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The Effect of Interactive Web-Based Learning (LWL) Model on Learning Outcomes Students with Visual Impairment and Students with Hearing Impairment at Universitas Islam Nusantara

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Abstract: Learning allows all students to be able to access education, including students with special needs. In the current pandemic, all learning activities are converted into online. However, students with special needs, especially blind and deaf students, have difficulty adapting and accessing learning using e-learning. It causes difficulties in understanding the contents of the material, and applications used cannot fully accommodate the needs of blind and deaf children. It has an impact on decreasing learning outcomes. The method used in this study uses a Research and Development (R&D) approach with an exploratory mixed-method research design. The subjects of this study were blind students (7 people) and deaf students (3 people) special education department in Uninus. The results showed that the Interactive Web-Based Learning (IWL) learning model had a good effect on the learning outcomes of blind and deaf students, especially in the physiology analysis subject for children with special needs and the growth and development of children with special needs. With the Interactive Web-Based Learning (IWL) learning model, it is hoped that blind and deaf students can explore more in online-based learning.
Keyword: Web-Based Learning, Learning Model, Students with Special Needs

INTRODUCTION

Education is the right of all individuals, including children with special needs. It is written in law number 20 of 2003 concerning the national education system that "every citizen (without exception) has the right to obtain quality education (article 5 paragraph 1)" (National Education System Law, 2017). It is the basis for all education units to provide excellent service to special needs students in academic and non-academic terms, one of which is Higher Education.

The learning process at the higher education level refers to the four pillars of education, namely 1) learning to know, 2) learning to do, 3) learning to live together, 4) learning to be. With the four pillars of education, it is expected that students can learn comprehensively and produce quality graduates and effective learning. Moreover, students have experience learning to compete in the era of the industrial revolution 4.0 as it is today.

Universities, both public and private, are obliged to accept students regardless of their conditions. It is stated in PERMENRISTEK DIKTI number 46 of 2017 concerning Special Education and Special Services in Higher Education, which means that universities must be ready and able to accommodate good education and infrastructure accessibility for the needs and comfort of students. (National Education System Law, 2017). Therefore, the fulfillment of the right to education must pay attention to four important indicators 1) availability indicators, 2) accessibility, both infrastructure, distance, and/or technology including access, economy, and education costs that must be affordable by all, 3) acceptance of the substance, curriculum, and teaching methods must be accepted by everyone, and 4) adaptability (adaptability) of active education management so that it can adapt to the needs of the various cultures and traditions of society. (Saputri, 2019).

In the Special Education study program, Nusantara Islamic University, there are students with disabilities with various obstacles such as visual impairment (blind) and hearing impairment (deaf). They study together with students in general in the same class. Various obstacles faced by students with disabilities such as difficulties in understanding a series of lecture materials, difficulties in accessing learning materials. They can only listen to lecture material by listening to lecturers lecturing or assisted by their classmates, using PowerPoint media. That too must be read so that their scores are below standard. Besides that, students with hearing impairment still have difficulty in the mastering lecture material.

The pandemic in 2020 appears to impact the learning mechanism; namely, all education systems change from face-to-face to online (online), and lecturers and students must adapt to current conditions. It has a significant impact on students with disabilities.

They have not been able to adapt to the online lecture mechanism. The obstacle faced is that students are not ready to accept face-to-face learning. The material provided is not explicit and detailed. The assignments are collected according to a predetermined deadline, making students stress because in one-day lectures with many assignments. In addition, some students do not have Android cellphones, have difficulties because there are no mentors or peer tutors in the learning process, wasteful quotas, cellphone memory becomes complete, and many others. In the subject of analysis of the physiology of children with special needs and the growth and development of children with special needs, students have difficulty understanding the material presented. It can be seen from the results of the post-test, which was conducted three times. This course is not familiar because the material contains pictures and foreign terms that must be understood in detail. These results show that students with visual impairments and hearing impairments are still confused in understanding the terms in these courses to have difficulty understanding the material. There are several applications that blind students use for online learning in the learning process, including JAWS, Eye Window, Braille Notes, and Note Taking Students have difficulty understanding the concept of the material presented. It can be seen from the results of the post-test, which was carried out three times. This course is not familiar because the material contains pictures and foreign terms that must be understood in detail. These results show that students with visual impairments and hearing impairments are still confused in understanding the terms in these courses to have difficulty understanding the material. There are several applications that blind students use for online learning in the learning process, including JAWS, Eye Window, Braille Notes, and Note Taking Students have difficulty understanding the concept of the material presented. It can be seen from the results of the post-test, which was carried out three times. This course is not familiar because the material contains pictures and foreign terms that must be understood in detail. These results show that students with visual impairments and hearing impairments are still confused in understanding the terms in these courses to have difficulty understanding the material.

