Digital Design of Teaching Materials in Microteaching Courses by Implementing Borg and Gall Method

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Abstract. The aim of this study is to develop Digital Design of Teaching Materials in Microteaching course. Technology utilization assist the development of digital based teaching materials. Digital teaching materials are the book which is displayed in digital form and can provide an attractive appearance because it is equipped with text, image, sound, animation, and video. It belonged to Research and Development (R&D) with the aims are to develop and validate educational products according to Borg and Gall method. The development process involves experts in learning material, language feasibility, and learning media to provide feedbacks and suggestions for improvement. The results of the development shown that the digital teaching material courses that have been produced are feasible to use because they were validated. The results of learning material validation were 96.3%, language validation was 87.6%, and media validation was 93%. Based on these three aspects, an average expert validation score of 92.3% with very good category.

Keywords: Digital, Teaching Material, Microteaching

1 Introduction

Based on the purpose, vision, and mission of the education perspective a teacher must be able to master the materials and management of a class in the teaching and learning process because teaching is not a simple process, but a complex process, where teachers are required to transfer knowledge, master techniques teaching to adapt a variety of teaching techniques to students who have various types of learning and different talents means a teacher Professionals must truly master their competence as educators. As emphasized in Article 8 of Law No. 14 of 2005 concerning Teachers and Lecturers, teacher competence can be interpreted as a set of knowledge, skills, and behaviors that must be owned internalized, and mastered by the teacher in carrying out professional duties which include competency pedagogic, personal competence, social competence and professional competence [1].

ICIESC 2023, October 24, Medan, Indonesia

DOI 10.4108/eai.24-10-2023.2342188

Teacher is a position or profession that requires certain skills or competencies to carry out their duties and functions as a teacher [2]. The duties of teaching are very complex and always develop along with the development of science, technology, and art. To master that complex task, and to be able to do it adapt to ever-evolving learning demands, then share prospective teacher students and teachers must prepare themselves and always practice their teaching skills, including through learning approaches which is simplified in this case through a micro-learning approach (Microteaching) a course that teaches students how regarding learning practices, where students as prospective teachers not only can plan learning activities in the form of an Implementation Plan Learning (RPP), but also can implement it and monitor changes that occur to students during the learning process [3],[4]. Microteaching exercises serve as a preliminary exercise before attending practice teacher training in real conditions in schools. The purpose of microteaching is equipment students with basic teaching skills [5]. 8 basic teaching skills must be mastered by prospective teacher students, including 1) opening and closing skills learning, 2) explaining skills, 3) asking skills (basic and continued), 4) skills to hold variations, 5) skills to provide reinforcement, 6) class management skills, 7) small group defense skills and individually, and 8) skills to lead small group discussions [6],[7],[8],[9].

To become a professional teacher candidate, students should be Candidates must master the eight basic teaching skills. In microteaching lectures, each student is allowed to perform teaching practice on a small scale. After the practical teaching activities, each student is given criticism and suggestions for improvement in learning next. Through microteaching learning obtained by students, It is hoped that this will form future professional educators. But in microteaching learning that has been done so far many problems were found, including the lack of skilled students in applying the eight teaching skills to teaching practice. After analysis, it turned out that the cause was the lecturer's explanation that was not remembered by the students. In addition, there is also no teaching material about the eight teaching skills as a reference in micro-learning lectures. Thus, necessary to develop microteaching teaching materials to help students understand eight basic teaching skills

The results of the analysis above became the background for the researcher to conduct research on the Digital Design of Teaching Materials in Microteaching courses. Digital design of microteaching teaching materials on research selected to respond to the challenges of the 21st century and adapt to the needs of students in the digital era 5.0, this is due to printed teaching materials having several shortcomings, among others, is not able to present movement, the presentation of material in printed teaching materials is linear, unable presenting events sequentially, it takes a lot of money to make good printed teaching materials and reading skills are needed strong from the reader [10]. The main weakness of printed teaching materials is difficult to guide readers who experience difficulties understanding certain parts of the printed teaching materials and difficult to give feedback for the questions it asks especially questions that have many answers or that require complex answers and deeply.

