

CREATION OF A DIGITAL MODULE AS LEARNING MEDIA FOR DEAF STUDENTS

Eka Yuli Astuti^{*)1}, Fajar Indra Septiana², Zulfa Rahmah Effendi³, Lilis Suwandari⁴, Emay Mastiani⁵, Sadiyah Nur Adhimah⁶

¹ Special Education Study Program, Faculty of Teacher Training and Education, Universitas Islam Nusantara, Bandung, Indonesia; email : ekayuliasuti@uninus.ac.id

² Special Education Study Program, Faculty of Teacher Training and Education, Universitas Islam Nusantara, Bandung, Indonesia; email : fajarindra@uninus.ac.id

³ Special Education Study Program, Faculty of Teacher Training and Education, Universitas Islam Nusantara, Bandung, Indonesia; email : zulfarahmah@uninus.ac.id

⁴ Special Education Study Program, Faculty of Teacher Training and Education, Universitas Islam Nusantara, Bandung, Indonesia; email : lizsuwandari@gmail.com

⁵ Special Education Study Program, Faculty of Teacher Training and Education, Universitas Islam Nusantara, Bandung, Indonesia email : emaymastiani@uninus.ac.id

⁶ Special Education Study Program, Faculty of Teacher Training and Education, Universitas Islam Nusantara, Bandung, Indonesia; email : sadiyahnur12@gmail.com

^{*)}Corresponding author; E-mail addresses: mochirwanh@gmail.com

ARTICLE INFO

Article history:

Received September 02, 2023

Revised September 10, 2023

Accepted October 2, 2023

Available online November 30, 2023

Keywords: deaf, digital module, learning media

Copyright ©2023 by Author. Published by Lembaga Pengembangan Pembelajaran, Penelitian, dan Pengabdian Masyarakat Universitas PGRI Mahadewa Indonesia

Abstract. Deaf people have learning characteristics that rely more on visual aspects. This research aimed to produce learning media in the form of digital module that could accommodate the needs and learning characteristics of deaf students in the course of thesis guidance theory course. This research belonged to the type of development by applying the ADDIE procedure. The results showed that the digital module scored 85.28% in the aspect of the validity test by learning media experts and deafness experts. While in the test practicality by students, the digital module received a score of 85.63%. These two scores indicated that both digital modules were at a very high level of validity and practicality. Subsequently, they were worthy of being a learning media option that could be used for deaf students.

INTRODUCTION

Implementing Education For All (EFA) in higher education is certainly not as easy as imagined, there are big challenges in providing maximum higher education services for people with disabilities (Widana et al., 2023). One of the core aspects that needs more attention is the field of learning for people with disabilities in higher education. This is not an exaggeration considering that the learning aspect is the core of education. Based on EFA principles, universities should pay attention to every aspect or component of learning so that it can be accessed by people with disabilities (Sueyoshi & Masayoshi, 2023). In more detail, one of these components is teaching materials or learning materials. Learning materials provided by lecturers must be able to accommodate not only the learning needs of people with disabilities but also the characteristics of their way of learning so that they are able to access learning materials and show maximum performance to participate in the learning process (Galvydytė & Ališauskas, 2016).

In the context of this research, there are four deaf students who are taking final year undergraduate courses in the Special Education Study Program at Nusantara Islamic University, Bandung. Based on interviews with them, information was obtained that they had difficulty understanding the content of the material in the source books, almost all of which were texts without explanations. Low understanding of the learning material is coupled with their lack of ability to understand terms or key words for the material which in fact they do not yet know or master, as the general impact characteristic of the deaf is inadequate mastery of vocabulary (Adibsereshki & Hatamizadeh, 2023).

As an illustration, deaf people have different learning methods from individuals without hearing impairments in general (Widana et al., 2023). They need visualisation that is complete but easy to understand, as is the learning characteristic of deaf people who rely on their visual aspect (Munadi, 2013). Therefore, researchers are trying to develop comprehensive learning media in the form of digital modules containing learning material for the Thesis Guidance Theory course. The modules prepared by researchers accommodate the principles of Universal Design for Learning (UDL), which is a learning framework for students with diverse learning needs and emphasises flexible, meaningful learning and involvement for students (Rifa'ie, 2020). This means that this teaching module has been modified in such a way as to facilitate the learning characteristics of deaf students (Purnadewi et al., 2023).