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Based on the above problems, a learning innovation is needed so that students with disabilities can be served to learn needs and the obstacles to learning online can be appropriately resolved, so the researcher wants to research under the title The Effect of Interactive Web-Based Learning (IWL) Models on Learning Outcomes in Students with Special Needs In the Special Needs Education Study Program, FKIP Uninus Bandung.

METHOD

The method used in this study uses a Research and Development (R&D) approach with an exploratory mixed-method research design. Mixed method research design is a procedure for collecting, analyzing, and "mixing" quantitative and qualitative research methods in one study to understand a research problem. (Cresswell, 2010). Thus, the mixed method uses two approaches, namely quantitative and qualitative, so that this method provides a comprehensive understanding in solving research problems.

Independent Variable

The independent variable in this study is the interactive web-based learning (IWL) model. According to (Kadir, 2008) application programs are ready-made programs or programs designed to function for other users or applications. Application is also defined as using or applying a concept that is the subject of discussion or as a computer program designed to help humans carry out specific tasks.

The interactive Web-Based Learning (IWL) learning model is an application in a website that can accommodate individual learning needs through online learning. The IWL learning model is designed based on an analysis of the learning needs of blind and deaf students with website media, making it easier to carry out learning activities. The content of the IWL model is a software as a learning medium that is needed containing menu materials, learning videos,

discussions, assignments that can be accessed easily by blind and deaf students. Interactive Web-based Learning is an online learning model using a website page as a learning medium that can present learning materials from lecturers in the form of pages that can be read directly by students with special needs with visual impairments through a screen reader that has been installed on visually impaired students' cellphones and equipped with a learning video feature accompanied by subtitles so that it has accessibility for deaf students. This website is also equipped with discussion features and a collection of assignments and exam results equipped with voice notes. All students, including blind and deaf students, can be directly involved in learning through this website, from lectures to the active assessment process.

Bound Variables

The dependent variable in this study is the learning outcomes of blind and deaf students. Learning outcomes are displayed in the subject of analysis of students with special needs (SEN) physiology and the growth and development of SEN. According to Winataputra (2007), learning outcomes are evidence of the success that has been achieved by students, where each learning activity can lead to an unprecedented change. In this case, learning includes process skills, activeness, motivation, and learning achievement.

According to (Sudjana, 2012) learning outcomes are abilities that students have after receiving a learning experience. Next, Warsito ((Depdiknas, 2006) argues that the results of learning activities are characterized by a relatively permanent positive change in behavior in the person learning. Concerning that opinion, then (Wahidmurni 2013) explains that someone can be said to have succeeded in learning if he can show changes in himself. Changes in these changes include the ability to think, skill, or attitude towards an object. Changes in behavior resulting from learning are often referred to as learning outcomes. Arikunto (Arikunto, 2002) states that a person's learning outcomes can be in the form of knowledge, skills, and attitudes. A person who has learned will experience changes in himself in knowledge, skills, and attitudes.

The learning outcomes referred to are the ability to think of blind and deaf students in capturing material in the physiology analysis course of the SEN and the course of growth and development of the SEN. In addition, understanding can be measured by seeing how the student's ability to answer questions, explain lecture materials again and during the teaching and learning process (pre-test and post-test).

Research subject

The subjects of this study were blind students (7 people) and deaf students (3 people) in the special needs education program, Uninus Bandung.

Research instrument

The instruments used in this study were observation and interview instruments (in stage 1). Whereas stage 2 using a test assessment instrument.

Research procedure

Stage 1, At this stage, the research is qualitative, namely the presentation of data in the form of narrative results, descriptions obtained from the results of assessments, observation, interview, and documentation studies related to the objective conditions of blind and deaf students in learning the physiology analysis subject for children with special needs and the growth and development of children and data from students, lecturers about methods, media, lecture implementation of the physiology analysis course for SEN and the growth and development of SEN.

