International Journal of Educational Innovation and Research ISSN: 2810-0808
Volume 2, Number 1, 2023, pp 10-22
DOI: https://doi.org/10.31949/ijeir.v2i1.3001

Leveraging Education through Artificial Intelligence Virtual Assistance: A Case Study of Visually Impaired Learners

Paul Niño Ry F. Mina[1], Ice Mae J. Solon[1], Fatima Rose E. Sanchez[1], Tristan Kent Y. Delante[1], Jean Kathleen R. Villegas[1], Florence John S. Basay[1], Jay-r V. Andales[1], Francine B. Pasko[1], Mary Fair Ruval O. Estrera[2], Roberto D. Samson Jr. [3], Romel C. Mutya[4*]
[1]SHS Students, Mandaue City Comprehensive National High School, DepEd – Mandaue City, Philippines
[2]Teacher III, Mandaue City Comprehensive National High School, DepEd – Mandaue City, Philippines
[3]Master Teacher II, Mandaue City Comprehensive National High School, DepEd – Mandaue City, Philippines
[4]Teacher III, Mambaling National High School, DepEd – Cebu City, Philippines
*Coresponding Author: romel.mutya@gmail.com

ABSTRACT
The study aims to explore an in-depth analysis of leveraging education through artificial intelligence (AI) virtual assistance among visually impaired learners. The investigation centers on describing the challenges and struggles encountered by visually impaired learners, highlighting the usage of AI virtual assistance, the adaptability of the visually impaired learners, and the enhancement of the curriculum. This study utilized a qualitative case study research design using Braun and Clarke's (2008) data analysis method to describe an in-depth dissection of a case study involving five visually impaired learners through semi-structured interviews. Findings revealed five themes: (1) barriers in the learning process, (2) essentiality of AI virtual assistants, (3) achieving competence through technology, and (4) inclusive teaching and learning environment. The findings show that this pandemic has brought challenges to visually impaired learners in education, such as personal struggles, insufficiency of resources, and adapting to new learning modalities. However, AI virtual assistance allowed them to explore their potential and help them achieve academic tasks that are generally difficult due to their visual impairment. Researchers recommend improving the teaching and learning of visually impaired students in secondary schools.

ARTICLE HISTORY
Received 2022-07-25
Accepted 2022-12-28

KEYWORDS
Artificial Intelligence
Inclusive Education
Leveraging Education
Virtual Assistance
Visually Impaired

INTRODUCTION

Technology plays a significant part in helping people connect, survive, and overcome certain constraints (Levy, 2014; Rasli et al., 2015; Schade et al., 2013). Artificial Intelligence (AI) and machine learning continue to innovate as technology advances (Cockburn et al., 2018; Marr, 2019). AI-powered Virtual Assistants have been identified, including iOS Siri, Microsoft's Cortana, Amazon's Alexa, and Google's G-Assistant (Afshar, 2021). These AI Virtual Assistants use voice recognition technology and emulate human interaction to perform tasks (Cho et al., 2019). Virtual assistants are one of the ultimate degrees of Robotic Automation; they can process multiple tasks and complex questions and evaluate a meaningful response. AI Virtual Assistant aids individuals and persons with disabilities in accessing technology (Olguín-Gil et al., 2021). It aims to make the user's experience hassle-free (Iyer et al., 2020). Machine learning and other advances in AI technology have resulted in the proliferation of virtual assistants (Nafea, 2018).

Various sectors, such as the educational sector, have implemented AI virtual assistants for advanced and higher education (Page & Gehlbach, 2017; Zawacki-Richter et al., 2019). This rapid development brings convenient daily life to students, especially for learners with disabilities, specifically the visually impaired ones (Forbes & Lasonen, 2021; Martiniello et al., 2021). Learners with visual impairments may be blind, partly sighted, or have poor vision. Visually impaired learners face specific challenges in literacy and academic development. Special training programs are provided for them in schools to help the learners. However, the learners still experience difficulties in accessing the world around them. This challenge primarily involves the independence of visually impaired learners, as no individuals are available to assist their needs. Although technology has advanced significantly, accessibility remains stagnant for visually impaired learners, particularly on the internet. The need for self-sufficiency is recognized in the situation of visually impaired people who are socially restricted in today's advanced high-technology environment. Most tasks require visual information, which has resulted in a significant disadvantage for visually impaired people (Yadav et al., 2021).

Learners with visual impairment have been drawn to the usage of assistive technology. This assistive technology has expanded the potential for personal and professional growth of visually impaired people (Sah, 2013). Assistive technology devices are used to enhance and improve the capabilities of learners with disabilities (Kotain & Sharma, 2015). Most visually impaired students learn about their environment through the sense of touch and hearing, unlike the other disabilities (Smith, 2008). If these learners lack the abilities to use assistive technology, they may have difficulty accessing technology and exploring the world they reside in. Thus, assistive technology has become a part of the core curriculum in junior high schools. Teachers have been trained extensively to educate visually impaired learners to gain a sufficient understanding of information technology programs. One of the typical reasons is that many visually impaired learners find themselves in situations where they need to use technology to develop their careers and seek independence (Ampratwum, 2016).