METHOD

The researchs applied the Research & Development (R&D) method in carrying out this research. The aim of carrying out this research was to produce an output in the form of a product of a digital module that accommodated the learning characteristics of deaf students in the Thesis Guidance Theory course.

The preparation of learning media in this research was carried out through the stages of Analysis, Design, Development, Implementation and Evaluation or ADDIE (Rayanto, 2020). The selection of this model was based on the consideration that this model provided ample space for researchers to carry out continuous evaluation and revision at each step or stage. Apart from that, this model also seemed simple in implementing the procedures but remained systematic and, moreover, the validity and reliability of the products produced could be guaranteed (Ediyanto, Mulyadi, Supriatna, & Kawai, 2018). The following were the stages carried out in developing digital module learning media depicted in a diagram below.

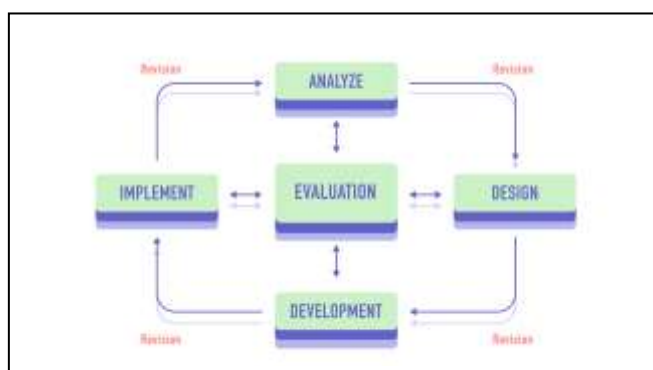


Figure 1. Diagram of the stages of development of ADDIE model learning media
Sumber dari <https://www.learnupon.com/blog/addie-5-steps/>

As subjects, there were four deaf students from the Special Education Study Program who were in the final year of semester 7 in the 2023/2024 academic year. Meanwhile, the instrument used in this research was a validation sheet containing an assessment questionnaire for the digital module that had been created. A validation sheet was provided to determine the validity of the learning media which was created and filled in by three experts, one learning media expert was a representative from the Association of Indonesian Orthopedagogic Educators (APOI) and two people were academics in the field of deafness and special education. Apart from that, the assessment questionnaire was also filled out by all subjects, namely four deaf students who took the Thesis Guidance Theory course. Data collection was carried out by carrying out FGDs with experts and students which also involved non-deaf students and a team of multimedia experts. The data that had been collected was then processed using descriptive percentage analysis, namely by explaining the level of validity of the digital module that had been created and developed.

RESULTS AND DISCUSSION

At the analysis stage, an initial needs and abilities assessment was carried out for the four deaf students taking the Thesis Guidance Theory course. Based on the results of the needs and capabilities assessment, the following representation data was obtained.

Table 1. Description of the subject's initial abilities

| Initial | Description |
|---------|--|
| S1 | S1 always takes notes on the lecture material given, whether from the lecturer or notes from fellow students, but according to his confession, he finds it difficult to understand the lecture material because it only contains long sentences and lots of new words to read. |
| S2 | S2 still has residual hearing and good word pronunciation, S2 experiences hearing problems during his growing years. Therefore, this subject's language and communication skills are quite good, the subject has good grammar and a larger vocabulary than S1. |
| S3 | This S3 has several similarities with the S2. S3 still has residual hearing, is able to read lips, and has good sign language skills. Usually, if you are studying online, your PhD companion will contact the class leader to ask for information regarding the assignment. |
| S4 | S4 is more proficient in sign language and is not accompanied by lip reading. S4 grammar is still not neat. In every offline lecture, the subject uses speech to text to translate the lecturer's words into sentences. This speech to text does not always help, if the subject does not understand then the subject will immediately ask their closest friend. |

In addition, based on the learning media needs assessment, the four subjects said that they needed learning media that contained material that could be studied repeatedly independently, which contained many references needed to understand the learning material.

