TEGAR 5 (1) (2021)
Journal of Teaching Physical Education in Elementary School

Available online at :
https://ejournal.upi.edu/index.php/tegar/article/view/38565
DOI: https://doi.org/10.17509/tegar.v5i1.38565

Development of TISERA Application in Physical Education Learning for Student with Hearning Impairment

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Article Info

Received : August 2020
Revised : September 2021
Accepted : September 2021
Available online : October 2021

Keywords:
hearing impairment, learning application, physical education.

Abstract

Physical Education learning for students with hearing impairment faces obstacles and difficulties due to the COVID-19 pandemic. This study aimed to create a Physical Education learning application product to help students carry out movement tasks and increase their motivation in Physical Education learning. The method used was a quantitative method with a descriptive-analytical approach. The sampling process used was an accidental sampling technique involving 11 respondents. The results of the implementation carried out for five meetings on 11 fifth grade students with hearing impairment in a Special Schools, using quizzes in the application, showed an increased learning. About 82% of parents reported that the application was helpful during online learning, while the student enthusiasm for learning increased by 73%. Student understanding on the material increased, while learning increased by 82%. External factors affecting students in learning Physical Education included animation and score acquisition. The score acquisition affected the student motivation to gain the best score. The results of the gerak tunarungu aktif dan sehat (active and healthy hearing impaired student movement) application as learning media in Elementary Schools can increase the student understanding on Physical Education learning materials.

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INTRODUCTION

The Covid-19 pandemic occurring in early 2020 greatly affected all sectors of human life (Djalante, et al, 2020). The lack of learning media and inadequate number of teachers have an impact on the quality of learning improvement. Students do not learn as they should. The current solution only exists for normal students. The education sector has also been severely impacted by the implementation of distance learning policies. The learning constraints experienced by students throughout Indonesia, and even around the world, show that distance learning provides new challenges in education requiring the ability to adapt so that the learning process could continue well. Students experience a decrease in learning motivation and their work assignments due to the COVID-19 pandemic (Putra, et al, 2020). Moreover, students with hearing and communication barriers, such as hearing impairment, experience more severe problems than normal students in receiving information and distance learning instructions (Jauhari, *et al,* 2020).

One method that can be used in distance learning is utilizing digital technology. The results showed that the intervention using video-based technology provided with guidance is effective in improving the self-concept of students with hearing impairment in the academic field (Asogwa, et al, 2020). Some of the existing learning videos for children with hearing impairment include android-based sentence correctors, educational video games to learn early reading, and game applications to improve the vocabulary skills of children with hearing impairment (Wirna, et al, 2018; Winarsih and Sarris, 2018).

Appropriate learning media, especially those related to Physical Education learning for the students with hearing impairment, is relevant to one of the Sustainable Development Goals (SDGs) goals, namely quality education and equality for disabilities (Mirasandi, et al, 2019). The results of a preliminary study, conducted by researchers on Google Play store and Google Scholar, had not found Physical Education learning applications for students with hearing impairment in Indonesia. Physical Education learning in special need schools is only delivered through WhatsApp application with written instructions, so that students do not get instructional instructions properly. In addition, some examples of videos from YouTube are not equipped with sign language (Andriyani and Buliali, 2021).

Based on the background of this study, this study was intended to develop a Physical Education learning application for students with hearing impairment. The active and healthy hearing-impaired student movement (TISERA) is a digital offline learning application. This application is presented with various animations to attract the attention of hearing-impaired students. The material in the application is adapted to the school curriculum, making it easier for students with hearing impairment to carry out Physical Education learning. The features presented in the application include learning videos, practice questions or quizzes, video features of outstanding students, and educational games. There are videos equipped with sign language and examples of movement tasks that students have to do in a complete learning nature. Students can move on to the next game after answering the questions at each stage.

The purpose of this study was to develop the TISERA application for special need schools throughout Indonesia as a Physical Education learning medium for students with hearing impairment. The development of this application is considered important because there is no research discussing Physical Education learning applications for students with hearing impairment, while the existing applications are generally only for speech development and exact science subjects.

METHODS

This study used a quantitative method with a descriptive-analytical approach. Samples were taken purposely involving 11 respondents from fifth Grade Special Need School students. The activity was carried out from June-October 2021 at Cicendo Bandung Special Need School.