In this era of evolving global economies, education plays a vital role in the potential development of every individual. However, because of the pandemic, schools were affected that lead to its closure (Azhari & Fajri, 2022). Both school closures changed the educational system from physical to virtual classrooms (Chopra et al., 2021). This distance education gives a colossal challenge for learners with disabilities, teachers, and parents. (Bouznad & Ibourk, 2020; Cudillo et al., 2022; Donohue & Miller, 2020; Geverola et al., 2022). It is a significant problem for teachers on how they can continue providing special training to their students—particularly those who are visually impaired since they will learn primarily through screens in virtual classrooms. Nevertheless, schools adopted all possible educational interventions to supplement their learning amidst the pandemic. These interventions include the use of assistive technologies like AI virtual assistants. Visually impaired learners encounter several hurdles and issues due to their visual impairments, which harm their academic performance.

Addressing the needs of visually impaired learners and enhancing overall accessibility are vital keys to their academic achievement. With the situations mentioned above, the general purpose of this study is to conduct an in-depth examination of the educational experiences of visually impaired learners using AI Virtual Assistants. This will serve as an avenue for the viewpoints and opinions of visually impaired students who used AI Virtual Assistance within education will be a part of this objective. Enhancing the learning capabilities of visually impaired learners and improving the quality of education in general.

Review of Related Literature

Artificial Intelligence (AI) in Education

Quality adoption of new technology relies heavily on the professional development of special educators. Moreno (2020) found that training focused on active learner experiences significantly affected special educator iPad tablet adoption and implementation in the classroom. Longitudinal training focused on dynamic learner experiences significantly affected the likelihood of special educator iPad tablet adoption and the resulting performance in the school. These technologies substantially impact curricular and instructional goals in science and STEM schools (Ellis, 2020). In addition, Vincent-Lancrin and van der Vlies (2020) highlighted how AI could accelerate personalized learning and support students with special needs. At the system level, good uses include predictive analysis to reduce dropouts and assess new skillsets. A new demand for complex skills that are less easy to automate is also the consequence of AI and digitalization.

Reaching AI's full potential requires stakeholders to trust the technology and its use by humans. Chassignol and his colleagues (2018) described the impact of AI on education and addressed how AI can help to decrypt student difficulties and understand how to help them, improve the imagination of a collectivity, and design a new educational experience. Although AI is changing and reshaping the educational landscape, AI will not completely replace our traditional educational system. It is wrong trying entirely to replace social interaction with AI. It should be added to the conventional studying process as it was done with gamification and currently happening with VR and AR technologies.

Students Learning Capabilities Using Artificial Intelligence

The virtual assistant design focuses on non-anthropomorphic shapes with live features providing an intuitive and self-explainable interface (Cobos-Guzman et al., 2021). Mekni (2021) build a conversational agent system that effectively and efficiently supports students seeking information on curriculum, scheduling, teachers, and classroom location at any time. Both assistant conditions led to more excellent performance when executing the work alone, but interestingly the reported task load with the embodied helper was much lower than with the disembodied voice assistant. Kim and his colleagues examined findings with implications for productive and efficient partnerships with the intelligent virtual assistant while stressing the illustrated assistant's improved social presence and depth. User research on our agent has proven that humans can teach it with new instructions. Individuals see tremendous value in utilizing an instructible agent and establish what users feel are the most critical use cases of such an agency (Chkroun & Azaria, 2019).

Companies in the information technologies industry have taken serious steps to develop and introduce products enhanced by virtual or digital assistants. In this paper, we attempt to conduct a preliminary study on virtual or digital assistants and propose a framework for developing virtual or digital assistants (Zhou, 2016). Many students fail to raise these problems without timely and on-demand aid and support. To solve this problem, we provide an intelligent virtual assistant for students that delivers ongoing instant help to student, staff, and faculty communities. Instead of adapting humans to machines, the idea is to give consumers better recommendation services so that robots will be adjusted to humans in daily life (Rafailidis & Manolopoulos, 2019).

AI Virtual Assistant for Visually Impaired

The concept of AI virtual assistant is accomplished using an Android mobile app with voice assistant, picture recognition, currency recognition, e-book, and chatbot. It will be an excellent technique for blind people to connect with the environment and take advantage of technology's capabilities (Yadav et al., 2021). Virtual assistants like Siri on iPhones, Google Allo, Microsoft Cortana, and others have all been made possible thanks to advances in AI. Despite this advancement, little has been done to put these technologies into practice to help the blind or visually impaired community. Recognition of a person and item differentiation are simple skills for most people, but these activities can be exceedingly challenging for those who are partially or fully blind. Making it easier to see what is in front of them at that moment will make their lives run more smoothly. Sharma and his colleagues (2020) developed a system/assistant that served to guide a visually impaired person and will indicate the person by speaking through the earpiece. The system helped the person recognize people, add new faces and detect objects in their vicinity.

Cruz and Olvera (2021) outlined a process for creating a prototype for a visually impaired student's intelligent virtual assistant (IVA). Expert advice on the qualities that should be addressed in the design of the software agent for it to communicate with a visually impaired user is provided. The suggested helper is practical and resource-efficient, interactive, and adaptable. The completed prototype is powered by a Raspberry PI 3 device, which is low-cost and tiny in size. The system is related to an open-source home automation environment for testing reasons. It turned out to be truthful, trustworthy, and enticing. (Cruz & Olvera, 2021). Face identification, object and text recognition, a barcode scanner, and a basic voice-based chatbot will all be used in the app. It can count the number of people in a room, read text from newspapers and documents, and open a link found in a barcode (Raghavan et al., 2021). Assistive technology for the blind and visually handicapped is gaining popularity. The field has a significant societal influence on our elderly and blind populations, which are on the rise (Bhowmick & Hazarika, 2017).

