The Effect of Using Technology in Learning on Student Learning Motivation: Analysis of the Effectiveness of Inclusive Education Programs

Victoria D. V. Latumeten[1*)], A.Fitriani [2)], Armita Permatasari, S.Pd., M.Pd[3)], Sri Rahayu Juniati[4)], Wahyuniar[5)]

[1)] *Institut Agama Kristen Negeri Ambon, Indonesia*
[2), 3), 4)] *Universitas Muhammadiyah Sinjai, Indonesia*
[5)] *Universitas Musamus, Indonesia*

[*)] *Corresponding Author: vdv.latumeten@gmail.com*

Abstract. The objective of this study is to assess the efficacy of technology in inclusive education on enhancing student learning outcomes. The research methodology employed is a comprehensive literature review, encompassing data from various sources pertaining to the integration of technology in educational settings. The findings indicate that the incorporation of technology in inclusive classrooms can markedly enhance student learning outcomes, particularly in developing cognitive and critical thinking abilities. Additionally, technology can facilitate the optimization of the learning process in terms of efficiency and effectiveness. It is also important to note that the use of technology in education presents certain challenges and risks that must be managed effectively in order to achieve optimal outcomes. Therefore, when considering the use of technology in education, it is essential to carefully select and integrate technology in a manner that is conducive to achieving desired results.

Keywords: technology, inclusive, education, learning, student

I. INTRODUCTION

One of the nation's most valuable resources is a child who has received proper guidance and education. The objective is for these children to become well-rounded individuals of good character in the future. The Law no 20 of 2003 states that the education of a nation should focus on the development of abilities and the shaping of character and civilization, in order to educate the nation's citizens in a manner that is dignified and beneficial. Education is a fundamental and inalienable right for all Indonesian citizens, including those with special needs. It is important to recognize that differences do not require debate; rather, they should be celebrated and encouraged. Every child is born with unique qualities and characteristics. The government plays a pivotal role in ensuring equitable access to education and in enhancing the overall quality of education within Indonesia (indah & binahayati, 2015).

The implementation of educational programs for students with special needs has resulted in the creation of specialized educational facilities for such individuals, designated as SLB, or "Sekolah Luar Biasa." However, this has led to a perception of distance between these students and their non-disabled peers, which in turn hinders social interaction and participation. This can result in a sense of social exclusion among students with special needs, which is detrimental to their development and integration in society. It is likely that children with special needs will assume that they are not included in the broader community and that their participation in it is not expected of them. However, it is also true that these children are entitled to rights and obligations and are entitled to adjust to their environment. It is therefore only natural that they should want to participate in it to a greater or lesser extent.

An inclusive school is an educational facility that welcomes and educates all children without distinction or prejudice, where students can interact and learn together in an egalitarian setting. In such an environment, all students enjoy the same entitlements and responsibilities without receiving any special considerations (Indah & Binahayati, 2015). In the context of teaching and learning, the use of learning technology assumes a pivotal role, as it can facilitate the integration of inclusive education, addressing the unique learning needs of students.

Inclusive educational institutions employ a range of aids and media to assist the diverse needs of their students. As observed by Ariyanto (2017), adaptive technology can facilitate learning for children with special needs. This technology allows these students to engage with technological media in the same way as their typically developed classmates, thereby enhancing their ability to participate in the learning process. To achieve the desired outcomes in the learning process, it is essential to focus on

the identified targets related to the students, allowing them to provide future evaluations to identify potential shortcomings in the learning process, both within the classroom setting and beyond.

Education is a process through which students learn and are taught, with the goal of developing their full potential through a combination of educational activities. The fundamental objective of education is to facilitate the optimal intellectual, social, emotional, and physical development of individuals. This is accomplished through the acquisition of essential skills, knowledge, and values that enable individuals to navigate the complexities of everyday life (Nuriansyah, 2020). The role of education in human development is significant. Education enables individuals to comprehend the world around them, their place within society, and the challenges that lie ahead in life (Dermawan et al., 2023a). Furthermore, education serves as the foundation for a country's social and economic growth. It can enhance the caliber of its human resources, preparing individuals to engage effectively in social, economic, and political life (Santoso, 2019).

Education may manifest in various forms, including formal education (in academic institutions such as schools, colleges or universities), non-formal education (through courses or training programs) and informal education (through daily experiences or activities). In all forms, education should strive to cover the cognitive, affective and psychomotor aspects to ensure that individuals receive an all-encompassing and holistic learning experience (Hita et al., 2021). There is a profound connection between education and learning outcomes (Irwan et al., 2019). The overarching objective of educational institutions is to enhance student learning outcomes. These outcomes encompass three key dimensions: knowledge, skills and attitudes. The extent to which these dimensions have been developed is an indication of the effectiveness of the learning process.