The method used a four-step approach. The first stage was a survey of schools for students with disabilities. The survey was conducted to find out the problems experienced by fifth Grade Special Need School students. The second stage was creating application products for the active and healthy hearing-impaired student movement. In this process, as the main activity for providing changes to partners, the application development involved other parties, including programmers to create TISERA application products designed by the team. The third stage was providing socialization of innovative application products. This process was an activity providing a functional application as the solution for partner problems whether the problems were relevant to the design displayed on the application, then directions for using the TISERA application were provided. The fourth was testing the designed application product. At this stage, students were given tests related to the application material for the active and healthy hearing-impaired student movement to test the feasibility of the TISERA application in Physical Education learning.

RESULTS AND DISCUSSION

Process of TISERA Application Analysis

The analysis process was carried out when designing the TISERA application to get an expected design. The analysis processes carried out on the UI/UX design of the TISERA application are as follows:

(i) Analysis of the TISERA application log-in method:
This process was carried out to obtain information about the process of running applications for the active and healthy hearing-impaired student movement and for viewing learning videos and animations operated by students (Gulo et al., 2021).

(ii) Application design analysis:
This process was carried out to gain student interest in operating the application so that students do not get bored in learning through the TISERA application.

(iii) Application trial analysis:
This process was carried out to see how the application works in adjusting the design and running the application, starting from class selection, material testing, quizzes, and educational games.

(iv) Stakeholder interviews:
Stakeholder interviews were conducted with the parties directly related to the TISERA application. The results of simple analysis and interviews showed that the TISERA application was helpful for hearing-impaired students in learning movement activities.

TISERA Application Development

The purpose of the design development was to produce a prototype of TISERA application which would be presented to partners to attract their interest in using the application. The application prototyping process is aimed to obtain information and feedback from users on the system through user interaction with the developed prototype, arguing that the prototype is sufficient to describe the initial version of the actual system (Multazam, 2020). The prototype can be applied to small or large system development with the hope that the development process can run well, orderly, and can be completed on time (Purnomo, 2020). The design process was administered based on the analysis conducted previously, including the suggestions from stakeholders. The resulting design was not

only a graphic design. It was also an interactive design so that potential users could easily use it for the evaluation process. The design of TISERA application features can be seen in **Figure 1.**

Figure 1. TISERA Application Design

Evaluation

After the prototype was completed, the next step was evaluation. Evaluation was carried out repeatedly to find out feedback from the design developed previously. The TISERA team conducted an evaluation process to find out the increase in user convenience in using TISERA application. Then, an experiment was conducted on Special Need School students to examine the weaknesses in TISERA application design. Stages carried out during the evaluation are as follows:

i. Field study: an evaluation process where the team went directly to the field to find out an overview of the operation of the application and its difficulties (Lo et al., 2019).
ii. Feasibility testing: the user could run the application using the prototype without explaining the general steps to operate TISERA application (Karuovic et al., 2011). The illustration of one of the features of TISERA Application can be seen in **Figure 2.**
iii. Questionnaire: users filled out a questionnaire regarding the application, whether the application was running well or there were still shortcomings. The questionnaire was distributed via Google form.

Figure 2. TISERA Application with Instruction Video

Implementation of TISERA Application

The assistance of the application implementation to partners was administered five times on five different days, namely the trial phase, mentoring phase, implementation phase one, implementation phase two, and implementation phase three. The trial phase was carried out directly on August 8, 2021 by adhering to strict Health protocols. The mentoring activity contained an explanation of the application description and how to download the application carried out online on August 21, 2021 using WhatsApp Group media for 3 hours attended by the Cicendo Special Need School Physical Education teachers, parents, 11 students, and members of the TISERA Team. The first implementation was a trial phase for using the TISERA application for 5th Grade students. The process was held online through a zoom meeting on August 28, 2021 for 2 meeting hours, led by the person in charge of the event, Shofa Sofia, accompanied by Physical Education teachers and the supervisor (assigned lecturer) of the program. Furthermore, the second implementation phase was a question-and-answer session about TISERA Application carried out through Whatsapp Group on August 29, 2021.

The third implementation was carried out online on September 3, 2021, employing a method aimed to enable students to learn independently using TISERA application by attaching evidence that students took Physical Education lessons independently, which was seen from videos sent

by parents via private chat to the TISERA implementation coordinator. The person in charge of the event provided instructions on what students had to do via WhatsApp media. This activity lasted for 2 meeting hours. The evidence that this implementation gave good results and provided benefits for our partners was obtained from the testimonies of parents in the group and interviews, showing that students were helped by the TISERA application. The evidence is presented in **Figure 3**.