The literature cited shows relevance with the present study for these materials gave information regarding the use of AI virtual assistance in education and for visually impaired learners. The preceding literature reviews reflect the similarities that provide the researcher with significant information, relevant

concepts, and valuable ideas in the conduct of this study.

Theoretical Framework

This study is anchored on the Experiential Learning Theory, Anchored Instruction, and Learning Theory. The experiential learning theory by David Kolb (1984) is based on the premise that the best way to learn something is to do it themselves, including visually impaired learners' experiences with AI virtual assistance to leverage education. The order Concrete learning, reflective observation, abstract conceptualization, and active experimentation are the four stages of the theory. The first two phases of the cycle are about grasping an experience, while the last two are about transforming it. Visually challenged students' experiences with AI virtual assistance are followed by four phases: concrete learning and active experimentation. In this current study, the experiences of the visually impaired learners will be explored through the different phases as perceived in the model above. Questions to be used during the interview will be crafted by the stages presented to encapsulate essential episodes of the whole period of leveraging education through AI virtual assistance.

The anchored instruction (Bransford, 1990) and Cognitive and Technology Group at Vanderbilt (CTGV) is a technology-based learning method that highlights the importance of putting learning into a relevant, problem-solving setting. AI virtual assistance training sessions for visually impaired students will then be built around an "anchor," a narrative, experience, or setting that contains a problematic situation to be resolved and is of value to the learners. The challenges from the visually impaired learners should never be simple to solve but instead complicated, requiring learners to debate and argue different choices. This framework is open-ended, and anchored modules usually contain most of the necessary details to address the problem and making it manageable in contexts with limited time and resources. In this current study, the learnings of the visually impaired learners will be explored through the different stages as perceived in the model above. Questions to be used during the interview will be crafted by the settings presented to encapsulate essential episodes of the whole period of leveraging education through AI virtual assistance.

The social learning theory by Albert Bandura (1971) is significant for modeling, observing, and imitating visually impaired learners' behaviors, attitudes, and emotional reactions in utilizing AI virtual assistance for leveraging education. Four processes are present through the mediational process of the theory attention, retention, reproduction, and motivation. In addition, observational learning is by observing the visually impaired learners in answering the questions given by the researcher. Questions to be used during the interview will be crafted by the stages presented to encapsulate essential episodes of the whole period of leveraging education through AI virtual assistance.

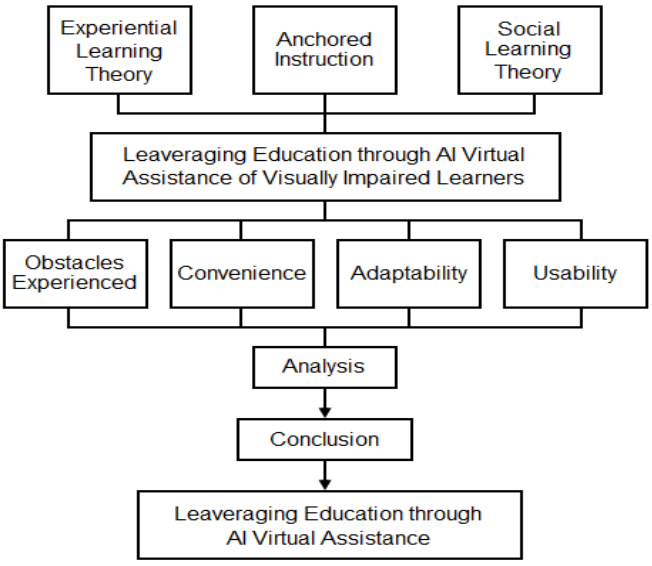

Figure 1. Theoretical Framework of the Study

Objective of the Study

The study aims to explore an in-depth analysis of leveraging education through artificial intelligence

(AI) virtual assistance among visually impaired learners. The investigation centers on describing the challenges and struggles encountered by visually impaired learners using AI virtual assistance, the highlights of the usage of AI virtual, the adaptability of the visually impaired in utilizing AI virtual assistance, and enhancement of the curriculum to address the concern of visually impaired learners.

METHODS

Research Design

This study utilized a qualitative case study design which allow investigating an emerging phenomenon on leveraging education though AI virtual assistance for visually impaired learners. This research design helps explore a phenomenon within some context through various data sources and explores through different lenses to reveal multiple facets of the phenomenon (Baxter & Jack, 2008). Thus, a real-time phenomenon is explored within its naturally occurring context, considering that context will create a difference (Kaarbo & Beasley, 1999).

Participants

The study was conducted in two public schools in Cebu, Philippines: one in Mandaue City and one in Cebu City. Both schools offer programs for learners with intellectual disabilities, hearing impairment, and visual impairment. A purposive sampling technique was used to recruit the five participants who achieved the inclusion criteria: (1) currently enrolled in a public secondary school, and (2) clinically diagnosed with visual impairment. This sampling technique selects a sample by taking a subject that is not based on the level or area but based on the specific purpose. The basis of the selection connects with the study's rationale and significance to ensure that the prospective data collected is relevant and beneficial to the research study. Table 1 shows the demographic profile of the participants. Pseudonyms were used to protect the identity of the participants.