Researchers conducted a preliminary study to see the objective conditions of blind and deaf students in the physiology analysis course for children with special needs and the growth and development of children with special needs. First, the researcher conducts interviews and observations about the lecture process (material, methods, and applications used). Then analyzed the results.

Stage 2, At this stage, the data is presented in the form of descriptive statistics. In this stage, students carry out lectures using the IWL model that has been created. The learning model is implemented by looking at the influence of students on learning outcomes in the physiology analysis course for children and the growth and development of students. Furthermore, to determine the effect of the IWL learning model on the learning outcomes of blind and deaf students, the researchers conducted tests using an experimental method with a single-subject research (SSR) design. In addition, experimental research was conducted to determine how much influence a treatment/treatment is given to subjects repeatedly within a specific time. (Sunanto, 2006). The design used in this research is AB which consists of two stages of conditions, baseline conditions (A) and intervention (B). A (baseline) is the initial condition of students in learning physiology analysis courses and the growth and development of students. This phase aims to determine how students understand the material presented using existing methods and media. Then calculated using the percentage of results and entered into recording data. B (intervention) is a condition where the intervention is given to students using the IWL model to develop understanding in the learning process in the physiology analysis course and the growth and development of students.

Table 1. The Interview Process and Answers by Blind and Deaf Students

Blind student	Deaf student
How is the process of teaching and learning activities in the subject of physical analysis of SEN and the growth & development of SEN?	
• I can follow the learning process, but sometimes the material presented is difficult to detect by the screen reader on my cellphone. • It is easy to understand if a lecturer explains the rest; I have to look for material to understand the material, especially those related to terminology. • PJJ makes it more difficult for me to follow the lessons because it needs adjustments to the application's material and application. • I prefer learning activities with media that make it easier for visually impaired people to access learning materials. • There is much material to read during PJJ, so I have difficulty understanding it because my cellphone capacity is limited. • The implementation of learning during PJJ for blind people needs to be more friendly in the application used	• The activities are good • I took these two courses, and I did not understand them because I had difficulty understanding the material. • From 8 materials, 2 or 3 materials that I can understand.
What methods and media were used during the lecture?	
• The method used is the same as we face to face only. We cannot meet in person—the media used by PowerPoint for the material. • Face to face. The media is PowerPoint. • The method is discussion, question, and answer. The material uses PowerPoint. The media is PowerPoint, video via YouTube, etc. • Lectures use face-to-face methods, lectures, discussions, and Q& A. • The lectures are virtual media, sometimes with video PowerPoint material. • Same as usual, face to face virtually. • I was using PowerPoint and learning videos.	• The method is virtual face-to-face, and the application used sometimes does not have subtitles, so I am dizzy. • Face to face. The media is using WhatsApp and Google Meet. • Face to face online method
Are the lecture materials easy to understand?	
• It is easy to understand if the lecturer clearly provides an explanation • Difficulty in terms, especially those who speak English. • Easy to understand because there is a PowerPoint. • A little less because it is difficult to repeat lessons • The material presented is easy to understand when there are lecturers only. Because I am lazy to note/record. • The material is easy to understand because the lecturer explains it easy to understand. • Easy to understand	• I do not understand it; sometimes, I like to ask lecturers or friends to repeat material that I do not understand. • The lecturer clearly explained (I can read his lips), but I was confused by the term from the medical (for the subject of physiological analysis). • I feel dizzy when no one translates the words, or the language has to be simpler, so I understand.
What are the obstacles in learning the physiological analysis course for children and the growth & development of children during PJJ?	
• There are so many pictures that it is difficult to imagine the parts. For example, the brain has many parts and sometimes makes confusion and complex understanding it. • Difficult if it is related to medical understanding (physiological analysis of Student with Special Needs) • In addition to the material related to the definition of network, constraints make a miscommunication.	• The network that likes unstable • When giving the material, the lecturer had explained it slowly and clearly (the articulation), but I was still confused. So there must be additional TKS in learning.
What are applications used in distance learning?	
We use WhatsApp, Zoom, Google Meet, YouTube, Microsoft team, Google Classroom, etc.	• Using WhatsApp, Zoom, Google Meet, YouTube, Microsoft team, etc., google classroom.

