Universal Design for Learning in Assistive Technology

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Abstract. In general, every human being has their own needs and uniqueness because they are caused by disease, congenital or caused by an event. With the uniqueness of every human being, there are also different needs in terms of learning. Because of its uniqueness, every human being must have their own needs and characteristics. The different needs of each learner need to be facilitated to support them in getting equal access to learning. Therefore we need a system with accessibility to facilitate all students in the learning process. This study uses a descriptive content analysis method to analyze content and describe information or text. Based on the results of the analysis carried out, it is obtained an illustration that the use of Universal design for learning will be more effective if it is supported by assistive technology to meet the diversity and goals of universal design for learning in improving learning for all students.

Keywords: universal design for learning, assistive technology, special needs

1 Introduction

In general, humans are born with their own uniqueness and must experience many changes in their lives caused by disease problems or increasing age. Because of its uniqueness, every human being must have its own needs and character. These factors increase the pressure on education providers and learners because of their different needs. Therefore, if more and more students with special needs follow, learning requires a system with accessibility to make it easier for students. The goal of Universal Design for Learning (UDL) is to improve learning for all learners [1]. Assistive Technology and Universal Design for Learning complement each other so that they can bring progress [2].

In the 1945 Constitution that every citizen is given the right to obtain the same education. There is no exception for those with special needs, including learning disabilities. So that it is a shared obligation to provide support so that every citizen gets educational services that are not discriminatory. By utilizing assistive technology is one strategy to stop discrimination in the classroom.

In a research assistive technology can produce positive results for students with special needs, namely slow learners. Assistive technology focuses more on the individual while universal design for learning focuses on systems and reduces barriers [3]. Assistive learning technology is defined as any product (devices, equipment,

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instruments, and software) that is either widely available or specially made for use by people with special needs, for participation, protection, support, training, measurement, or replacement of functions/structures and activities, or to avoid distractions, activity limitations, or participation restrictions [4]. A method for teaching and learning that conceptualizes knowledge with a learner-centered emphasis and prioritizes accessibility, usability, and inclusivity is known as universal design for learning [5].

This literature study discusses the definition and relevance of Universal Design for Learning with Assistive Technology to eliminate gaps in the teaching and learning process and its application to the learning system when combining assistive technology.

2 Method

The research uses descriptive content analysis method to analyze content and describe information or text [6] The analysis of the article with the descriptive content analysis study method will answer the attachment of Universal design for learning with assistive technology.

The analysis was carried out for articles published between 2012 and 2022 with the provisions of articles related to universal learning design in assistive technology. Keywords to search for articles with "technology assistive", "universal design for learning", and "education", Articles were obtained from various journal sites such as Google Scholar, Scopus, Emerald, and Taylor Francis.

2.1 Literature Review

Digital Training and Education for Assistive Technology. With the spread of digital assistive technology, there is an increasing need for professionals who have the the information and abilities needed to use technology effectively. In this article, it is concluded that assistive technology has the potential to enable people with complex physical and/or intellectual disabilities to access a wide range of activities including communication, education, work and recreation [7].

2.2 Assistive Technology Supporting Inclusive Education: Existing and Emerging Trends. The role of inclusive education and assistive technology in ensuring students with special needs receive the best possible education. In this article it is concluded that assistive technology facilitates social interaction, access to curriculum, and the capacity for interpreting expression, there is a strong chance of inclusion in the classroom [8].

2.3 Universal Design for Learning and Assistive Technology: Complementary or Excluding? As research and legislation on inclusion in education develop, Numerous theories and regulations have been developed to promote students' inclusion with special needs in schools. This article shows that although it seems inappropriate at first glance, assistive technology and learning through universal design can support and complement each other in the educational inclusion process [9].

2.4 Universal Design for Learning. The use of technology in universal design can lead to greater inclusivity, but unless educators apply universal design for learning principles to meet the needs of all learners more effectively, applying simple technologies alone is not enough to achieve this greater inclusivity [10].

2.5 A MOOC on universal design for learning designed based on the UDL paradigm. Open online course design based on universal design for learning principles for learning. The results of this study can be concluded that online training activities improve accessibility without platform adjustments and involve students in their learning [11].

3 Discussion

3.1 Assistive Technology

Technology that is developing has a crucial part in the advancement of assistive technology, because this technology can be utilized for effective use in terms of the needs of its users. In special education this tool is known as assistive technology. A product is considered assistive technology if its main function is to help or enhance the functioning and independence of individuals and thereby improve their well-being [12]. For kids with exceptional needs, academic tasks and material access are made simpler by assistive technology that are specifically relevant.

The approach to the integrating assistive technology into inclusive learning focuses on using technology to practice, and to assist in the learning process. A large population of 'at risk' learners appear to need help, but because they often do not fit easily

into the diagnostic profile, they often receive less assistance. Assistive technology serves in bridging this gap by 'helping' in the practice of educating learners in the same class, including children with special needs helping them learn the material in a way they can understand, by removing barriers that have prevented them from being on the same level. with their comrades [13].