Meanwhile with digital teaching materials accessibility to teaching materials becomes easier, the cost is more affordable, and study time becomes more flexible [11]. The aim of this study is to develop a Digital Design of Teaching Materials in Microteaching course, technology

utilization can support the development of digital-based teaching materials, digital teaching materials are a book which is displayed in digital form and can provide an attractive appearance because they is equipped with text, images, sound, animation, and video [12], [13]. It can be used as a medium of communication between teachers and students in the process of online learning and offline learning. Digital teaching materials often called ebooks are a book displayed in electronic form that can be accessed via smartphones and computers or laptops.

2 Method

This research is a type of R&D (Research and Development), which aims to develop a new product. R&D research is used because this research aims to produce digital teaching materials in microteaching courses by determining level of success and effectiveness product [14]. The development in this research refers to the development method according to Borg and Gall [15]. The Borg & Gall method is structured programmatically with systematic activities so that problem solving in learning related to learning media follows the characteristics of student learning and according to needs. The Borg & Gall method development consists of ten stages which include: (a) research and data Collection, (b) planning, (c) initial product development, (d) initial product trial/limited trial, (e) product improvement initial, (f) wider field trial, (g) product improvement of wider field test results, (h) final product trial, (i) final product revision or improvement, (j) dissemination and implementation.

However due to the limited time, without ignoring the important element of this research, the researcher adapted the stages of the Borg and Gall including (1) planning; (2) developing the product, (3) evaluating the product and (4) final product. The steps in this development, are provided in the chart below:

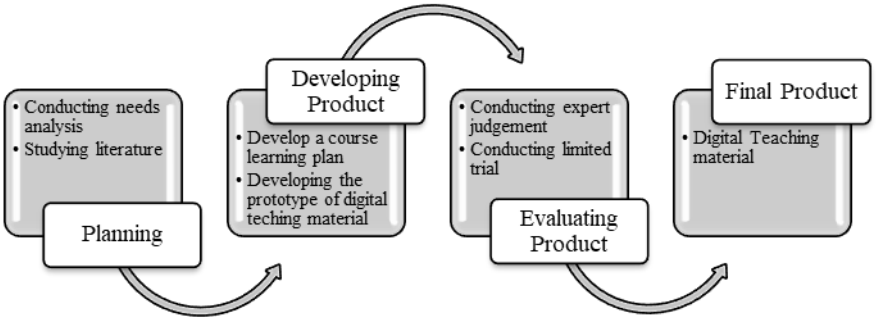

Fig. 1. Research Flowchart

3 Result and Discussion

This research and development produce products in the form of digital teaching materials used in Microteaching courses. Digital teaching material products are digital learning media applications that can be used on computers or laptops, cell phones, and other gadgets. The digital teaching materials used are intended as learning supplements for Microteaching courses which contain lecture material, information on the lecture design process and student assignments, and other relevant supporting learning materials, all packaged digitally. At the planning stage, researchers made observations of the previous microteaching lecture process. In this case, the researcher observed learning, learning tools, and media used as a whole. Based on observations of the lecture process, it was found that:1) Many students do not bring books as a learning resource so they only rely on what is written and conveyed by the lecture, 2) Lack of use of learning media in microteaching lectures, 3) The use of the internet and literacy-based learning is still not optimal and 4) There is still a lack of variation in the use of learning resources.

The next stage of developing digital microteaching teaching materials includes creating storyboards and flowcharts, creating and collecting material content, and creating digital applications. Storyboard is an overview of the digital design that will be developed with application content containing teaching materials with supporting materials and sources. A flow chart is a diagram that describes the flow of the use of digital teaching materials. After creating a storyboard and flow chart, content is then created that supports digital teaching materials such as the required images, application buttons, audio, simulations, animations, and videos. Digital teaching materials are developed with the Flip Builder platform. The development of digital teaching material applications starts by filling content into the PDF platform.

