." *Ear and Hearing* 30, no. 1 (2009): 128-135. https://doi.org/10.1097/AUD.0b013e3181926524