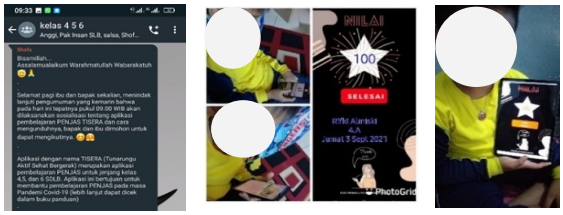

Figure 3. Implementation of TISERA Application

From the survey conducted via Google form using a scale of 1 = low, 2 = sufficient, 3 = high, the results of the survey carried out at the data collection stage through the questionnaire can be seen in **Table 1.**

Table 1. Student Interest in Learning Physical Education through the Application

Respondents	Before Using the Application	After Using the Application	Descriptions
A	Sufficient	High	Improved
B	Sufficient	High	Improved
C	Low	Sufficient	Improved
D	Sufficient	High	Improved
E	Sufficient	Sufficient	Unchanged
F	Sufficient	High	Improved
G	Low	Sufficient	Improved
H	Sufficient	High	Improved
I	Sufficient	Sufficient	Unchanged
J	Sufficient	Sufficient	Unchanged
K	Sufficient	High	Improved

The results presented in Table 1 conclude that 8 (73%) of students experienced an increase in learning motivation, while the remaining 3 (27%) of students did not experience a change in motivation.

Overview of Student Motivation Before and After Using TISERA Application

The result of the survey on student motivation to learn Physical Education using a Likert scale, 1 = low, 2 = sufficient, 3 = high, is shown in **Table 2**.

Table 2. The Overview of Student Motivation Before and After Using TISERA Application

Respondents	Before Using the Application	After Using the Application	Category
A	Sufficient	High	Improved
B	Sufficient	High	Improved
C	Low	Sufficient	Improved
D	Sufficient	High	Improved
E	Sufficient	Sufficient	Unchanged
F	Sufficient	High	Improved
G	Low	Suffici ent	Improved
H	Sufficient	High	Improved
I	Sufficient	Sufficient	Unchanged
J	Sufficient	Sufficient	Unchanged
K	Sufficient	High	Improved

The results presented in Table 2 show that 8 (73%) of students experienced an increase in learning motivation, while the remaining 3 (27%) of students did not experience a change in motivation.

Motivation according to the planned behavior theory is influenced by two factors, namely internal factors and external factors, including in the learning of students with disabilities (MacFarlane and Woolfson, 2013). The influence of parents in providing direction to hearing-impaired students during Physical Education learning

using TISERA had a positive impact. The results of the interviews showed that parents were greatly helped by the application so that the students were more active.

Self-determination theory explains that the motivation of doing exercise is influenced by the obstacles in doing it (Ryan and Deci, 2020). Hearing barriers possessed by hearing-impaired students add to the difficulty of students in receiving learning instruction information, especially in distance learning (Hudzaifah et al., 2021). The limited learning media for hearing-impaired students reduces the students' motivation in learning Physical Education due to the lack of movement examples provided by the teacher (Afudaniati et al., 2021). Physical Education learning process for the hearing-impaired students should be supported by technology tailored to meet the needs of hearing-impaired students, especially in the delivery of information on movement tasks that hearing-impaired students must receive (Fernández and Batanero et al., 2019).

Overview of Student Understanding of Physical Education Learning Before and After Using TISERA Application

The survey results of the material understanding level using Google forms employing a scale of 1 = low, 2 = sufficient, 3 = high, obtained a picture of students' understanding of Physical Education learning before and after using TISERA application as described in **Table 3**.

The results presented in Table 3 conclude that 9 (82%) of the 11 students experienced an increase in understanding the material, while the remaining 2 (18%) of students did not experience a change.

Distance learning for hearing-impaired students in fifth Grade Special Need School have difficulties that must be solved, especially in the Physical Education Sports and Health subject. The learning was carried out only by giving assignments via whatsapp media; the movement tasks that should be done by students were not carried out; parents who helped students in the learning process had difficulty in helping students, especially related to movement and the lack of learning videos and internet quotas that make the learning difficult to be effective (Sama et al., 2020).

