Learning Innovation and Assistive Technology for Students with Special Needs in Higher Education

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ABSTRACT

Communication technology has been very developed in Indonesia. Everything can be accessed and enjoyed easily. Someone in Sabang can easily communicate with someone in Merauke because of the sophistication of today's technology. Persons with disabilities also have the same rights and obligations as other human beings. However, they often have limitations to make many humans seem to alienate them. Even though they also have the right to get a good education and quality learning. Currently, people with disabilities worldwide reach 1 billion people or 12% of the world's population, and 80% are in developing countries. According to the Indonesian Ministry of Social Affairs records, in 2011, the number of people with disabilities in Indonesia reached 7 million people, or about 3% of the total population in Indonesia, which amounted to 238 million. According to Law No. 4 of 1997 concerning persons with disabilities, persons with disabilities are defined as any person who has physical and mental disorders, which can interfere or become obstacles and obstacles for him to perform properly, consisting of persons with physical disabilities, persons with mental disabilities. , people with physical and mental disabilities.

Keywords: learning innovation, assistive technology, special needs

INTRODUCTION

The public's understanding of disability and persons with disabilities is closely related to the discriminatory behavior they experience in their daily lives has been conveyed by various writings, research, and reports in various places in the world. Some of them have documentation that reaches international scientific publications, such as research in Uganda (Merchant et al., 2020). However, over time, Indonesians, especially activists with disabilities, criticized the definition in Law no 4/1997 as a term still closely associated with stigmatization. Children with special needs are considered prone to physical deficiencies in the form of medical disorders/medical disorders that cause individuals with disabilities to experience barriers to carrying out activities properly; this is contrary to appropriate standards; what is 'normal' is what people who do not usually do have a medical disability (Toquero, 2020). This concept is perceived and judged to be discrediting, stigmatizing persons with disabilities.

The Muhammadiyah University of Palangkaraya, especially in the Faculty of Lecturers and Educational Sciences (FKIP), has not yet developed a learning model to facilitate slow learner students to achieve maximum learning outcomes following their development stage. Although, at FKIP UM Palangkaraya, there is no definite data on the number of slow learner students, a creative and innovative learning model is needed and follows the development of the times, but it does not leave local culture full of the meaning of goodness and character development for slow learner students. Lecturers in facilitating students to master basic competencies in learning.

In the current learning process, each student has unique characteristics. The unique characteristics make students in the Higher Lecturer environment learn about diversity (Priyono et al., 2022). Lecturers respond to the diversity of students in the class by facilitating students to be actively involved in the learning process, not least for students with limited ability in learning or called slow learners who tend to experience communication problems. Slow learner students tend to be no different from regular students physically. However, different behavior and speed of understanding lectures (Mumpuniarti et al., 2020). Problems related to the difficulty of regular lecturers and students interacting with slow learner students to help complete assignments,

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encourage and motivate, and explain lecture material. This difficulty is closely related to the characteristics of slow learner students, such as being more aloof and aloof in studying and having few friends.

Lecturers must be fair in giving attention to all, including students with special needs; this reinforces the fact that skills in communication and interaction cannot be neglected to achieve learning goals. It is not easy for lecturers to achieve learning objectives in inclusive classes with various student characteristics if only relying on lecturer-student interactions. Interaction must be built in conducive conditions where students understand each other's strengths and obstacles, especially for students with special needs who are slow learners.

Inclusive education for slow learner students can have its characteristics by using learning models such as the Auditory, Intellectually, Repetition (AIR) model, which is widely used by education personnel to facilitate students' competency standards of learning (McCorkle, 2020). This model can be modified with local wisdom in Indonesia. Creative lecturers can develop learning models based on multimedia technology. One of the multimedia technology designs that can be developed in learning is Mobile Learning-Based Digital Learning Media.

This program aims to develop assistive technology in digital learning media based on mobile learning to help students with disabilities understand learning materials amidst the limitations they experience. Mobile learning can be interpreted as a multimedia application in the form of information that is displayed through mobile devices or gadgets used in the learning process, in other words, to channel messages (knowledge, skills, and attitudes) and can stimulate thoughts, feelings, attention, and interest in learning so that Deliberately the learning process occurs, is purposeful and controlled. With this innovation, students with disabilities can also study learning materials provided by lecturers independently, anytime, anywhere.

The rise of sophisticated equipment that is well known to the public is one of the sophisticated tools resulting from modification and technological development, which has begun to develop a special product design for persons with disabilities (Hai et al., 2020). There are various interesting and useful features, for example, touch screen, voice commands, and screen reader; these features are specially designed for blind people or people who use Speech Recognition Technology. There is also a mono sound feature that can convert stereo sound into the one-way sound needed by the deaf.