Furthermore, the technique for developing digital books encompassed the stages of designing and manufacturing digital books, digital book design, validation, and subsequent revision of digital book outcomes following expert testing. The product of digital design teaching materials in microteaching courses is submitted to learning material experts to provide feedback/assessment. The process of data gathering was conducted utilizing a questionnaire-based methodology with the National Education Standards Agency (BNSP) Indicator [16],[17]. Data collection was carried out using the questionnaire method. Presentation of data analysis of digital design teaching materials tested by learning content experts. Input and suggestions from content experts regarding digital design subject matter that is very suitable for online and offline learning are presented in the diagram.

Expert validation of content material product development of teaching materials digital is done by providing products to material experts, Products digital books are delivered to learning material experts to be given feedback assessment. Content experts who validate deep content Digital-based microteaching teaching materials. Validation results are available seen in the following diagram:

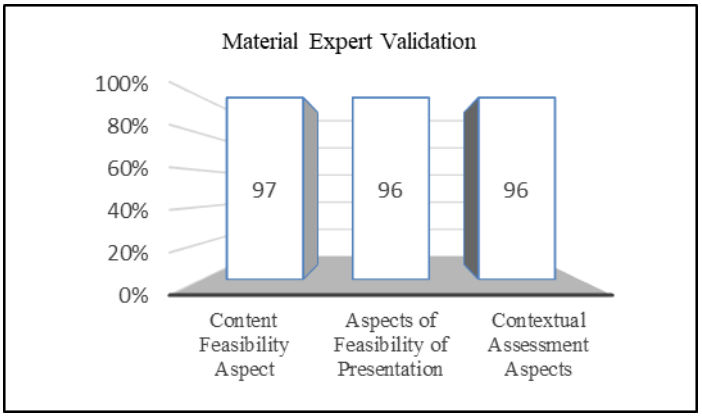

Fig. 2. Material Expert Validation

The results of the material feasibility test review from the content feasibility aspect were 97% in the very good category, the presentation feasibility aspect was 96% in the very good category, and the contextual assessment aspect obtained a percentage of 96% in the good category. Thus, the assessment results were 96.3% or the very good category. This means that teaching materials are suitable for use with notes from reviewers or material experts. Then the appropriateness instrument for the language aspect of learning consists of indicators including: 1) Straightforward, 2) Communicative, 3) Dialogic and interactive, 4) Conformity to student development, 5) Conformity to language rules, and 6) Use of terms, symbols, or icons.

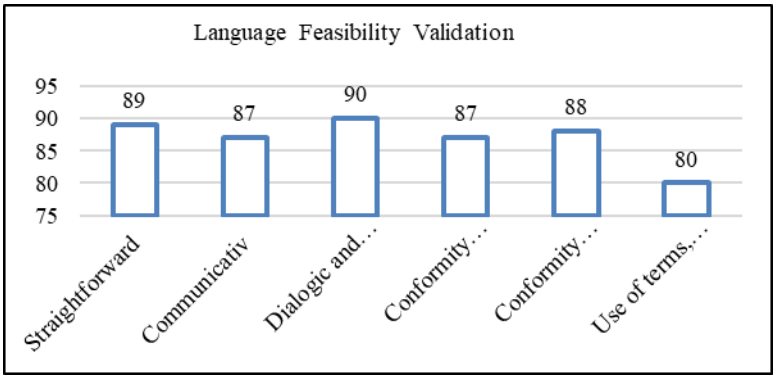

Fig. 3. Language Feasibility Validation

The results of the language feasibility test review also obtained very good results overall from the Direct aspect, amounting to 89% in the very good category, Communicative at 87% in the very good category, Dialogical and interactive at 90% in the very good category, then Suitability to the Participants' Development Education was 87% in the very good category, Conformity with Language Rules was 88% in the very good category and Use of terms, symbols or icons was 80% in the very good category. Thus, the assessment results were 87.6% or the very good category. This means that teaching materials are suitable for use with notes from reviewers or language experts.