At the design stage, considering input from the analysis stage, the textbook contained pictures and simple sentences that were friendly to their vocabulary mastery. Therefore, researchers decided to develop digital modules that maximised infographic visualization features and contained hyperlinks to key texts in the learning material.

At the development stage, the researchers again reviewed the framework or concept and feature plans that had been produced at the design stage. The digital module that had been planned was reviewed again to perfect the concept and once it was felt that it was sufficient, the researchers began coordinating with a team of multimedia experts to realise the preparation and creation of the digital module by implementing the features that had been planned. The features developed in the digital module were visualisation of material in the form of infographics (diagrams and illustrations) and text created in the form of hyperlinks. The following is a screen display related to the two features used in the digital module that has been prepared and developed.



Figure 2. Visualisation of learning material in the digital module

The image above is a visualisation of learning material that uses simple words or sentences to provide maximum understanding impact for students, especially deaf students. An example of hyperlink text is in the image below.

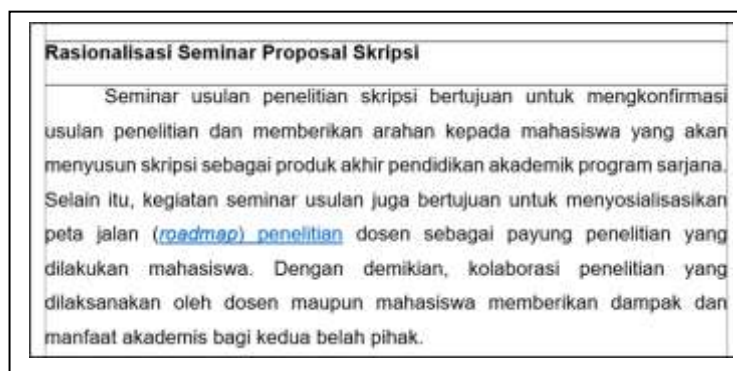


Figure 3. Example of hyperlink text in the digital module

Figure 3 above is an example of hyperlink text provided in the digital module. The blue text can direct us to the internet page address provided, which contains further and broader explanations regarding the word.



Figure 4. Page displayed from the hyperlink text in Figure 3

The image above is a display of an internet page that appears in a browser related to words that have a hyperlink feature. This feature is used in all parts of the module. At this development stage, a validity test was also carried out on the digital module through assessment by one learning media expert and two deaf experts. Based on the assessment of this validity test, the following data was obtained.