In the context of formal education, the achievement of learning outcomes is commonly gauged via assessments and other academic evaluations. These learning outcomes encompass the extent to which students grasp the subject matter, their aptitude to apply these concepts in everyday contexts, and their capacity to solve problems. Nevertheless, the domain of student learning outcomes extends far beyond academic assessments alone. It encompasses the growth of social skills as well, including the capacity to collaborate with others, communicate effectively, and lead teams (Sidabutar, 2021). Furthermore, learning outcomes encompass the development of attitudes, including positive self-perception, interpersonal skills, resilience, and responsibility.

A well-rounded educational experience should facilitate optimal learning outcomes. To achieve this, educational institutions must employ effective and pertinent instructional methods, as well as provide the requisite support and guidance for each individual student. By implementing effective educational practices, students will be able to achieve satisfactory learning outcomes and will be prepared to confront future challenges. To enhance student learning outcomes, various effective strategies are essential.

II. METHODS

The research is a literature study that employs several academic journals on technology and education in inclusive schools. The results of this literature review will be used to ascertain the manner in which technology is utilized in inclusive education. Some of the methodologies utilized within literature study research, such as research that aims to analyze the effectiveness of technology in education on improving student learning outcomes, involve the examination of existing literature. The subsequent phase of this study involves identifying relevant sources of literature pertaining to the research topic, including books, scientific journals, and articles published in scientific journals. These sources are selected based on their relevance to technology and its role in enhancing the learning outcomes of students.

The literature selected is subjected to further scrutiny according to pre-established criteria, including relevance to the topic, quality of writing, and year of publication. The selected literature is then subjected to a comprehensive evaluation process, during which its key elements are analyzed and interpreted in order to identify information and findings that align with the research objectives. The findings of the analysis of the literature must be analyzed and interpreted. Then, the conclusions must be drawn as to the effectiveness of technology in education in improving the learning outcomes of students in classrooms that accommodate students with disabilities.

III. RESULTS AND DISCUSSION

The integration of technology into the educational process presents a significant challenge for teachers in inclusive classrooms. The effective use of diverse teaching methodologies and learning strategies is essential in ensuring that students with disabilities comprehend the material presented.

Furthermore, the role of educators in inclusive settings is not only to facilitate academic learning but also to instill confidence and self-assurance in children with disabilities. This entails creating a conducive environment where these students feel comfortable, respected, and equal to their peers. The utilization of learning media is similarly crucial to the learning process, as it enhances the efficacy of material delivery. Therefore, it is imperative to identify learning media that is both engaging and facilitates comprehension.

In compliance with the 1945 Constitution article 31 paragraph 1 and Law Number 20 of 2003 concerning the National Education System, the Indonesian government provides guarantees to students with special needs to obtain quality education. Rather than debating the differences between special needs students and other students, the focus should be on leveraging the

advantages of inclusive education. An essential element of inclusive education is the provision of appropriate learning tools and media. These differ from the resources typically employed by students in general. Among the assistive technologies that play a pivotal role in the learning process is the computer. Inclusive education also encompasses the use of computers and computer networks. In the context of inclusive education, children with special needs should have the opportunity to utilise technological media in the same way as their peers. In order to facilitate the learning process for children with special needs. Among the numerous adaptive technologies, those facilitating the access of the network and computers are of paramount importance. Several adaptive technologies are particularly significant, including NVDA (Nonvisual Desktop Access), JAWS (Job Access with Speech), and I-chat (I Can Hear and Talk) (Ariyanto, 2017).

NVDA (Nonvisual Desktop Access) is a technology that employs a screen reader to facilitate the use of computers by children with disabilities, such as those who are blind or visually impaired. NVDA works by translating text on the computer screen into auditory form, enabling children to navigate and interact with the computer. NVDA users can also utilize the keyboard's arrow keys to navigate through text and listen to it as it is read aloud. The use of a computer by blind and visually impaired individuals can be facilitated by the memorization of the computer's keyboard functions and location of its various components. This is achieved by maximizing the screen and inputting text through the available buttons on the keyboard. This process enables the user to navigate menus and select commands, which can be executed by pressing a designated shortcut button (Apriliana, 2015).

