

Portraits of Assistive Technology in English Learning for Visual Impaired Students in Higher Education

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This study investigates learning English with assistive technology, the learning outcomes, and the experiences of using assistive technology, particularly JAWS and MELDICT. One visually impaired student at a private university in South Sulawesi, Indonesia, was interviewed as part of a qualitative case study. Observation and interviews were used to explore the utilization of assistive technology for learning English by a visually impaired student. The results identified that in the process of learning English skills, a visually impaired student used JAWS dominantly, and nevertheless, visually impaired students used both JAWS and MELDICT, especially in writing. Moreover, assistive technology positively affects the learning outcomes of visually impaired students who absorb the material effectively. Using JAWS and MELDICT, the visually impaired student's English-learning endeavors were both pleasant and fruitful. Practitioners should receive additional debriefing or training to strengthen their pedagogical and psychological capacities to deal with special needs students.

Keywords: assistive technology, JAWS, Meldict, visually impaired student

INTRODUCTION

The rapid development of technology can modify the paradigm not only in education in general but also in special education. Technology's impact on education disciplines has been enormous (Ramos, 2020). Several kinds of technology are adapted or directly utilized to increase the abilities of children with special needs. This tool that aids children with special needs is called Assistive Technology (Al-Zboon, 2020; Senjam, 2021). For students with disabilities, assistive technology can be a helpful and supportive tool (Ahmed, 2018). In line with Dominic et al. (2020), the advancement of assistive technology in education has been accelerated due to recent technologies that have made their way into particular education institutions around the world. Assistive technology refers to any commercially bought or manufactured goods or devices used to improve or maintain the functional capabilities of people with impairments Wong & Cohen (2011). The technology is tailored to the unique capabilities of children, making it easier for

students to follow along with their learning. These devices range from low-tech devices such as a specific pen grip to more advanced products such as hearing aids and spectacles to high-tech items such as braille displays and computers with specialist software for assisting individuals with reading disabilities (Petty, 2012).

In its development, assistive technology for students with special needs has been widely used in various learning activities for students with disabilities. An individual has a disability that affects his/her ability to participate in activities considered "normal" in his/her daily life called disabled. Disabilities can be physical, cognitive, intellectual, and sensory impairments, such as being visually impaired (Puspitasari, 2019), hearing impaired (Dewi et al., 2019), or intellectual disabilities (Bawa & Osei, 2018). Disabilities have a detrimental effect on the teaching and learning process, necessitating assistive technologies (AT). In this study, assistive technology is one tactic for assisting students with visual impairment in an Indonesian context. Visual impairment refers to a significantly reduced or diminished capacity to see, which results in problems that cannot be resolved using conventional means, such as eyeglasses (Agesa, 2014). Hamid (2020) revealed that students with visual disabilities had reduced / poor visual acuity and visual or visual function defects. A student with visual impairment has reduced vision, which will impede learning if it is not supported by assistive technology.

Moreover, using assistive technology in English learning for visually impaired students has been demonstrated to be beneficial in several previous studies. Setiawan et al. (2020) found that the teacher used e-text concerning the JAWS application and an auditory technique (Live Reader with a story called My School and Live Reader with multiple-choice tests) to assist visually impaired students in reading English. Fansury et al. (2019) revealed that implementing audiobooks as teaching media for blind students in learning English could help students in the learning process. Susanto & Nanda (2018) added that a range of resources, including screen reader technology such as Non-Visual Desktop Access (NVDA) and Job Access with Speech (JAWS), were utilized significantly by the students in their English language acquisition. Hesti & Riski (2017) also noted that the visually impaired students who are required to be taught using specific strategies tend to use Braille books and auditory media. Based on the previous studies above, mostly teacher and visual impairment students used JAWS in the teaching and learning process.

Unlike the previous studies that addressed the use of Job Access with Speech (JAWS), Non-Visual Desktop Access (NVDA), audiobooks, Braille books, and auditory media in learning English. This study uses assistive technology for visual impairment in English learning, namely Jobs Access with Speech (JAWS) and Mitra Electronic Dictionary (MELDICT) describe visually impaired students' learning process, outcomes and experiences. JAWS is an abbreviation for Job Access with Speech. This program was a Microsoft Windows screen reader that enabled blind and visually impaired people to interpret the screen (Susanto & Nanda, 2018). While the dictionary, called Mitranetra Electronic Dictionary (MELDICT), was created by Yayasan Mitra Netra (YMN) and Citibank Peka in Indonesia. Meldict Indonesia-English can be operated by the visual impairment or blind using a talking computer, which is a computer equipped with a screen reader. The visual impairment students can listen to what is displayed on the monitor (Wiyannah, 2016).