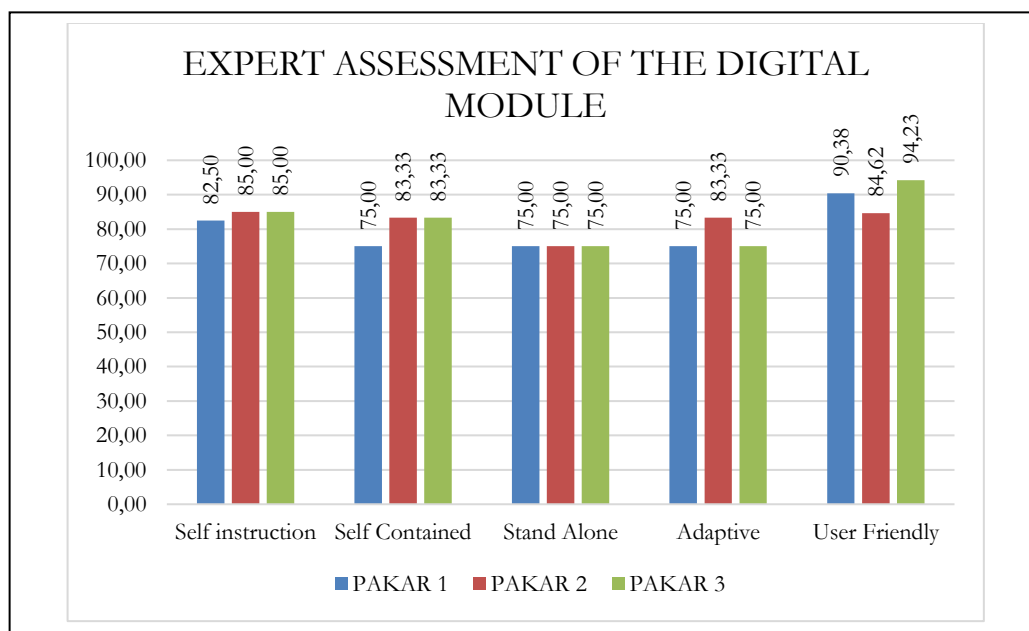


Figure 5. Chart of assessment of the digital module by experts

Based on the assessments given by experts in all aspects, an average percentage of 85.28% was obtained, which fell into the "Very high" category with the percentage of expert 1 (learning media expert) being 84.17%, the percentage of experts 2 was 84.17% and 87.50% from expert 3.

The implementation stage was the trial stage of applying the learning media that had been developed. Implementation was carried out in classes with deaf students as the subjects of this research in the Thesis Guidance Theory course. This stage was also intended to measure the level of practicality of the digital module that had been developed. Implementation was

carried out 3 times at meetings at the beginning of the semester. The implementation of the learning process referred to RPS utilising digital media modules that had been developed. After carrying out the trial at each meeting, an evaluation was carried out by examining the deficiencies in the learning media and analysing input from not only deaf students but also non-disabled students. Thus, at each meeting there was a re-development of the media that had been implemented.

At this stage, deaf students were also asked to provide an assessment of the digital modules that had been used during the trial process. Through this process, it was known that deaf students' assessments of the learning media that had been implemented were as follows.

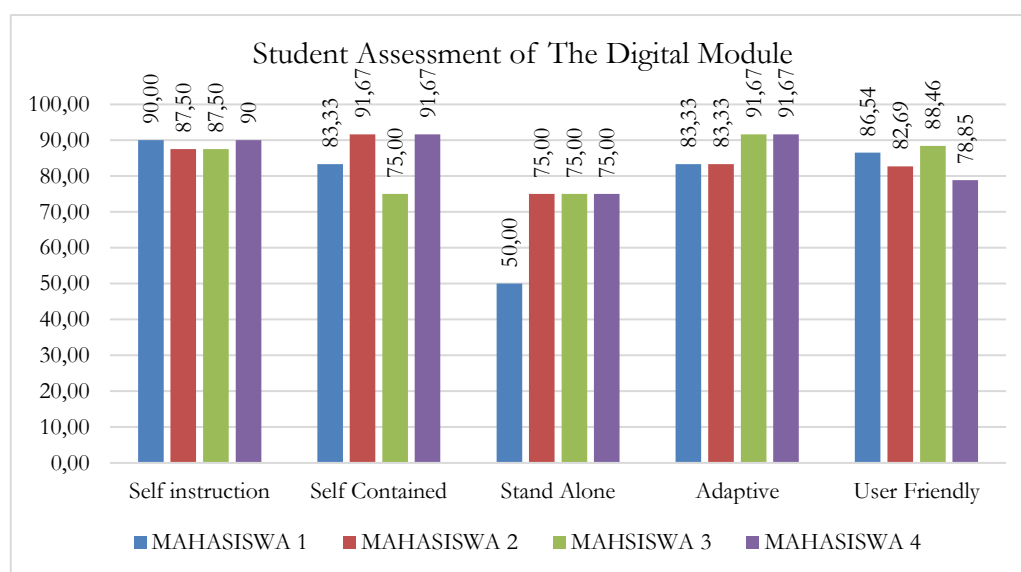


Figure 6. Student assessment chart for the digital module

The average score of all deaf students who took part in implementing digital modules in learning was 85.63%, so it could be said that the practical level was "Very high". Student 1 gave a score percentage of 85.83%, student 2 with 85.00%, student 3 with 86.67%, and student 4 with 85.00%.

At the evaluation stage, an FGD was carried out which was attended by researchers, learning media experts, deaf experts, a team of multimedia experts, deaf students and non-disabled students. In its implementation, the researchers explained the results of implementing learning media in a lecture setting. On this FGD occasion, open discussions were also conducted with experts and students so that the researchers received input and assessment of the learning media that had been developed. The main input that needed attention and improvement was more towards modifying graphic visualisation with objects that were more representative of the learning material, using simpler language (not too standard) and enriching hyperlink text so that students could browse more learning materials.