The Jaws program comprises hardware and software that emits reading sounds, both printed and Braille. This technology is developing at an accelerated pace, creating new opportunities for learners who are visually impaired. The Jaws program can be used in educational settings to enhance learning for blind individuals. The advent of this program promises to revolutionize the learning process for individuals with visual impairments, ensuring they do not fall behind in understanding the materials and tasks presented by educators. The program enables learners to access files containing learning materials, empowering them to complete assignments independently. Furthermore, these assignments can be printed in both Latin script and braille, offering flexibility in the format of the printed materials (Meri & Zulvanti, 2018).

The application known as i-CHAT, which is short for "I Can Hear and Talk," is a learning tool that employs computer-based sign language for children who experience either a hearing or visual impairment. It is designed in multimedia format and was developed Paula, Indriyani, and Kadek (2020) for this purpose. The i-chat application has been introduced in approximately 1,220 SLB-Bs in Indonesia (Paula, Indriyani, & Kadek, 2020). The i-chat application is a CSR (corporate social responsibility) program from PT Telekomunikasi Indonesia, Tbk. As of now, the i-chat app contains approximately 7,000 words in the form of video content and pronunciation. This application can benefit the hearing-impaired community as well as their parents, teachers, and relatives. The i-CHAT application is available in Indonesian and Malaysian (Malay) Sign Language (Paula, Indriyani, and Kadek, 2020). The application guides users in learning Indonesian and Malaysian Sign Language, and in constructing affirmative sentences (Andreas and Bilpen, 2016).

A variety of international initiatives have been undertaken with the goal of providing educational services for children with special needs. Despite these efforts, a considerable number of children with special needs remain without access to such services. In light of this, inclusive education has emerged as a fundamental human right, as outlined in the International Declaration of Human Rights (1948) and the International Convention on the Rights of the Child (1989). The Indonesian government has attempted to provide educational services for children with special needs, namely special schools (SLB), which are already established in various regions throughout Indonesia. However, this approach has created a divide between children with special needs and their typically developing peers, potentially leading to feelings of alienation and isolation in social settings. Article 5 of Law No. 20 of 2003 states, "Every citizen has the same right to education, even if the child has special needs." It thus follows that the government has an obligation to facilitate and provide access to education for children with special needs.

In the contemporary educational landscape, technology plays a pivotal role in the learning process. Consequently, teachers are expected to possess the requisite technical proficiency to facilitate an IT-based learning environment. The integration of technology in inclusive classrooms presents a significant challenge for educators, who must employ a diverse array of learning strategies and methodologies that are accessible to students with diverse learning needs.

In the context of inclusive education, the integration of technology-based learning tools is essential for facilitating the understanding of educational materials by children with special needs alongside their typically developing peers. The use of technology in this setting has been demonstrated to be an effective means of enhancing the learning outcomes of children with special needs.

One strategy for enhancing student learning outcomes is the incorporation of technology in educational settings. Technology offers a valuable opportunity to enrich learning and foster a more interactive and enjoyable learning experience for students. Various technologies, including multimedia, e-learning, and augmented reality, have been utilized in educational contexts. The integration of multimedia in educational settings facilitates the incorporation of diverse media, including images, sound, video, and text, within a single presentation, thereby enhancing students' comprehension of the subject matter being conveyed (Dermawan et al., 2023). In comparison, e-learning offers the potential for online learning, thereby facilitating access to more diverse and flexible learning resources. Augmented reality, a technology that combines real-world objects with virtual objects, has the potential to provide a more realistic and interactive learning experience for students (Fardani, 2020).

Nevertheless, the utilization of technology in educational settings is not without its challenges, including restricted access to technological resources, disparities in technological expertise between students and instructors, and the necessity to design learning experiences in a way that effectively utilizes technology. In this context, a number of theories can inform the development of effective educational technology use. The constructivist theory posits that learning occurs through interaction between students and the learning environment. Consequently, technology can be employed as a tool to enrich students' learning experience (Wijayanti et al., 2021). The student-centered learning theory emphasizes that learning must be tailored to the needs and abilities of students. In this regard, technology can be utilized to provide a more personalized and flexible learning experience for students.

In addition to developing effective technology-based learning methodologies, it is also necessary to pay attention to appropriate learning models in the use of technology in order to improve student learning outcomes (Rahma, 2021). Some learning models that have been developed in the use of technology include those that are either collaborative or problem-based. Collaborative learning models allow students to work together to solve problems or achieve common goals through discussion and sharing ideas. In the context of technology-based learning, collaborative learning models can be facilitated through online platforms that enable students to interact and collaborate regardless of their physical proximity.