METHOD

Research Design

This research used qualitative research and progressive case studies. Case studies are an in-depth analysis of a case, often a program, event, activity, process, or one or more individuals (Creswell and Creswell, 2018). It also allows the researchers to dig for more in-depth information on the phenomenon according to the context (Yeung, 2020). The visual impairment students' process, result, and experience were researched using observation and interview. Those data collection techniques allow the researchers to gather more in-depth data.

Visually Impaired Students

Before conducting the research, the researcher has personally obtained permission from the institution to conduct research with visual impairment students. The study was conducted at a private university in South Sulawesi, Indonesia. One of the universities facilitated the teaching-learning process for students with special needs (SSN), particularly visually impaired students. The visually impaired students could be described as follows: Vimpt, a pseudo name. He was in the fourth semester of the English Department student who categorized as a low vision student (vision loss that may be severe enough to impede a person's ability to carry on everyday activities but still allows some functionally helpful sight). He is categorized as myopia (people with myopia are usually can see close objects well, but objects in the distance, such as highway signs or writing on a chalkboard, appear blurred). At the same time, his right eye can still see if the object or thing is less than a meter away. While viewing the writing, the font size must be 14 or greater. He always relied heavily on his hearing to understand everything. By optimizing their hearing, he concentrated on what the speakers said. JAWS and MELDICT as tools help bridge his limitation in learning English.

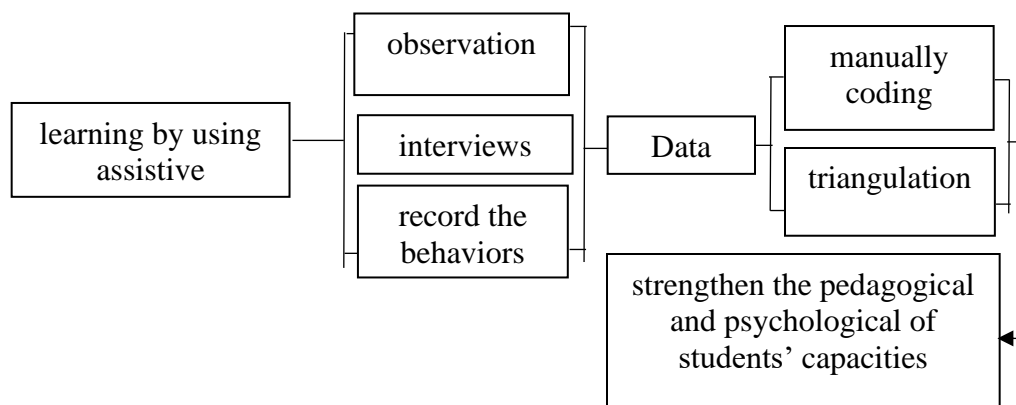
Instruments and Procedures

To gain data about visual impaired students' process and outcomes in English learning by using assistive technology. The researcher used observation and interviews. The observation was used to capture the learning activity. Observation is collecting data based on what the researcher sees and perceives without filtering (Yin, 2014). An interview encourages the exploration of study subjects' ideas, behavior, experiences, and phenomenon to get in-depth information. Heigham and Croker (2009) stated that the process of gain information allows for new options to investigate people's experiences and perspectives. Then, the researchers ask visual impairment students about the outcome and experience in English learning by using semi-structured interviews to ask a series of questions specifically (Creswell & Creswell, 2018; Merriam and Tisdell, 2016). The interview session was recorded, transcribed, and coded manually.