The various facilities provided by this technology do not always provide convenience. For people with disabilities, technological advances become an insurmountable barrier to ease their lives. Intensive use of screens, for example, will be very difficult for people with disabilities blind people. The important message that can be taken from the lecture is how important Information and Communication Technology (ICT) is in generating education for people with disabilities. Information and Communication Technology should be used to overcome the problems of persons with disabilities. When viewed in terms of its potential, ICT has a significant role in improving the quality of education for people with disabilities. The aspect of technology coverage is so broad that with the best possible processing and development, products will be obtained in the form of tools, learning media, and sites that can be used as tools in the learning process for persons with disabilities and as a medium of concern for them.

METHOD

The stages of the development method that will be carried out include:

a. Concept. The stage is to determine the goals and who the program users are (audience identification, in this case, of course, students). In addition to determining the type of application (presentation, interactive, etc.) and the purpose of the application (entertainment, training, learning, etc.);

b. Design. The stage of making specifications regarding the program architecture, style, appearance, and material/material requirements for the program (Fatchurahman et al., 2021);

c. Collecting Materials. The stage where the gathering of materials according to needs is carried out. This stage can be done in parallel with the assembly stage or with a linear stage;

d. assemblies. The stage where all multimedia objects or materials are created. The manufacturing/production process involves skilled specialists or various software types. The making of this multimedia application is based on the storyboard and navigation structure that comes from the design stage;

e. testing. Done after completing the assembly stage by running the application/program and seeing whether there are errors or not (Bulkani et al., 2022). This stage is also known as the alpha testing stage (alpha test), where testing is carried out by the maker or the environment of the maker itself;

f. Distribution. The stage where the application is stored in a storage medium. At this stage, if the storage media is not sufficient to accommodate the application, then compression is carried out on the application.

RESULTS

Multimedia elements that combine several components such as color, text, animation, images/graphics, sound, and video are very supportive in meeting the learning needs of students who have different cognitive abilities. The concept of multimedia, according to Mayer (2001), includes three levels, namely, the first is the technical level related to technical tools: these tools can be considered as vehicles carrying signs; second, the semiotic level, which is related to the form of representation (i.e., text, images or graphics); this form of representation can be considered as a type of sign; third, the sensory level, which is related to the sensory channel that functions to receive signs. If the user can control the existing elements in a multimedia application, then the multimedia is called interactive multimedia.

Multimedia is a form of computer technology that is currently widely used in education. Multimedia includes various media in one software (software). Several experts, including Furt, Hafford, Thomson, and Jayant (Munir, 2001: 13), define multimedia as a link between various media such as text, numeric, graphics, images, animation, video, photography, text, and data that are controlled by computer programs. in one digital software) Moreover, it has interactive capabilities, a good alternative as a learning tool. Through animation, a spatial structure can be moved, rotated, separated according to its side planes to relatively quickly build a structure for students' understanding of the concept of spatial structure. Animation also makes it easier for lecturers to deliver lecture material.

Learning is held with the hope that students can capture/receive, process, store, and issue information that has been processed. Gardner (Rahmat, 2008) suggests that the ability to process information is in the form of seven bits of intelligence, namely (1) logical-mathematical, (2) spatial, (3) linguistic, (4) kinesthetic-paradise, (5) music, (6) interpersonal, and (7) intrapersonal. Media that can accommodate these requirements is a computer. Computers can present information in video, audio, text, graphics, and animation (simulation).

Edgar Dale in Rakim (2008) describes the importance of visualization and verbalizing in a learning experience called "Edgar Dale's cone of experience" stated that there is a continuum from concrete to abstract between direct, visual, and verbal experience in instilling a concept or understanding. The more concrete the experience provided, the more guarantee the learning process will occur. However, for learning efficiency to occur, efforts are made to make the learning experience provided more abstract ("go as low on the scale as you need to ensure learning, but go as high as you can for the most efficient learning").

DISCUSSION

The product produced is an animation of digital learning media based on mobile learning. This animation will help students to be able to master the lecture material by utilizing mobile learning-based animation (Winatra et al., 2019). Digital animation is designed with special software that produces a product that combines sound visuals nailed by utilizing advanced features so that students have high enthusiasm in the learning process (Alherz et al., 2020).

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The success indicator lies in student learning outcomes and interest in learning after implementing mobile learning-based learning innovations. Multimedia allows students to practice good thinking skills (such as problem-solving, decision making, and others) and has indirectly improved their ICT use skills. The activities that will be designed in this mobile learning-based learning innovation include the development of learning materials, the development of multimedia innovations, the development of learning designs consisting of learning outcomes, sub-topics, and the type of media that will be used for each topic in the development of mobile-based learning innovations.

Multimedia can interactively present a non-sequential, nonlinear, and multidimensional text. This visualization will make it easier to select, synthesize and elaborate the knowledge you want to understand. Multimedia is only one tool that facilitates the teaching and learning process but is not necessarily suitable for presenting all subjects in the teaching and learning process (Ullah et al., 2020). In addition, individual differences of students, according to their speed and learning ability, can be assisted by computer program services that are tailored to the required teaching materials and the communication that takes place between students and computers under the lecturer's facilitator is realized in the form of stimulus-response (Kusumah, 2003: 1).