How are the results of distance learning in the physiology analysis course of SEN and the growth & development of SEN?	
• Physiology analysis and growth and development courses are easy to understand, but they still don't 100% understand the material. In addition, the application users cannot accommodate me to download the material delivered. • I was only absent from attending lectures because it was difficult to access the application. • It is easy to understand when the lecturer explains, but when doing the assignment, it is rather tricky. • Good, assignments submission uploaded to the application is like an error. • As a result, in my opinion, I could not understand the two materials of the course. I also like to be confused when I have to collect assignments carefully. • There is learning material that is difficult to understand (nervous system) because of many terms. • Just understand.	• My learning outcomes are not optimal • Difficulty understanding the material • Have to ask for help from friends or lecturers have to repeat the material presented.

Table 2. Assessment Instruments Interactive Web-Based Learning (IWL) Learning Model

Aspects measured using Interactive Web-based Learning (IWL) learning model
How is the process of teaching and learning activities in the physiology analysis course for children and their growth & development using the Interactive Web-based Learning (IWL) learning model?
Are the lecture materials easy to understand using the Interactive Web-based Learning (IWL) learning model?
How is the Interactive Web-based Learning (IWL) learning model design attractive and able to access it in a friendly and good manner?
How is the menu displayed on the Interactive Web-based Learning (IWL) learning application?
Is the Interactive Web-based Learning (IWL) learning application easy to understand?
How is the relationship between material and media in the Interactive Web-based Learning (IWL) learning model?
Is the Interactive Web-based Learning (IWL) learning model easy to access and understand?
How are the learning outcomes for students in the physiology analysis course for children and their growth & development using the Interactive Web-based Learning (IWL) learning model?

FINDING & DISCUSSION

Finding

The results showed that students' learning outcomes in the physiology analysis course and the development of children development were still lacking. Based on the results of the interview and observation, it was found that in the process of teaching and learning activities, blind students did not understand the terminology and had difficulty understanding the material because the screen reader application was unable to capture all the material displayed, difficulties in repeating the subject matter if the lecturer had finished lectures, the method used was lectures, discussion and using PowerPoint media so that the learning outcomes of blind students are not optimal. Furthermore, for deaf students, the difficulty of reading the lips of the lecturer makes it challenging to grasp the meaning of the lecture material. Based on the data above, it can be concluded that the learning outcomes of blind and deaf students in the subject of physical and developmental analysis are still very limited in understanding the content of the material due to internal and external factors. From the above objective conditions, a learning model was compiled in the form of an application in the form of an online website that aims to make blind and deaf students access social learning and comprehend the content of the material comprehensively. The preparation of a learning model is based on the analysis of learning problems faced by students with visual impairments and hearing impairment, the suitability of the learning needs of blind and deaf students with applications, and appropriate software as the learning media.

The preparation of this learning model consists of learning material from the lecturer in the form of pages that can be read directly by blind students through a screen reader that has been installed on a blind student's cellphone and is equipped with a learning video feature accompanied by subtitles so that it has accessibility for deaf students as well as equipped with discussion features and assignment collection and examination results equipped

with voice notes so that all students, including blind and deaf students, can be directly involved in learning through this website from the start of lectures to the active assessment process.

This program results in a learning model interactive web-based learning (IWL), which can be accessed by blind and deaf students in learning in the physiology analysis course and the growth & development of children with special needs.