In the learning context, the media used for students with special needs must receive serious attention from educators (Kusumawardhani, 2020). Especially for the deaf, where they compensate for the auditory aspect with another aspect, namely the visual aspect, to make it easier for them to obtain information and knowledge (Sukerti, et al., 2019). Therefore, learning media is needed that is based on UDL principles in order to accommodate the learning needs and learning characteristics of students so that they can access and explore learning material easily, anywhere and at any time independently (Dalton, 2015).

A learning media that can accommodate the learning characteristics of deaf people is learning modules. In current developments, learning media can be made in digital form. Digital modules as learning media have the benefits of (1) improving students' learning activities for the better, (2) training students to think at a higher level, and (3) helping students to learn independently anytime, anywhere (Suryani, et al., 2020). This opinion is reinforced by the results of research by Purnomo & Nugraheni (2019) that digital modules can effectively improve learning outcomes and student competencies. To better accommodate the learning characteristics of deaf people who rely on visualisation as compensation for impaired hearing (Soemantri, 2007), the module is equipped with visualisation for the majority of learning material which is considered to be the core learning material. This is also done to overcome the lack of vocabulary possessed by deaf students (Efendi, 2008) so that deaf students have a higher chance of understanding the learning material. The digital module that was prepared by the researchers received a validity score from experts of 85.28% and 85.63% from students, so it could be said to be very suitable for accommodating the learning characteristics of deaf students. Additionally, text in the form of hyperlinks made it easier for deaf students to search for further explanations of important words or terms used in the learning material. This is in accordance with the findings of Charlina & Rasdana (2022) that students can stimulate their own understanding in reading through the analysis they carry out to find the structure and rules of the text.

The digital module is designed as optimally as possible in order to provide a maximum and impactful learning experience for all students, including deaf students. This is carried out to fulfill the UDL principles as stated in Ghaleb's research results (2014) that the use of assistive and adaptive technology can help students with disabilities to increase and hone their independence in the context of academic learning, participate in class on discussion opportunities, and help them to be able to complete some difficult academic assignments.

CONCLUSION

The creation of digital modules as learning media in the Thesis Guidance Theory course was intended to accommodate the learning needs and characteristics of deaf students who in fact relied on visual aspects. In the validity test, the digital module scored 85.28%. Meanwhile, in practical tests by students, the digital module got a score of 85.63%. These two scores indicated that both digital modules were at a "very high" level of validity and practicality, so they are worthy of being a learning media option that could be used for deaf students. There are several recommendations that the researchers can convey, namely (1) If possible, lecturers carry out initial ability assessments of students who will take the courses they teach. (2) Lecturers should accommodate the learning characteristics of students taking the courses they teach, and follow the rules or principles of UDL. (3) Further research is needed regarding the implementation of digital modules as learning media for deaf students.

ACKNOWLEDGEMENTS

The researchers express their deepest gratitude to several parties, including (1) Directorate of Learning and Student Affairs, Directorate General of Higher Education, Research and Technology, Ministry of Education, Culture, Research and Technology. Thanks to the trust and funds that have been given so that the researchers could carry out research and completed this scientific article. (2) The academic directorate of Nusantara Islamic University that facilitated registration, implementation and evaluation of this research, especially in the administrative and bureaucratic aspects.