Data Analysis Technique

The researchers in this current study will manually code the data from the interview because it appears more logical to reduce errors and inaccuracies. Then, observation was utilized to choose and record the behaviors of a visually impaired student during the learning process. To complete the interview data, the researcher observed centrally and thoroughly. The stage is essential and is referred to as triangulation (Patton, 2015). Triangulation refers to the collection of data from various viewpoints on the phenomena under study or, more broadly, in conducting the study (Denzin & Lincoln, 2018). The codes were then aggregated to form themes that reflected visual impairment students' opinions and experiences learning English with assistive technology. In short, the research design is described in following diagram:

**FIGURE 1
RESEARCH DESIGN**



RESULTS

Visual Impairment Student Process in Learning English

This study focused on student or individual with disabilities, namely visual impairment. Listening, speaking, reading, and writing are all necessary skills for visual impairment student to learn English. It includes real-life circumstances that visually impaired students confront when learning English with assistive technology like JAWS and MELDICT. This study aims to look into the use of technology in learning English, with a focus on narrative texts. Because students already have prior experience of narrative text, it was chosen as the theme of the course in this case. The following is an overview of how the visually impaired students learned English using JAWS and MELDICT.

Listening

Students with visual impairments utilize JAWS as a screen reader to improve their listening skills. According to the researcher's observations, visually impaired students who use JAWS tend to utilize a quick tempo; he dislikes it when the voice mode of the JAWS program is slow in learning English. The findings of interviews were conducted by researchers.

Well, maybe I utilized American style, so I made it faster than British style, he asserted. It often slowed the tempo.

The tempo of listening skills aids and influences student with visual impairments' comprehension of the content being studied.

I thought perhaps if I listened clearly, I would immediately be able to comprehend it.

This proves that visually impaired student has optimal hearing abilities and is an advantage for him even though they learn everything only through hearing. The role of JAWS itself in listening skills is to help visual impairment student to listen more clearly to explanations, words or sentences that are not clear, and to check the assignments he has made previously.

Reading

From the results of observations made by researchers, visual impairment students often use JAWS to generate or select words or sentences in the reading process. This is done by rereading the text. Visually impaired student mastered several ways to read and understand material in JAWS. Visual impairment student explained that how to operate JAWS was the same as the normal student process of reading a book and returning to the previous page to ensure that the information he wanted to save and select was correct. While reading, the visual impairment student also listened to what JAWS had to say. The visual impairment student reread the material repeatedly by pressing the arrow keys on his keyboard. This is related to the results of interviews obtained by researchers. Visual impairment student states that:

In my perspective, if the work included a text, I generally preferred used JAWS... I was similar to an ordinary student would do if an ordinary student read page to page, and I was there to confirm it by pressing the arrow button in my keywords.

The above indicates that visually impaired students are familiar with using or operating JAWS in learning, especially in reading skills.

Speaking

The results of observations made by researchers found that the visually impaired develop their ability to pronounce unfamiliar or previously unknown words while learning English with JAWS. If JAWS produced the exact words with similar pronunciations, students experience visual disturbances repeatedly.

Visual impairment student is familiar with English, including its pronunciation and spelling, as well as how to read and write words or sentences generated by the JAWS system, and duplicating each word teaches him how to spell words correctly. Researchers obtained the results of interviews. Visual impairment student stated that:

I could investigate how to pronounce words from JAWS, such as "vary." I could imitate it...that berbeda in Bahasa Indonesia and "very" Sangat in Bahasa Indonesia, but then what? To be honest, there were quite a few about pronunciation.

The correct pronunciation will help his understanding of the sentence. The visually impaired student reads automatically according to what JAWS says, which helps him learn the reading style of the text. In addition, visual impairment students claim that the pronunciation of sentences varies according to the type of sentence; for example, a statement is different from a question, or vice versa.

Writing

From the results of observations made by researchers, it was found that visually impaired students expressed all his ideas in both Indonesian and English forms during the writing process. If there are words that he does not know, then the visually impaired student will translate and then insert it into MELDICT. This is related to the results of the interviews obtained. Visually impaired student stated that:

At times, I had the notion that there were difficult words/sentences. Generally, if it occurred, I felt and recognized it. Then I read it again. When I read it, I immediately recognized by using Meldict. Because the sound was unusual, it was incorrect.

After translating, the visually impaired student returned to review his writing to eliminate errors and ensure the accuracy of his language and vocabulary using JAWS. After listening to JAWS and there are still some errors, the visually impaired student made improvements again. This is related to the results of the interviews obtained. Visually Impaired student stated that:

At times, I felt like way. If I reread it, the JAWS reads somewhat awkwardly. Thus, there may have been some mistyping I typed. I preferred to continue writing, and after I had completed everything, I checked carefully. For sure, the word that I mean, I used JAWS and MELDICT. So, those helps me to determine the correct word.