The next validation is learning media which includes indicators in the graphic aspect, there are assessment components in the form of presentation of digital teaching materials, font selection, placement of images and videos, clarity of instructions for using digital teaching materials, display of digital teaching materials, use of language and ease of digital teaching materials for participants to understand. educate. In terms of effectiveness, the assessment components include the nature of digital teaching materials and the ability of digital teaching materials to create motivation and enjoyment for students. In the interactive aspect, the assessment component is the use of digital teaching materials that can be used in certain times and circumstances as well as the ability of digital teaching materials to understand the concept of sound wave material and build students' knowledge. In the media display aspect, the assessment indicators include media support capacity which includes video, audio, and images as well as media navigation.

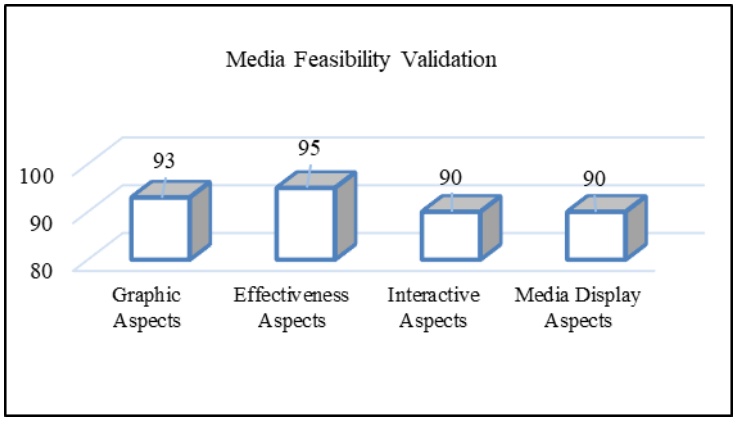

Fig. 4. Media Feasibility Validation

The value of the validation results for media aspects which include graphic aspects, effectiveness aspects, interactive aspects, and overall media display aspects is in the very good category with an average of 93%. All aspects received a very good category with graphic aspects at 93%, effectiveness aspects at 95%, interactive aspects at 90%, and media display aspects at 90%. This is because digital teaching materials have an attractive appearance in all aspects, one of which is the appearance of the media and the suitability of images, animation, audio, video, and simulations. Apart from that, this media can make it easier for students to understand material and concepts and can create motivation and activeness for students in building their knowledge. The final results of the validation of digital microteaching teaching materials can be seen in the following table of average expert assessments.

Table 1. Average Expert Assessments

No	Aspect	Percentage	Interpretation
1	Material Validation	96,3%	Very Good
2	Language Validation	87,6%	Very Good
3	Media Validation	93%	Very Good
	Average	92,3%	Very Good

Based on the results above, digital teaching materials can be said to be feasible if they obtain a percentage value of >61%. The results of material validation were 96.3%, language validation was 87.6%, and media validation was 93% as seen in Table 4.1. From these three aspects, an average expert validation score of 92.3% was obtained. It can be concluded that the teaching materials are suitable and declared "very good" according to the predetermined interpretation criteria.

4 Conclusion

The results of exposure and data analysis, it can be concluded that the digital teaching material courses that have been produced are feasible to use because they have been validated. The results of material validation were 96.3%, language validation was 87.6%, and Media validation was 93%. Based on these three aspects, an average expert validation score of 91.3% with a very good category.

Acknowledgments. This research was able to be completed with assistance from many parties, therefore the research team would like to express our thanks to all parties involved, especially to the Rector of Unimed and his vice, the chairman of LPPM Unimed and all his staff, the Dean of then Faculty of Social Sciences at Unimed and deputy dean, and head of department with all lecturers on civic education.

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