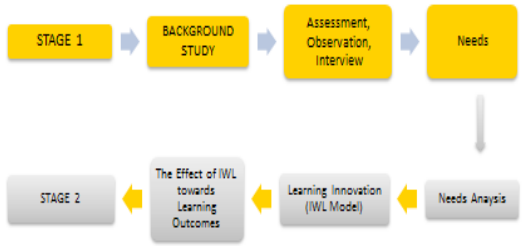

Figure 1. Stages of research

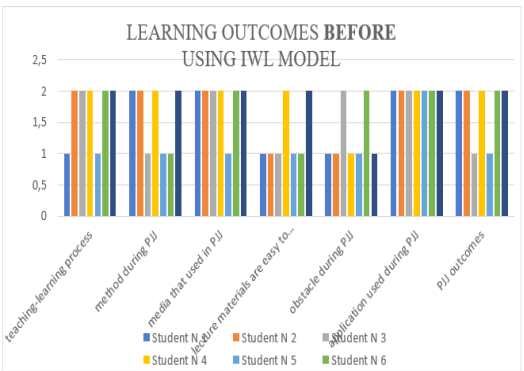

Figure 2. Learning outcomes before using the IWL model

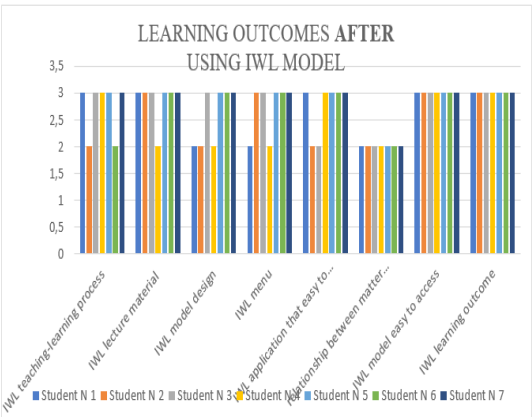

Figure 3. Learning outcomes after using the IWL model

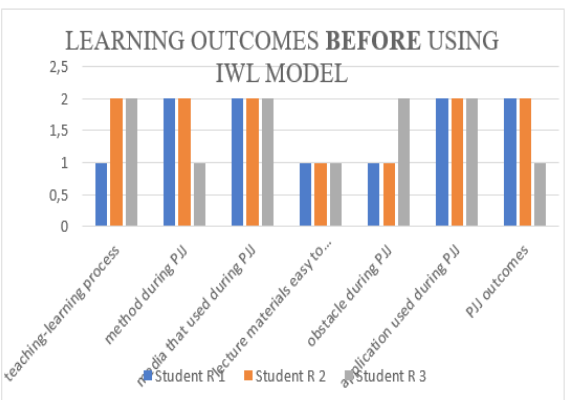

Figure 4. Learning outcomes before using the IWL model

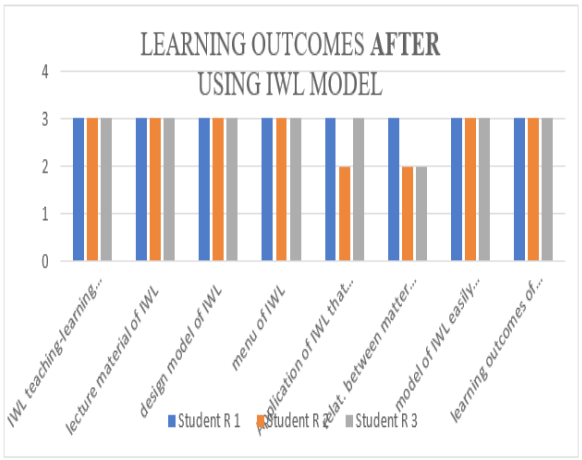

Figure 5. Learning outcomes after using the IWL model

The interactive web-based learning model was tested on blind and deaf students by giving tests using instruments adapted to the menu in the application.

The data results of table 2 are presented in the following data obtained in Figures 2, 3, 4, and 5.

Based on the data from the calculations that have been done in the form of the graph above, it can be concluded that students who are blind and deaf after being given learning using the learning model increase in the process of teaching and learning activities, understanding the lecture material so that the learning outcomes show an increase. So that the learning model Interactive Web-based Learning affects the learning outcomes of students with special needs (blind and deaf) in special education study programs.

DISCUSSION

The purpose of this study is to see the effect of the model Interactive Web-based Learning on the learning outcomes of students with special needs in the UNINUS Special Needs Education study program, especially in the subject of analysis of the physiology of children with special needs and the growth & development of children with special needs. Learning is an activity that involves acquiring knowledge, skills, and positive values through interaction with their environment. The learning process is a communication process, namely delivering messages from message sources through certain channels/media to message recipients. Therefore, message, message source, channel/media, and message receiver are components of the communication process. The process that will be communicated is the content of teachings or education in the curriculum. The message's source can be teachers, students, other people, or writers of books and media. (Sudjana, 2012).