Problem-based learning models facilitate the acquisition of knowledge through the resolution of authentic problems. The utilisation of technology enables the implementation of problem-based learning models through simulations and virtual environments, which provide students with opportunities to interact in a simulated setting. Additionally, the flipped classroom approach has been demonstrated to enhance student learning outcomes when utilising digital technologies (Dasmo et al., 2020). The flipped classroom model enables students to obtain learning materials through videos or online learning resources before entering the classroom. This allows students to focus on discussion and the application of previously learned concepts during class time.

The development of a successful learning model that utilises technology to enhance student achievement can be informed by the application of two theoretical frameworks: that of student-centred learning and problem-based learning.

Student-centred learning posits that the most efficacious pedagogical strategy is one that is customised to align with each student's individual needs and abilities. Conversely, problem-based learning asserts that the most productive approach to learning is one that immerses students in complex and realistic problem-solving scenarios. These two theoretical perspectives are both well-established and have been extensively researched in academic literature. In addition to effective learning models, a number of other factors can also affect the effectiveness of using technology in education to improve student learning outcomes. These include factors such as technology accessibility, learning content quality, teacher technology skills, and institutional support (Wajong et al., 2020).

The accessibility of technology is a crucial factor in the efficacy of utilizing technology in education to enhance student learning outcomes. Students who lack adequate technology accessibility will encounter difficulties in accessing online learning materials, which can negatively impact their learning outcomes (Haeruman et al., 2021). Therefore, there is a pressing need to enhance technology accessibility for all students, including those from underprivileged families. The quality of learning content is also a significant factor in the efficacy of technology in education for improving student learning outcomes. High-quality learning content facilitates students' comprehension of the concepts taught in an effective and straightforward manner. Therefore, it is essential to ensure that online learning content is of sufficient quality and in alignment with the applicable curriculum (Hita et al., 2017).

In addition, teachers' technological proficiency is a crucial element in the efficacy of technology-based learning to enhance student outcomes. Teachers with robust technological abilities are better positioned to assist students in navigating and comprehending digital learning materials (Utami, 2021). Consequently, it is imperative to facilitate the enhancement of teachers' technological competencies through targeted training and professional development.

Institutional backing is also a pivotal factor in the successful integration of technology in education to optimize student learning outcomes. Educational institutions must provide adequate support for the use of technology in learning, including in terms of planning, developing, and implementing online learning. In addition, the school principal and other stakeholders must provide support to ensure the effective implementation of technology in education.

The use of technology in education offers numerous advantages that can enhance student learning outcomes. One such advantage is the capacity to provide more flexible and personalized access to learning materials (Noormiyanto, 2020). With technology, students can access learning materials at any time and from any location, according to their individual learning needs. This can assist students who have demanding schedules outside of school or who reside in remote areas in accessing learning materials with ease (Bela & Ashabul, 2022). Furthermore, the integration of technology in education can also enhance student engagement in learning. The utilisation of interactive and engaging learning materials can foster students' interest and motivation to learn, thereby improving learning effectiveness and student learning outcomes.

The use of technology in education is regarded as a potential solution to enhance student learning outcomes (Wicaksono, 2020). The results of the literature review indicate that the integration of technology in education has the potential to enhance student learning outcomes. However, the effectiveness of this approach is contingent upon several factors. One such factor is the design of learning materials that align with the unique characteristics of each student (Fardani, 2020). The adaptation of

learning materials to the specific needs of the learner can enhance their interest and motivation, thereby reinforcing the efficacy of technology-based learning.

Moreover, the effective utilization of technology in education is contingent upon the calibre of technology employed. The technological apparatus utilized must be sufficient and capable of accommodating students' learning needs. Inadequate technology can impede students' learning outcomes, due to their inability to effectively access learning materials (Rahmawati, 2022). The integration of technology in education must be coupled with an appropriate learning strategy. An efficacious learning strategy can enhance the efficacy of technology integration in education. One strategy that can be employed is project-based learning (PBL). PBL facilitates active learning and direct involvement in the learning process, thereby enhancing the efficacy of technology integration in education.

IV. CONCLUSIONS

The integration of technology in inclusive educational settings presents a significant challenge for educators. It necessitates the adoption of a range of learning strategies and methods to facilitate comprehension among learners with diverse abilities. Educators in inclusive settings must also navigate the complexities of educating students with disabilities, striving to maintain patience and ensure that these students feel comfortable and perceive themselves as having equal rights as their typically developing peers. The necessity for adaptive technology tools in the education of children with special needs is evident. These tools provide access to computers and information technology, which is often challenging due to the specific obstacles experienced by these students. Several adaptive technologies are available to address these challenges, including NVDA (Non-Visual Desktop Access), JAWS (Speech Work Access), and I-Chat (I can hear and speak).

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