Table 1. Demographic Profile of the Participants

Participant's Pseudonym	Details (Sex, Age, Grade Level)	Type of Visual Impairment	AI Virtual Assistant Used
Ethel (P1)	Female, 16, Grade 9	Totally Blind	Talkback, Commentary Screen Reader, Google Assistant
Clark (P2)	Male, 17, Grade 8	Low Vision-Near Sighted	Commentary Screen Reader, Google Assistant
James (P3)	Male, 23, Grade 11	Totally Blind	Commentary Screen Reader, Google Assistant, Google Text to Speech, Talkback
Jane (P4)	Female, 15, Grade 7	Low Vision	NonVisual Desktop Access (NVDA)
Alfred (P5)	Male, 23, Grade 11	Totally Blind	Google Assistant, Talkback

Research Instruments

The researchers utilized interview questionnaires validated by a panel of experts in instrumentation to create an in-depth dissection of a case study involving visually impaired learners that uses AI virtual assistants. The respondents' profile was the indicator that helped determine the issue stated. The researcher's questionnaire asked the respondents to provide their understanding of the issue through face-to-face and virtual interviews.

Data Gathering Procedure and Ethical Consideration

A certificate to conduct the study from the school's superintendent and school principals were secured. Upon approval, an invitation and consent form were sent to the participants to ask permission to conduct the study before the interview, correctly indicating voluntary participation in the research and understanding all the rights of refusal and withdrawal. Strict confidentiality was assured, which was specified in the informed consent form. Adhering to the ethical principles during the entire study was also observed.

Personal information like names, contact numbers, addresses, or direct identity that could identify the participants was kept strictly confidential.

Data were obtained through semi-structured face-to-face and virtual interviews while maintaining the general safety and protocols, consisting of Part A. demographic information and Part B. semi-structured questions. A panel of experts validated the guide questions. Then, it was carefully reviewed and revised to confirm their suitability and the study results. The participants were asked in their local dialect (*Cebuano*) to be comfortable and be free to express their thoughts towards the questions during the interview process. During the interview, audio tapes were used for recording purposes that lasted from 10 to 20 minutes, but everything was kept confidential and assured them anonymity of their identities.

Data Analysis

This study utilized a thematic analysis of the data, which is critical in an open-ended way to investigate the use of AI Virtual Assistance in education. The researchers transcribed voice recordings to improve the data's credibility. The material acquired from face-to-face and virtual interviews was noted and closely investigated to comprehensively grasp the subject matter. In the data analysis, the researchers utilized Braun and Clarke's (2006) method, which is appropriate for this qualitative research study. The method has six steps to analyze the gathered data: transcribe, take note of items of interest, code across the entire data set, search for themes, review themes by provisional mapping themes and their relationships, define and name the themes, and finalize the analysis. The researchers identified joint statements from the narrations of the research participants. When the researchers found expression confusing or could not understand, participants were called and requested to confirm what they wanted to express. Then, the data were coded, and themes were drafted. The researcher explored the subthemes and their relationships with the data many times. Finally, the sub-themes were combined to form themes. Regarding data conformability, the emerging trends were submitted to the participants, who were to provide input about what they said during the interviews to accurately recount their experiences.

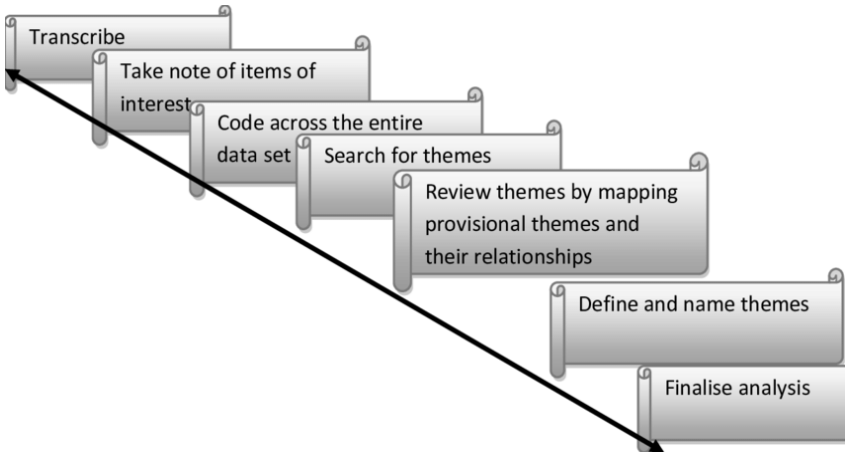

Figure 1. Thematic Analysis of the Study (Braun & Clarke, 2006)

RESULTS AND DISCUSSION

Four themes emerged from the analysis of the narratives of the visually impaired learners: (1) barriers in the learning process, (2) essentiality of the AI virtual assistant, (3) achieving competence through technology, and (4) inclusive teaching and learning environment. These themes captured the in-depth analysis of leveraging education through AI virtual assistance among visually impaired learners. The interview findings for each theme are then discussed within the context of the literature.

Theme 1: Barriers in the Learning Process

Vulnerable individuals, including people with disability, were the most affected in this time of uncertainty (CEPAL, 2020). The pandemic had put students with visual impairment in a challenging situation. They faced challenges in the learning process, such as personal struggles, insufficiency of resources, and adapting to the new modality of learning. These can be observed from the narratives of the participants.