3.2 Universal Design for Learning (UDL)

Universal design for learning for learning is implemented by providing curriculum flexibility and various alternative activities for students of various abilities. These adjustments were designed early in the lesson design, not adjustments added later. UDL not only provides equal access to information, but equal access to learning. This allows the learner to choose the most appropriate way to access the information while the learner monitors the learning process. Universal design for learning is a strategy to remove barriers to learning for learners that includes universally designed instructions, universally designed curricula and universally designed assessments [14]. By using a universal design for learning every learner benefits from a variety of flexible approaches [15].

Universal design for learning is an effort to overcome various contexts of circumstances with the context of scientific development covering 3 things, namely 1) Accessibility, 2) Usability, 3) and Inclusion. This context is used as the foundation of the service and is an aspect of the tools used to serve the unique needs of diverse learners.

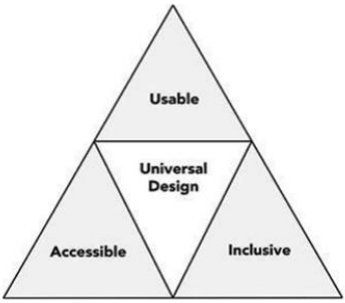

Table 1. Universal Design for Learning

These universal design for learning principles can be applied to learning objectives, methods, materials, and assessments. Universal design for learning can be run with the use of digital content, taking into account that digital texts and digital media offer better flexibility than using traditional media. This is especially true where the digital content is device-independent, with permission to create derivative works, through which the learner can translate and convert the material into other formats adapted to the characteristics of the learner.

Universal design for learning is not only a framework that promotes improvement in removing barriers to learning and student participation, but also encourages learners to explore their emotional dimensions and internal control to develop learning situa-

tions, as well as providing practical instructional guidance to improve leadership skills [16].

3.3 Universal Design for Learning in Assistive Technology

Assistive technology has similarities with learning media that require appropriate pedagogical support through learner training. Learner training is needed to ensure that assistive technology can be used and run well. The universal design for learning (UDL)-based educational framework in inclusive-based education is an educational plan that includes the use of technology to meet the needs of all learners without exception [17]. The three main guidelines detailed in the UDL framework include: (1) different ways of creating engagement; (2) various modes of representation and (3) various modes of action and expression ("UDL: The UDL Guidelines," nd). Learners in an inclusive education environment generally have students with heterogeneous conditions consisting of students with disabilities, and students from various cultural backgrounds and racial groups. Learning planning using the UDL framework serves to ensure all learners are involved in the learning process.

The UDL Guidelines help learners to consider many elements when designing an inclusive curriculum. Learners need to consider academic, social needs; as well as the possibility of technology that can assist in achieving [18]. Learning planning based on learner needs requires that students be motivated to participate in learning and access knowledge in appropriate ways. For example, by providing access to screen-reading software designed for dyslexic learners, learners with poor reading skills will be helped by screen-reading applications.

Assistive technology is part of the facilities for students with special needs to improve accessibility, ensure equal access to education and support inclusive classes. But if assistive technology is only used by students with special needs, it can make the deficiency more glaring, as a result, it can prevent students with needs from using assistive technology. This becomes a barrier to learning.

The similarity between universal design for learning and assistive technology is that they both prioritize technology to improve learning for students with special needs. The most striking difference between the two is that universal design for learning utilizes technology in curriculum design to remove barriers to learning. Meanwhile, assistive technology is designed to help students personally offset barriers in the curriculum. Assistive technology increases the efficiency of universal design. Universal design is not unique or personal but rather universal and inclusive, facilitating diversity [19]. Because of its universal design, it is useful for more learners.

Universal design for learning requires the basic components of pedagogy, curriculum and learning processes to be accessible. The principles of the Universal Design for Learning framework emphasize 3 aspects of pedagogy: the means to convey information, the expression of knowledge and engagement in learning. Learners with special needs related to learning disorders may experience difficulties in all three aspects.

4 Conclusion

Schools or places of learning can represent a lot of diversity. Each person or learner is different and maybe they all need different facilities to get the same access to learning. Ensuring they are treated fairly means ensuring that students get the facilities they need to succeed. Research shows the effectiveness of assistive technology, the provision of facilities is a means to provide support. However, facilities or support may not be needed if the barriers that cause injustice are overcome and UDL aims to do so through universal curriculum design.

Universal design for learning and on technology to enhance learning for all learners [1]. Universal design for learning will be more effective if it is supported by assistive technology to meet the diversity and goals of UDL to improve learning for all learners. Where technology is used as an instructional technology that supports UDL rather than as an assistive technology to remove barriers, make it an accessible tool for all learners and promote an inclusive learning environment [20].

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