Table 3. Description of student motivation before and after using TISERA application

Respondents	Before Using the Application	After Using the Applica-	Description
A	Low	Sufficient	Improved
B	Low	High	Improved
C	Sufficient	Sufficient	Unchanged
D	Low	High	Improved
E	Low	Sufficient	Improved
F	Sufficient	High	Improved
G	Sufficient	High	Improved
H	Sufficient	High	Improved
I	Sufficient	High	Improved
J	Sufficient	Sufficient	Unchanged
K	Sufficient	High	Improved

Physical Education is important for students to maintain physical fitness and to stay active during the pandemic (Anggara et al., 2021). The Physical Education learning process will be better if it is supported by technology adapted to the needs of hearing-impaired students, especially in the information delivery of movement tasks that must be carried out by the students (Fernández and Batanero et al., 2019).

Learning is a complex process carried out by everyone throughout life involving interaction with the environment, thus learning can be done anytime and anywhere, not limited by space and time (Arsyad, 2014). In the era of rapid development of technology and information, digital learning becomes one of the main factors for hearing-impaired students; the difficulty

in communication makes traditional learning difficult for hearing-impaired students, thus digital learning provided with visual videos enables hearing-impaired students to understand the learning activity process, while learning videos facilitate the process of assigning assignments and providing learning materials to hearing-impaired students so that teaching and learning activities are carried out effectively and efficiently (Trianto, 2007).

This application development used the User Interface (UI) and User Experience (UX). The user interface is the part of the computer and software that can be seen, heard, touched, and spoken to, either directly or in a certain way. UI and UX are needed to give a good impression to potential users and to compete with other competitors, so the application needs a good design (Karuovic *et al*., 2021). UI enables the system and users to interact through commands, such as using content and entering data (Antle *et al.,* 2013), while UX is referred to an experience related to the reactions, perceptions, behaviors, emotions, and thoughts of users when using the system (Multazam, 2020). The difficulty in giving instructions and communication creates problems in Physical Education learning; the right user interface for the problems and hearing-impaired students is a software that can be seen, including a software providing sign language videos presented in applications, to help hearing-impaired students to receive instructions and the material delivered during the learning process (Ardhiyani J dan Bachtiar AM, 2014).

The approach taken to design this application was the User-Centered Design (UCD) focusing on certain prospective uses, where UCD is characterized by a continuous design and evaluation process starting from the initial step to the implementation step (Salvo, 2001). The designed learning videos had been adapted to the needs of partners by providing video signals on the learning videos so that students can understand the material being explained (Lucas, 2009).

TISERA application cannot provide additional material because it is an offline-based application. However, stakeholders welcomed the team's explanation that TISERA application would be developed to enable users to interact directly in real time. TISERA application will be developed with additional features, starting from student and teacher accounts to facilitate login access to the application, automatic attendance during learning, quizzes with direct scores that can be seen by the teacher to see student learning progress, to a movement sensor to record movement tasks performed by students and to provide feedback to students for movement corrections.

CONCLUSION

Parents and teachers gave positive responses starting from the socialization stage to the application implementation stage. TISERA application made it easier for students to carry out Physical Education learning activities and helped teachers deliver learning activities. There was an increase in learning interest, motivation, and understanding of Physical Education material in fifth Grade students with hearing impairment in Special Need School after using TISERA application.

ACKNOWLEDGEMENT

A sincere gratitude to the Ministry of Education, Culture, Research, and Technology, Center for National Achievement, Universitas Pendidikan Indonesia, and Partners, including students of Cicendo Bandung Special Need School and their parents, teachers, and school for their support and cooperation, so that this PKM-PM program can be held.

REFERENCE

Afudaniati, A. R., Hidayatullah, M. F., dan

Andayani, T. R. 2021. Dampak pandemi covıd-19 terhadap pelaksanaan pembelajaran pendıdıkan jasmanı adaptıf di SLB. *In Combines-Conference On Management, Business, Innovation, Education And Social Sciences*, 1(1), 258-263.

Andriyani, A., dan Buliali, J. L. 2021. Pengembangan media pembelajaran lingkaran menggunakan augmented reality berbasis android bagi siswa tunarungu. *Math Didactic: Jurnal Pendidikan Matematika*, 7(2), 170-185.

Anggara, F. (2021). Evaluasi tingkat pembelajaran pendidikan jasmani, olahraga dan kesehatan pada masa pandemi covid-19. *Jurnal Ilmiah Bina Edukasi*, 1(1), 37-45.