Personal Struggles. Visually impaired students had a hard time using the AI virtual assistant due to a lack of experience and unfamiliarity with the technology. The absence of the gadgets was a great struggle

they experienced since this was the first time they used the technology because of the pandemic, but now they are slowly learning how to use it. Some students were unfamiliar with other AI virtual assistants besides Google TalkBack. They were uncomfortable using the technology in their studies because some were slow encoders. Participants stated that,

> Ethel: *"I am uncomfortable utilizing some AI virtual assistant technology. I used Google TalkBack because I am not techy. I am too slow in typing, and I will say, "Hey, Google."*
>
> James: *"I struggled at first in using and navigating the technology because I did not know anything about technology before. But now, I am slowly learning. I use Google assistant when I have important things to research because, in typing, I am slow. Sometimes, using the technology can be tiring and convenient at other times."*

Navigating and using AI virtual assistants can be challenging for those who are not familiar with the nature of the technology. Some participants struggled first is using the application and they asked their companions, friends, and family members to help them navigate and use the AI virtual assistant. Participants mentioned that,

> Jane: *"At first, I struggled, but I slowly adjusted. There are probably some files that are difficult to open. I asked for help from those who could see. The tricky part of the screen reader is that it does not read images. There are files like, for example, the college VI, and they send more towards photos and visuals, which is problematic.*
>
> Alfred: *"I was having a hard time with my phone in closing all the applications. I asked my family members to help me in closing the apps. Now, I learned to close it on my own."*

Insufficiency of resources. The use of distance-learning programs, open-educational applications, and platforms in schools helped reach learners remotely and limit the disruption of classes during this pandemic. Using digital technologies and learning modules in teaching students from home helped continue education. However, some students do not have enough resources such as cellphones, laptops, and computers to connect with their teachers. These have challenged students and parents (Abbacan-Tuguic, 2021; Mutya et al., 2022), especially for visually impaired students. These brought a struggle for them in utilizing the AI virtual assistant. Participants narrated that,

> Ethel: *"I don't have a cellphone before, and no AI virtual assistant can help me in my classes. It was not easy when my teacher would require us to search the topics on the internet and collect the reports the day after. The reports will be presented in the class since we are in the regular class. My classmates helped with my studies. With no access to AI virtual assistant, it is quite challenging since it serves as my eyes in daily life."*
>
> James: *"The screen reader I used cannot access Google docs. It is hard when you are using a cellphone, desktop, or laptop is recommended."*

Adapting to New Learning Modality. Learning loss is at an all-time high due to the pandemic forcing unfamiliar, inaccessible ways of learning onto students in the Philippines, especially visually impaired students. They must know this technology to keep up with this high-tech world. There are still some issues with the virtual assistants they use, but they are still learning and adapting to the new learning modality in the new normal. To mitigate these challenges, distance learning modalities must be improved (DepEd, 2020; UNICEF, 2021). A participant highlighted that,

> Jane: *"The virtual learning environment today is not enough for the learnings I received. Because you cannot interact with your teacher in the learning process, I must adapt to using the virtual assistant.*

However, I struggled to adapt because nowadays, it is very high-tech. I did not know anything about technology before."

The barriers to learning experienced by visually impaired students were due to the adaptation of new learning modalities to mitigate the impact of the pandemic in the educational institution. They were the most affected by such a dramatic change in their daily rhythms and ways of learning. They had adapted and maximized their potential to use it effectively (Kavčič et al., 2017; Roseli et al., 2010). Some of their peers recommended specific technology for those who had not discovered the AI virtual assistant (Chong & Abeliuk, 2019). They have learned to overcome their struggles by correctly utilizing their ability to cope with the situation with the help of someone more capable or with a self-learning technique (Roseli et al., 2010).

Given the unique circumstances, suitable modifications to learning and assessment activities should be provided. The preceding necessitates the urgent attention of policymakers, representatives from various rehabilitation services, stakeholders, and government agencies to examine and implement these ideas to achieve the cherished goal of providing access to education to visually impaired individuals and forestall the digital divide (Kapote & Srikanth, 2022).

Theme 2: Essentiality of AI Virtual Assistants

The AI virtual assistants understand natural language voice commands and complete tasks for the user. The role of an AI virtual assistant is essential to visually impaired learners. It helps them in their studies and organizes the learning process. These technologies are becoming popular and useful technology, with a variety of advantages, contributing to the automation of tasks and providing support for students in time management, access to information, and communication facilitation (Gubareva, R., & Lopes, 2020).

Proficiency and Accessibility of AI Virtual Assistant. The AI virtual assistant has been a great help to visually impaired students. These technologies are competent in giving them
agility of updatable response with absolute quickness, can read for the users and automatically what is written on the screen, and describe a visual image with a voice command feature. AI virtual assistant has become accessible; everyone can perceive, comprehend, navigate, and engage with AI virtual assistants. Furthermore, some AI virtual assistants such as Google assistant is already part of almost every device, making it more accessible. The participants' responses can observe the proficiency and accessibility of these technologies.