This mobile learning-based digital learning media animation is designed by looking at the needs of students for low learning motivation and their lack of ability to capture the learning carried out by lecturers. This mobile learning-based digital learning media animation will greatly impact student learning processes and outcomes because students will get a learning process with a different and more interesting atmosphere, increasing students' willingness to learn better.

CONCLUSIONS AND RECOMMENDATIONS

The more people who understand the development of technology and care about people with disabilities, the more people with disabilities will impact the advancement of education. It is time for technology to become a milestone in the revival of education for people with disabilities because, in essence, education is a fundamental thing and needs to be obtained by every human being. Besides being useful for developing the abilities of children with disabilities, technology can increase their participation in various aspects of life to create an information barrier-free environment. Equipment, learning media, and social movements that utilize information and communication technology are, of course, interrelated and mutually supportive in improving education for people with disabilities. Because, even though there are sophisticated tools and good learning media, if efforts to reduce society's negative views are not carried out, surely the ultimate goal of more optimal education will not be achieved.

The application of ICT needs to be balanced with infrastructure improvements for people with disabilities so that later the integration of these public services can be felt to the fullest. The importance of understanding the variety of disabilities also requires special approaches to determine policy designs based on the needs of persons with disabilities, so that infrastructure improvements and the application of ICT are truly a breakthrough that can realize equity in public facilities, especially in fulfilling the rights of students with disabilities. People with disabilities are also human; the shortcomings they carry are certainly not what they want. They also have the right to get a decent life and share in the facilities available. It is time for people with disabilities to rise from adversity.

ACKNOWLEDGMENTS

REFERENCES

Alherz, A., Tsuruta, N., & Kondo, K. (2020). Multiple-character Animation Systems for Children at Different Educational Stages. *International Journal of Asis Digital Art & Design*, 1–7.

Bulkani, Fatchurahman, M., Adella, H., & Setiawan, M. A. (2022). Development of Animation Learning Media Based on Local Wisdom to Improve Student Learning Outcomes in

Elementary Schools. *International Journal of Instruction*, *15*(1), 55–72. https://doi.org/https://e-iji.net/volumes/368-onlinefirst

Fatchurahman, M., Setiawan, M. A., & Karyanti, K. (2021). The development of group healing storytelling model in multicultural counselling services in Indonesian schools: Examination of disciplinary cases. *The Education and Science Journal*, *23*(4), 157–180. https://doi.org/10.17853/1994-5639-2021-4-157-180

Hai, N. X., Villa, R. A., Van Tac, L., Thousand, J. S., & Muc, P. M. (2020). Inclusion in Vietnam: More than a quarter century of implementation. *International Electronic Journal of Elementary Education*, *12*(3), 257–264. https://doi.org/10.26822/iejee.2020358219

McCorkle, W. D. (2020). The relationship between teachers' grade level and views on immigration and immigrant students. *Journal of Social Studies Education Research*, *11*(1), 21–41.

Merchant, W., Read, S., D'Evelyn, S., Miles, C., & Williams, V. (2020). The insider view: tackling disabling practices in higher education institutions. *Higher Education*, *80*(2), 273–287. https://doi.org/10.1007/s10734-019-00479-0

Mumpuniarti, M., Handoyo, R. R., Pinrupitanza, D. T., & Barotuttaqiyah, D. (2020). Teacher's pedagogy competence and challenges in implementing inclusive learning in slow learner. *Cakrawala Pendidikan*, *39*(1), 217–229. https://doi.org/10.21831/cp.v39i1.28807

Priyono, D., Suriadi, S., Pramana, Y., & Junaidi, J. (2022). Development of a Health Education Application Smartphone-based FoCED to Increase Knowledge About Foot Care In Patients With Diabetes Mellitus. *ABDIMAS: Jurnal Pengabdian Masyarakat*, *4*(2), 685–688. https://doi.org/10.35568/abdimas.v4i2.1178

Toquero, C. M. D. (2020). Inclusion of people with disabilities amid COVID-19: Laws, interventions, recommendations. *Multidisciplinary Journal of Educational Research*, *10*(2), 158–177. https://doi.org/10.447/remie.2020.5877

Ullah, F., Wang, J., Farhan, M., Jabbar, S., Wu, Z., & Khalid, S. (2020). Plagiarism detection in students' programming assignments based on semantics: multimedia e-learning based smart assessment methodology. *Multimedia Tools and Applications*, *79*(13–14), 8581–8598. https://doi.org/10.1007/s11042-018-5827-6

Winatra, A., Sunardi, S., Khair, R., Idris, I., & Santosa, A. (2019). Aplikasi Augmented Reality (Ar) Sebagai Media Edukasi Pengenalan Bentuk Dan Bagian Pesawat Berbasis Android. *Jurnal Teknologi Informasi*, *3*(2), 212. https://doi.org/10.36294/jurti.v3i2.1217