Antle, A. N., and Wise, A. F. 2013. Getting down to details: using theories of cognition and learning to inform tangible user interface design. *Interacting with Computers*, 25(1), 1-20

Ardhiyani, J., & Bachtiar, A. M. 2014. Analisis User Interface media pembelajaran pengenalan kosakata untuk anak tunarungu. *Makassar: Konferensi Nasional Sistem Informasi (KNSI)*.

Arsyad, A. 2014. *Media pembelajaran.* Jakarta: Rajawali Pers.

Asogwa, U. D., Ofoegbu, T. O., Eseadi, C., Ogbonna, C. S., Eskay, M., Nji, G. C., dan Onah, B. I. 2020. The effect of a video-guided educational technology intervention on the academic self-concept of adolescent students with hearing impairment: Implications For Physical Education. *Medicine,* 99(30).

Djalante, R., Lassa, J., Setiamarga, D., Sudjatma, A., Indrawan, M., Haryanto, B., dan Warsilah, H. 2020. Review and analysis of current responses to covid-19 in indonesia: Period of January to March 2020. *Progress In Disaster Science*, 6, 100091.

Fernández-Batanero, J. M., Sañudo, B., Montenegro-Rueda, M., and García-Martínez, I. 2019. Physical education teachers and their ict training applied to students with disabilities. The Case of Spain. *Sustainability,* 11(9), 2559.

Gulo, Y. T. M., Nasution, A. K., Batubara, B. M., dan Waruwu, S. 2021. Koncokelas: aplikasi video pembelajaran berbasis animasi sebagai usaha pemberdayaan anak putus sekolah melalui rumah belajar. *Pelita Masyarakat,* 2 (2), 83-94.

Hudzaifah, H., Akhyar, M., dan Fadhilah, S. S. 2021. Analisis kebutuhan anak tunarungu SDLB di SLB-B YRTRW Surakarta dalam memahami materi pembelajaran jarak jauh. *Jurnal Orthopedagogik*, 2(1), 16-26.

Jauhari, M. N., Mambela, S., dan Zakiah, Z. 2020. Dampak pandemi covid-19 terhapad pelaksanaan pembelajaran penjas adaptif di Sekolah Luar Biasa. *STAND: Journal Sports Teaching and Development*, 1(1), 63-70.

Karuovic, D., Eleven, E., Pardanjac, M., Jokic, S., and Radosav, D. 2011. Educational software adapted to children with hearing impairment. *Technics Technologies Education Management-Item,* 6(4), 1276-1282.

Lucas, M. D. 2009. Procedures for working with students with hearing impairments or hearing impairments in general physical education. *VAHPERD Journal,* 30(1), 23-26.

MacFarlane, K., dan Woolfson, L. M. 2013. Teacher attitudes and behavior toward the inclusion of children with social, emotional, and behavioral difficulties in mainstream schools: An application of the theory of planned behavior. *Teaching and Teacher Education*, 29. 46-52.

Mirasandi, I. P., Akhyar, M., dan Widyastono, H. 2019. Media development on the concept sentence learning model based android for students with hearing impairment. *Journal of Physics: Conference Series* 1339 (1). 012115. IOP Publishing.

Putra, P., Liriwati, F. Y., Tahrim, T., Syafrudin, S., dan Aslan, A. 2020. The students learning from home experience during covid-19 school closures policy in indonesia. *Jurnal Iqra*, 5(2).

Ryan, R. M., dan Deci, E. L. 2020. Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860.

Salvo, M. J. (2001). Ethics of engagement:

User-centered design and rhetorical methodology. *Technical Communication Quarterly*, 10(3), 273-290.

Sama, S., Bahri, S., dan Budiyono, F. 2020. Sinergitas guru dan orang tua dalam pembelajaran daring pada masa covid-19 di kecamatan kalianget. *Prosiding Diskusi Daring Tematik Nasional,* ISBN 978-623-6613-01-6. pp. 62-66.

Trianto, S. P., dan Pd, M. 2007. *Model-model pembelajaran inovatif berorientasi konstruktivistik*. Jakarta: Prestasi Pustaka.

Winarsih, M., dan Sarris, A. P. 2018. Educative video game based android system for learning early reading for children with hearing impairment. *American Journal of Educational Research,* 6(8), 1111-1116.

Wirna, Y., Silitonga, E. C., Putri, M. F. R., dan Zulmiyetri, Z. 2018. Aplikasi korektor kalimat berbasis android untuk anak tunarungu. *INVOTEK: Jurnal Inovasi Vokasional dan Teknologi,* 18 (2), 41-48.