Ethel: "*The AI virtual assistant such as the Commentary Screen Reader is quick and fast in responding. It is flexible on whatever you want to use it on.*"

James: "*Some of the AI virtual assistants I used are already built into my phone. I have access to the internet, which is why I can navigate the messages sent to me with the help of Google Text to Speech."*

Jane: "*I am thankful that there is a laptop with NonVisual Desktop Access (NVDA). I only use NVDA. It is fast, and I enjoyed using it.*"

Alfred: "*The TalkBack that I used helped me to describe a picture, and it will speak out, but if the image were only shown, it would not speak.*"

Hassle-free Technology. The participants find the AI virtual assistant easy to utilize, especially in navigating, which has been a big help in their day-to-day life. Specifically, in connecting with others by using messenger or having a google meet. Easy navigation can be done by just clicking and mainly using voice commands. Utilizing AI virtual assistants give them access to more things. Participants shared that,

Ethel: "*It made things easier for me to navigate. When the link is given by the teacher in the messenger or google meet, it's easier for me to go in because I call the commentary screen reader "Open messenger," and the link will open immediately.*"

Clark: "*It made it easier since I don't need to read. I'll just listen, then if I want my cellphone to do what I want, all I have to do is say the word.*"

Relevance and Sufficiency. All AI virtual assistants provide a critical factor for the visually impaired learners, naming it their eyes to everyday life. This technology helps them to develop independence due to its presence. It shows the importance to them through the enormous aid of the utility. Participants were not left behind when they utilized the AI virtual assistance throughout their educational journey.

James: *"It is much easier because it is an advantage because you will be independent and not rely on others. Now, I can cope with the tasks provided by the teacher without being left behind."*

Alfred: *"You will be motivated to attend the class because of the AI virtual assistant, especially in the online classes."*

The essentiality of AI virtual assistants is the primary support for visually impaired learners in their educational journey, especially during pandemic. The learners encountered the proficiency of these technologies on how quick responding and flexible it is. It provides convenience in navigating the messenger and Google meet by clicking or using the user's voice. They became independent using AI virtual assistants (Mekni, 2021; Sam et al., 2019). Moreover, Song (2019) found that AI virtual assistants have a favorable influence on behavioral intention.

Theme 3: Achieving Competence through Technology

Achieving competence involves mastering and effectually delivering the job tasks at one's current career level. Overcoming barriers consists in assessing the situation, consulting experts, considering alternatives, and acting (Wheatley et al., 2021). The AI virtual assistant has been helpful to students in achieving an understanding of the lesson and achieving their potential (Nafea, 2018).

Harnessing Learner's Potential. The learning capacity of the participant is guaranteed to be comfortable due to the aid of AI virtual assistants. The proceeding participant read and learned faster through the assistance of these technologies. It aided this participant in achieving progress. AI virtual assistant harnesses the power to open the visual world. These technologies help them to do numerous things. Participants share that,

Jane: *"My reading was faster than before and my learning. The AI virtual assistant provides us an avenue to harness our potential in the classroom discussion."*

Alfred: *"There was a big improvement for me since it's a big help. At first, I was having a hard time with my class, but now I can participate during class discussions."*

Artificial intelligence (AI) has been a key technological enabler in Education that significantly impacts work and lifestyle activities (Oyedeji, 2022). Walker (2019) found that AI technologies improve students' learning and increase instructor efficiency. AI virtual assistants provide each student has their assistant supporting them in their studies.

Theme 4: Inclusive Teaching and Learning Environment

Inclusive learning and teaching should recognize all students' entitlement to a learning experience that respects diversity, enables participation, removes barriers, and anticipates and considers various learning needs and preferences. It should allow all students to engage meaningfully with the curriculum and achieve their full potential (Gravestock, 2017). Teachers must also be aware of the technological barriers that blind students face and the legal tools to confront such obstacles and embrace inclusive education. Participants shared their experiences on how to develop an inclusive environment for them.

James: "*They should know that we also can perform and find new opportunities in the class. The school must provide us with the opportunities to explore our potential.*"

Clark: "*When you can participate in the class, it helps us to relate with the other students so that we don't get isolated. You know, like we are also part of the class like that. We also have rights to education like any other student, and this opportunity is a way of having our rights.*"

Comments by the visually impaired students suggest that the practice of inclusive education has the propensity to promote social acceptance and rights and overcome discriminatory practices meted out against persons with disabilities. The study findings revealed that students with visual impairments and some teachers supported inclusive education. This practice allowed the visually impaired to measure their academic achievements with their peers without disabilities.

CONCLUSION

This pandemic has brought challenges to visually impaired learners in education, such as personal struggles, insufficiency of resources, and adapting to new learning modalities. However, AI virtual assistance provided them an opportunity to explore their potential. These technologies help them achieve academic tasks that are generally difficult due to their visual impairment, such as handling module materials and communicating with their teachers. Researchers recommend that the school fully embrace inclusive education and focus on their needs during adversity. These could alleviate their experience in the teaching and learning process.

ACKNOWLEDGMENT

The authors would like to sincerely thank the participants of this study and the supportive mentor from Mandaue City Comprehensive National High School for the constructive feedback to improve the overall quality of the paper.

DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FUNDING

The author(s) received no financial support for the research, authorship, and/or publication of this article.

REFERENCES

Abbacan-Tuguic, L. (2021). Challenges of the New Normal: Students' Attitude, Readiness and Adaptability to Blended Learning Modality. *International Journal of English Literature and Social Sciences*, *6*(2), 443-449.

Afshar, V. (2021, April 7). AI-powered virtual assistants and the future of work. ZDNet. https://www.zdnet.com/article/ai-poweredvirtual-assistants-and-future-of-work/

Anderson, A. (2019). *Virtual reality, augmented reality and artificial intelligence in special education: a practical guide to supporting students with learning differences*. Routledge.