Visually Impaired Students' Outcome in English Learning

The visually impaired student learned narrative text during the learning process. Based on the researcher's observation and interview, the visually impaired student described what he had done in learning English using JAWS and MELDICT. To begin, the teacher instructs students to select narrative types such as personal experience, fairy tales, folktales, myths, and fables. The visually impaired students then chose a folktale to tell. He told the narrative in Indonesian and used MELDICT to translate it into English. The visually impaired student then uses JAWS to double-check his narrative text after the text has been translated. The visually impaired student can use JAWS to check the accuracy of the folktale that has been created. Furthermore, the story is told by the visually impaired students. Visually impaired student also talked about how to write and retell stories. Visually impaired student is more interested in creating narrative texts that he understands better about the storyline, particularly folklore in his hometown, according to the interview results. Visually impaired student argued that:

I memorized correctly the narrative material that I had previously studied. I could also tell a narrative story and explain the generic structure of the story in an understandable way, which was nearly identical to the material I had learnt.

Visually impaired gains and adds to his English knowledge, such as tenses, vocabulary, and the generic structure of narrative texts, as a learning outcome. As a consequence, visually impaired student was able to identify some of the phrases, phases in the arrangement of narrative text, and vocabulary that he had acquired when the teacher asked about it.

Visually Impaired Students' Experience in Learning English Using JAWS and MELDICT

Visually impaired student was enthusiastic while learning English with the use of JAWS and MELDICT. According to the visually impaired student, these assistive tools help him learn English. In addition, the visually impaired student might use the internet to find information that he desired and needed. Besides, it also hones visually impaired students' ability to recognize words with proper pronunciation. In line with the interviews' data, visually impaired student said that:

Using JAWS and MELDICT in my learning process, it was able to explore and improve all of my English skills. Regarding to my capacity to acquire material from the internet and my comfort with expressing my ideas in Indonesian. If I have trouble deciphering words, I can use Meldict as a translator. Then, hearing the term pronounced by a native speaker aided me. It decreased misunderstanding caused by hearing mispronunciations of words or sentences from others who did not speak English fluently.

As a result, the visually impaired student felt happiness and pleasure while learning using such applications. Those applications supported and assisted him in developing his English proficiency as well as his computer skills.

DISCUSSION

Several critical issues emerged from data analysis in this study. In this study, visual impairment students reported several issues in learning English. First, it relates to the process of English learning for visually impaired students enrolled in higher education. In this study, a student with a visual impairment demonstrated that he could utilize JAWS and Meldict. The results of this study described that visually impaired students could hear clearly while utilizing the speech mode setting of JAWS. Wiyanah (2016) discovered that using Job Access with Speech (JAWS) as a screen reader on a computer can help blind students overcome some of the barriers to English learning. This refers to the legibility and conversion of any text into clear speech.

Moreover, the visually impaired students used JAWS's arrows and back buttons in the reading process. Additionally, JAWS delivers the correct pronunciation of words; there is no mispronunciation. Meldict also helps visually impaired student figure out what difficult words mean in writing. Overall, JAWS and Meldict are beneficial to visually impaired students' learning processes. It relates to Susanto & Nanda (2018), who emphasize the importance of role-playing pedagogy, musical instruments, and the usage of JAWS and NVDA as screen reader technologies in special education institutions as a distinctive method of teaching English to high school students. Kapperman et al. (2018) stated that using JAWS for visually impaired students allows them to carry out the learning process independently without needing assistance. As a result, it is highly beneficial for visually impaired individuals to learn more effectively by leveraging their potential and limits to develop into creative and autonomous learners.

Meanwhile, they use JAWS and MELDICT to learn English, which places a premium on the writing abilities of a visually impaired students. This study determined that visually impaired students' usage of assistive technology benefits the university and high school learning processes. Additionally, it appears as though individuals with visual impairments are familiar with the usage of assistive technology. In another case, Syuhadi et al. (2020) also discovered that systematic and explicit decoding instruction could assist individuals with visual impairments in the reading process, namely how to sound out English words, if they are provided with appropriate materials and instruction. However, braille materials are such a crucial element of learning that visual impairment students must be offered at every meeting.