REFERENCES

- Adibsereshki, N., & Hatamizadeh, N. (2023). Social intelligence of students with and without hearing impairment in mainstream schools. *International Journal of Special Education*, 38(2), 58-65.
- Charlina, C., Rasdana, O. (2022). Pemanfaatan Hyperlink untuk Multimedia Presentasi pada Pembelajaran Teks Anekdote. *GERAM*, 10(1), 100-108. <https://doi.org/10.52291/ijse.2023.38.22>
- Dalton, E. M. (2017). Beyond Universal Design for Learning: Guiding Principles to Reduce Barriers to Digital & Media Literacy Competence. *Journal of Media Literacy Education*, 9(2), 17-29. <https://doi.org/10.23860/JMLE-2019-09-02-02>
- Ediyanto, E., Mulyadi, A., Supriatna, A., & Kawai, N. (2018). The Education and Training Program Guideline for Special Guidance Teacher Competence Development in Indonesian Inclusive School. Indonesian. *Journal of Disability Studies*, 5(2), 251–267. <https://ijds.ub.ac.id/index.php/ijds/article/view/118>
- Efendi, Mohamad. (2008). *Pengantar Psikopedagogik Anak Berkecenderungan*. Bumi Aksara.
- Galvydytė, J., & Ališauskas, A. (2016). Educational characteristics of students with learning disabilities. *Specialusis ugdymas*, 13(4), 51-92. <https://doi.org/10.21277/se.v1i34.251>
- Munadi, Y. (2013). *Media Pembelajaran (Sebuah Pendekatan Baru)*. Referensi GP Press Group.
- Purnadewi, G. A. A., Arnawa, N., & Tatminingsih, S. (2023). The influence of school culture, learning interest, and learning motivation on science learning outcomes. *Indonesian Journal of Educational Development (IJED)*, 4(2), 126-138. <https://doi.org/10.59672/ijed.v4i2.3040>
- Purnomo, & Nugraheni. (2019). Pengembangan Modul Tari Berbasis Digital untuk Meningkatkan Kompetensi Guru Sekolah Menengah Tari. *Gondang: Jurnal Seni dan Budaya*, 3(2), 119–127. <https://doi.org/10.24114/gondang.v3i2.14157>
- Rayanto, Y. H. (2020). *Penelitian pengembangan model Addie: Teori & Praktek*. Lembaga Academic & Research Institute.
- Rifa'ie, M. (2020). Fleksibilitas pembelajaran daring pada masa Pandemi Covid-19. *Jurnal Pendidikan dan Kebudayaan*, 5(2), 197-209. <https://dx.doi.org/10.24832/jpnk.v5i2.1605>
- Soemantri, S. 2007. *Psikologi Anak Luar Biasa*. Reflika Aditama
- Sueyoshi, A. & Masayoshi, T. (2023). *Support for Students With Disabilities at Japanese Institutions of Higher Education*. In K. Koreeda, M. Tsuge, S. Ikuta, E. Dalton, & L. Ewe (Eds.), *Developing Inclusive Environments in Education: Global Practices and Curricula* (pp. 208-227). IGI Global. <https://doi.org/10.4018/979-8-3693-0664-2.ch011>
- Sukerti, N. W. (2019). Penerapan video pembelajaran ekosistem mangrove berbasis komtal untuk meningkatkan penguasaan konsep ekosistem siswa tunarungu. *Quantum: Jurnal Inovasi Pendidikan Sains*, 10(2), 172-179. <http://dx.doi.org/10.20527/quantum.v10i2.6937>
- Suryani, K., Utami, I. S., Khairudin, K., Ariska, A., & Rahmadani, A. F. (2020). Pengembangan Modul Digital berbasis STEM menggunakan Aplikasi 3D FlipBook pada Mata Kuliah Sistem Operasi. *Mimbar Ilmu*, 25(3), 358–367. <https://doi.org/10.23887/mi.v25i3.28702>
- Widana, I. W., Sumandya, I. W., Citrawan, I. W., Widana, I. N. S., Ibarra, F. P., Quicho, R. F., Delos Santos, M. R. H. M., Velasquez-Fajanela, J. V., & Mukminin, A. (2023). The effect of teacher's responsibility and understanding of the local wisdom concept on teacher's autonomy in developing evaluation of learning based on local wisdom in special needs school. *Journal of Higher Education Theory and Practice*, 23(10), 152-167. <https://doi.org/10.33423/jhetp.v23i10.6189>

Widana, I. W., Sumandya, I. W., Citrawan, I. W. (2023). The special education teachers' ability to develop an integrated learning evaluation of Pancasila student profiles based on local wisdom for special needs students in Indonesia. *Kasetsart Journal of Social Sciences*, 44(2), 527–536. <https://doi.org/10.34044/j.kjss.2023.44.2.23>