Azhari, B., & Fajri, I. (2022). Distance learning during the COVID-19 pandemic: School closure in Indonesia. *International Journal of Mathematical Education in Science and Technology*, *53*(7), 1934-1954.

Bandura, A. (1971). Social learning theory. New York: General Learning Press.

Bransford, J.D. et al. (1990). Anchored instruction: Why we need it and how technology can help. In D. Nix & R. Sprio (Eds), *Cognition, education and multimedia.* Hillsdale, NJ: Erlbaum Associates.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, *13*(4), 544-559.

Bhowmick, A., & Hazarika, S. M. (2017). An insight into assistive technology for the visually impaired and blind people: state-of-the-art and future trends. *Journal on Multimodal User Interfaces*, *11*(2), 149-172.

Bouznad, S., & Ibourk, A. (2020). School closures, equality of opportunity: Some recommendations. *Revista Romaneasca pentru Educatie Multidimensionala*, *12*(2Sup1), 103-110.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

CEPAL (2020). Personas con discapacidad ante la enfermedad por coronavirus (COVID-19) en América Latina y el Caribe. Retrieved from: https://www.cepal.org/es/publicaciones/45491-personas-discapacidad-la-enfermedad-coronavirus-covid-19-america-latina-caribe

Chassignol, M., Khoroshavin, A., Klimova, A., & Bilyatdinova, A. (2018). Artificial Intelligence trends in education: a narrative overview. *Procedia Computer Science*, *136*, 16-24.

Chkroun, M., & Azaria, A. (2019). Lia: A virtual assistant that can be taught new commands by speech. *International Journal of Human–Computer Interaction*, *35*(17), 1596-1607.

Cho, E., Molina, M. D., & Wang, J. (2019). The effects of modality, device, and task differences on perceived human likeness of voice-activated virtual assistants. *Cyberpsychology, Behavior, and Social Networking*, *22*(8), 515-520.

Chong, S., & Abeliuk, A. (2019, December). Quantifying the effects of recommendation systems. In 2019 IEEE International Conference on Big Data (Big Data) (pp. 3008-3015). IEEE.

Chopra, J., Rani, A., Chopra, S., Manik, P., & Singh, R. R. (2021). Transition from physical to virtual classroom amidst COVID-19 crisis: Analyzing students' perspective to drive improvement in the current online teaching methodology. *Journal of Education and Health Promotion*, *10*.

Cobos-Guzman, S., Nuere, S., De Miguel, L., & König, C. (2021). Design of a Virtual Assistant to Improve Interaction Between the Audience and the Presenter. *International Journal of Interactive Multimedia & Artificial Intelligence*, *7*(2).

Cockburn, I. M., Henderson, R., & Stern, S. (2018). The impact of artificial intelligence on innovation: An exploratory analysis. In *The economics of artificial intelligence: An agenda* (pp. 115-146). University of Chicago Press.

Cruz, E. I., & Olvera, D. M. F (2021). Diagnostic for the design of a virtual educational assistant for visually impaired children. *International Journal of Latest Research in Humanities and Social Science 4* (1) 26-33.

Cudillo, C., Mutya, R., & Adlaon, M. (2022). Parents' Challenges And Their Child's Academic Performance In Science In The Modular Distance Learning. European Journal of Education Studies, 9(7).

DepEd (2020). DepEd prepares Self-Learning Modules for education's new normal. Retrieved from: https://www.deped.gov.ph/2020/07/02/deped-prepares-self-learning-modules-for-educations-new-normal/

Donohue, J. M., & Miller, E. (2020). COVID-19 and school closures. *Jama*, *324*(9), 845-847.

Ellis, J., Wieselmann, J., Sivaraj, R., Roehrig, G., Dare, E., & Ring-Whalen, E. (2020). Toward a productive definition of technology in science and STEM education. *Contemporary issues in technology and teacher education*, *20*(3), 472-496.

Forbes, M., & Lasonen, J. (2021). Use of Intelligent Virtual Assistants in Lifelong Learning for Persons with Visual Impairments. *The SAGE Handbook of Learning and Work*, 460.

Geverola, I. J. R., Mutya, R. C., Siason, L. M. B., & Bonotan, A. (2022). Challenges and struggles of public senior high school science teachers during the new normal. *Journal of Research, Policy & Practice of Teachers and Teacher Education*, *12*(1), 49-68

Gravestock, P. (2017). Building momentum towards inclusive teaching and learning. University of Wolverhampton, presented at Institute of Physics. Retrieved from: https://www.iop.org/publications/iop/2017/page_69352.html

Gubareva, R., & Lopes, R. P. (2020). Virtual Assistants for Learning: A Systematic Literature Review. *CSEDU (1)*, 97-103.

Iyer, V., Shah, K., Sheth, S., & Devadkar, K. (2020, June). Virtual assistant for the visually impaired. In *2020 5th International Conference on Communication and Electronics Systems (ICCES)* (pp. 1057-1062). IEEE.

Kaarbo, J., & Beasley, R. K. (1999). A practical guide to the comparative case study method in political psychology. *Political psychology*, *20*(2), 369-391.

Kapote, S., & Srikanth, P. (2022). Barriers and the Role of Assistive Technology to Access Education for Children with Visually Impaired During COVID-19 Times. *Indian Journal of Clinical Medicine*, 26339447221089124.

Kavčič, A., Pesek, M., & Marolt, M. (2017, May). A platform for supporting learning process of visually impaired children. In *2017 40th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)* (pp. 848-852). IEEE.