Online learning or E-learning in current conditions allows students to carry out learning activities effectively. With online learning, the learning contents, interactions, or guidance can be conveyed to students according to the situation and conditions. (Rosenberg, 2001): E-learning or online learning refers to the use of internet technology to deliver a series of solutions that can enhance knowledge and skills. The benefits of E-learning or online include 1) E-learning can be measured; E-learning is something speedy. E-learning helps us to keep up to date with the latest information, 2). E-learning has the capacity and consistency, 3). E-learning helps high memory, 4). E-learning saves time and money, 5). E-learning is very friendly to the environment, 6). E-learning is flexible. (Science Studies, 2019).

E-learning provides a flexible and accessible learning system that allows each student to adapt to their conditions and needs. Therefore, E-Learning can be used for education for all E-Learning can help accommodate students with disabilities and accommodate the needs of instructors and educational institutions, helping students in the early stages of learning, breaking down barriers, being used as a tool to increase Different potential students based on knowledge, E-learning can also encourage the inclusiveness of a variety of SEN (Di Iorio, Feliziani, Mirri, Salomoni, & Vitali, 2006).

E-learning accompanied by proper training and instructors will comprehensively enhance the learning process. In addition, non-physical accessibility such as information, communication, and technology can be used or understood by persons with disabilities, such as printing in large fonts. Individuals with low vision can access it, deaf-speech people, providing adaptive hearing aids in theaters. (Syafi'ie, 2014).

The objective conditions of students with special needs (blind and deaf) in the Special Needs Education study program are still problematic in dealing with learning using the online system. Visible obstacles are the need for adaptation in carrying out online / online-based learning activities, difficulties in operating applications in the field, understanding of material during online/online lectures are not optimal. It impacts students' learning outcomes with special needs (blind and deaf) that are less than optimal, such as; a points scoring system that imposes a specific time limit. Thus students with visual impairments will always have the potential to lag behind alert friends in getting points. Not all forms of online learning will be easily accessible to blind students even though they have used tools or software support such as screen readers. Assistive devices support persons with disabilities in carrying out activities or jobs that do not have data or are challenging due to their disabilities. (Tarsidi, 2013). Difficulty in terms of online exams that are time-limited or with the exact duration of processing time as alert students. Whereas for deaf students it is difficult to understand the movements of the lecturers' lips so that their understanding of the material becomes wrong or misperception, the unavailability of subtitles and/or language hints on the video used by the lecturer for teaching, a bad internet connection can provide deaf students experiencing delays in receiving information. Learning modifications for deaf disabilities include: a) Increasing visual teaching materials; b) Not looking away from deaf disabilities because they get information from lip movements; c) Students with hearing disabilities sit at the front; d) Avoid too fast speech and complex sentences; e) Demonstration method, modeling, or hands-on practice is recommended; f) Deaf persons are allowed to explain their thoughts by using sign language and/or in writing; g) Provide a sign language interpreter. (Aulia, Ummah, & Samawi, 2020).

Based on these findings, a learning innovation is needed for students with special needs (visually impaired and deaf) in online lectures. With this innovation, it is hoped that it will affect students' learning outcomes with special needs (blind and deaf). One of them is using a learning model, Interactive Web-based Learning. This learning model supports the same access to learning for students with special needs (Shevlin & Kenny, 2004). Therefore, support for students who are blind and deaf is very appropriate and necessary. Furthermore, online learning content should make it easier for students with special needs to access it. Dabbagh (in Hasanah, 2020) stated that the characteristics of students in online or online learning activities are: 1. enthusiasm for learning, 2. literacy for technology, 3. ability to communicate interpersonally, 4. collaborating 5. skills for independent learning.

CONCLUSION

The results showed that the Interactive Web-Based Learning (IWL) learning model had a good effect on the learning outcomes of blind and deaf students, especially in the physiology analysis subject for children with special needs and the growth and development of children with special needs. Thus, with online learning using a model, Interactive Web-based Learning will affect students' learning outcomes with special needs so that the learning needs of students who are blind and deaf can be met. Therefore, with the Interactive Web-Based Learning (IWL) learning model, it is hoped that blind and deaf students can explore more in online-based learning.

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