At the same time, there are some difficulties encountered by visually impaired students throughout the learning process. In listening, visual impairment students are preferred to conversations in American than British. In reading, the visual impairment student must exercise patience when using the computer's cursor and rereading the text. Then, in speaking, the visually impaired student struggles to distinguish the sounds of consonants [v] and [f]. In writing, the visual impairment is sometimes difficult to write words correctly at times. Thus, the use of JAWS and MELDICT aids students significantly in their complicated learning process. Aryanti (2014) found some obstacles faced by visual impairment in learning English. In listening skills, they struggle to keep up, are unable to grasp quickly, have restricted vocabulary, and have difficulty with sounds. VIS has specific issues with speaking skills, such as a lack of English intonation use of one's mother tongue. There are several reading obstacles, such need for more time to read. Furthermore, vocabulary and grammar are issues that VIS faces in writing.

The next issue found in this research is that the visual impairment student emphasized learning outcomes in English using assistive technology. Meldict allows visually impaired students to double-check the translation of narrative text. In line with Hendaryanti & Hadiprayogo (2018) MELDICT has a considerable effect on learning outcomes in English, particularly in terms of boosting vocabulary understanding, according to the findings of the study. Students with visual impairments no longer need to rely on large dictionaries. MELDICT is helpful for visually impaired students. However, visually impaired students confront a challenge: they must first create assignments in Indonesian and then translate them into English. As a result, the task's completion is slowed. Furthermore, the visual impairment student used local dialects to learn English, particularly in developing speaking abilities, as he must adjust to native languages. Moreover, visual impairment can coherently explain the definition, generic structure, tenses, and expression of the material presented. In line with, Wiyanah (2008) revealed that despite the poor quality of the narrative writing, blind students can classify their classification by using the general structure. Moreover, Suharti & Sutikno (2019) stated that assistive technology, namely iTranslate Translator & Dictionary, Microsoft Word: Review, Grammarly assist EFL students in translating stage. Furthermore, iTranslate Translator & Dictionary, Microsoft Word: Synonym, Grammarly are discovered to aid in proofreading or reviewing new ideas or text-built stage; Checking Parts of Speech, Spelling, and Improvisation Synonyms.

The experience's Visual impairment is another crucial issue of this study. In visual impairment students' experience, using assistive technology to learn English has been helpful. The visually impaired student is overjoyed because he can accomplish everything independently without relying on the teacher or other friends for assistance due to assistive technology. Supported by Dawn (2013) by providing tools for improved independent access to information and effective communication, assistive technology enables people with visual impairments to make up for these limitations, succeed in school, and find competitive employment. Based on the research conducted by Arslantas (2017), visually impaired learners have benefits in learning foreign languages. In comparing sighted and visually impaired students, it has been shown that visually impaired students have stronger verbal memory when they receive the same treatment and auditory input as sighted students. Kapur (2017) added that the experience that visually impaired students face includes difficulties with reading, writing, listening, and speaking. He also lacks knowledge, information, policies, and procedures, ineffective teaching methods, resources and parental involvement, labeling and negative attitudes, and a lack of teacher collaboration and a rigid curriculum. These harrowing experiences can be overcome by developing good communication skills, paying proper attention in class, sitting in front of the class near the whiteboard, and using technology and other assistive equipment appropriately. Another critical highlight was not only visual impairment students with diverse learning experiences in learning English. But also, visually impaired teachers were able to give a positive response to sighted teenage students in teaching English. Effendi et al. (2021) stated that the findings depict an unusual EFL classroom occurrence. Sighted teenaged students shared great learning experiences while learning English in a classroom with their visually impaired teacher. As they reported, students had amusing, engaging, enlightening, collaborating, and highly active English classes.

CONCLUSION

Visually impaired student required assistive technology to help them enhance their capacity to learn. JAWS AND MELDICT were the media that were effective and beneficial for his learning English. The visual impairment student improved his English proficiency and other language components by studying English material. By doing so, visual impairment would avoid becoming students who were ignorant of the technology of the age, despite the fact that visual impairment was students with a physical disability. Throughout his learning process, the participant described his results after mastering the English subject with JAWS and MELDICT. The visual impairment associated with students' learning outcomes was dubbed the product of learning. Students with visual impairments gained new skills and strategies such as listening comprehension, expanding their vocabulary, practicing their pronunciation, writing, reading narrative text and some expressions, and also provided an engaging ways of learning English through the use of JAWS and MELDICT. Additionally, as assistive technology, JAWS and MELDICT fostered and aided his learning to develop into an independent student. In summary, technology-based learning must be paired with teachers' instruction to help students with visual impairment enhance their abilities.

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