Kim, K., de Melo, C. M., Norouzi, N., Bruder, G., & Welch, G. F. (2020, March). Reducing task load with an embodied intelligent virtual assistant for improved performance in collaborative decision making. In *2020 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)* (pp. 529-538). IEEE.

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. New Jersey: Prentice-Hall.

Levy, P. (2014). *Digital Inferno: Using technology consciously in your life and work, 101 ways to survive and thrive in a hyperconnected world*. Clairview Books.

Martiniello, N., Asuncion, J., Fichten, C., Jorgensen, M., Havel, A., Harvison, M., ... & Vo, C. (2021). Artificial intelligence for students in postsecondary education: a world of opportunity. *AI Matters*, *6*(3), 17-29.

Marr, B. (2019). *Artificial intelligence in practice: how 50 successful companies used AI and machine learning to solve problems*. John Wiley & Sons.

Mekni, M., Baani, Z., & Sulieman, D. (2020, January). A smart virtual assistant for students. In *Proceedings of the 3rd International Conference on Applications of Intelligent Systems* (pp. 1-6).

Mekni, M. (2021). An artificial intelligence based virtual assistant using conversational agents. *Journal of Software Engineering and Applications*, *14*(9), 455-473.

Moreno, G. (2022). Expanding Definition of Technology in Special Education: Impact of Training on the Adoption of iPad Tablets by Special Educators. *International Journal of Disability, Development and Education*, *69*(2), 722-738.

Mutya, R. C., Geverola, I. J. R., Cano Jr, A. C., & Friolo, R. V. (2022). Coping with uncertainties: Unveiling the lived experiences of working students in the new normal. *Ho Chi Minh City Open University Journal Of Science-Social Sciences*, *12*(1), 112-129.

Nafea, I. T. (2018). Machine learning in educational technology. *Machine learning-advanced techniques and emerging applications*, 175-183.

Olguín-Gil, L. E., Vázquez-Guzmán, F., Vázquez-Zayas, E., Mejía, J., & Blanco-Cruz, I. (2021, October). Virtual Assistant as Support for People Visually Impaired. In *International Conference on Software Process Improvement* (pp. 174-188). Springer, Cham.

Oyedeji, T. (2022). Harnessing Artificial Intelligence for Educational Creativity. *IFE PsychologIA: An International Journal, 30*(1), 103-114.

Page, L. C., & Gehlbach, H. (2017). How an artificially intelligent virtual assistant helps students navigate the road to college. *AERA Open*, *3*(4), 2332858417749220.

Rafailidis, D., & Manolopoulos, Y. (2019, June). Can virtual assistants produce recommendations?. In *Proceedings of the 9th International Conference on Web Intelligence, Mining and Semantics* (pp. 1-6).

Raghavan, R., Krishnan, V., Nishad, H., & Shaikh, B. (2021). Virtual AI Assistant for Person with Partial Vision Impairment. In *ITM Web of Conferences* (Vol. 37, p. 01019). EDP Sciences.

Rasli, A. M., Norhalim, N., Kowang, T. O., & Qureshi, M. I. (2015). Applying managerial competencies to overcome business constraints and create values: Evidence from small technology-based firms in Malaysia. *Journal of Management Info*, *2*(2), 22-28.

Roseli, N. H. M., Aziz, N., & Mutalib, A. A. (2010, June). The enhancement of assistive courseware for visually impaired learners. In *2010 International Symposium on Information Technology* (Vol. 1, pp. 1-6). IEEE.

Sam, A. P., Singh, B., & Das, A. S. (2019, June). A robust methodology for building an artificial intelligent (ai) virtual assistant for payment processing. In *2019 IEEE Technology & Engineering Management Conference (TEMSCON)* (pp. 1-6). IEEE.

Schade, L. C., Sandberg, J., Bean, R., Busby, D., & Coyne, S. (2013). Using technology to connect in romantic relationships: Effects on attachment, relationship satisfaction, and stability in emerging adults. *Journal of Couple & Relationship Therapy*, *12*(4), 314-338.

Sharma, V., Singh, V. M., & Thanneeru, S. (2020). Virtual Assistant for Visually Impaired. *Available at SSRN 3580035*.

Song, Y. W. (2019). *User acceptance of an artificial intelligence (AI) virtual assistant: an extension of the technology acceptance model* (Doctoral dissertation).

UNICEF (2021). Reopening schools safely in the Philippines. Retrieved from: https://www.unicef.org/philippines/reopening-schools-safely

Vincent-Lancrin, S., & van der Vlies, R. (2020). Trustworthy artificial intelligence (AI) in education: Promises and challenges.

Walker, A. S. (2019). *Perusall: harnessing AI robo-tools and writing analytics to improve student learning and increase instructor efficiency*. J. Writing Analytics, 3.

Wheatley, D., Hardill, I., & Buglass, S. (Eds.). (2021). *Handbook of Research on Remote Work and Worker Well-Being in the Post-COVID-19 Era*. IGI Global.

Yadav, A. V., Verma, S. S., & Singh, D. D. (2021). Virtual Assistant For Blind People. *International Journal*, *6*(5).

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education–where are the educators?. *International Journal of Educational Technology in Higher Education*, *16*(1), 1-27.

Zhou, Z. (2016). A framework for virtual assistants: An exploratory study. *International Journal of Social Science and Business*, *1*(4), 49-56.