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Digital Practicum Module in Integrated Science for Elementary School Subjects

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ABSTRAK

Rendahnya penggunaan modul praktikum pada proses pembelajaran IPA SD Terintegrasi. Penelitian ini bertujuan untuk menciptakan modul praktikum digital pada mata kuliah IPA SD Terintegrasi. Jenis penelitian ini yaitu research and development dengan proses tahapan ADDIE. Subjek penelitian ini yaitu validitas isi, desain, dan media modul praktikum, dan kepraktisan modul praktikum. Metode pengumpulan data yaitu metode studi literature, kuisioner dan wawancara. Bentuk instrument berupa rating scale, dengan teknik analisis data yaitu deskriptif kualitatif dan kuantitatif. Hasil penelitian menunjukkan bahwa penelitian ini berhasil menghasilkan modul praktikum digital pada mata kuliah IPA SD Terintegrasi di Pendidikan Guru Sekolah Dasar. Tingkat pencapaian validitas media sebesar 94%, validitas isi sebesar 94%, dan validitas desain sebesar 92,5%, hal ini menunjukan jika validitas mencapai predikat sangat baik. Tingkat pencapaian respon praktisi memperoleh nilai 94% dengan predikat sangat baik; Tingkat pencapaian respon kepraktisan media pada uji perorangan memperoleh nilai 98,33%; Serta tingkat pencapaian respon praktisi pada uji kelompok kecil memperoleh nilai 97,5% dengan predikat sangat baik. Simpulan menunjukkan produk pengembangan berupa modul praktikum digital pada mata kuliah IPA SD Terintegrasi dapat dinyatakan valid, praktis, dan layak digunakan dalam proses pembelajaran. Implikasi dalam penelitian ini yaitu adanya modul praktikum digital yang dapat menyokong proses pembelajaran IPA SD Terintegrasi.

ABSTRACT

The low use of practicum modules in the Integrated Elementary Science learning process. This study aims to create a digital practicum module in Integrated Elementary Science courses. This type of research is research and development with the ADDIE stage process. The subject of this research is the validity of the content, design, and media of the practicum module and the practicality of the practicum module. Data collection methods are literature study methods, questionnaires, and interviews. The instrument form is a rating scale with descriptive, qualitative, and quantitative data analysis techniques. The results showed that this study successfully produced a digital practicum module in the Integrated Elementary Science course in Elementary School Teacher Education. The level of achievement of media validity is 94%, content validity is 94%, and design validity is 92.5%. It shows that the validity reaches a very good predicate. The level of achievement of the practitioner's response obtained a value of 94% with a very good predicate; The level of achievement of the media practicality response in the individual test obtained a value of 98.33%; And the level of achievement of the practitioner's response in the small group test obtained a value of 97.5% with a very good predicate. The conclusion shows that the developed product as a digital practicum module in Integrated Elementary Science courses can be declared valid, practical, and feasible for learning. This study implies that there is a digital practicum module that can support the learning process of Integrated Elementary Science.

1. INTRODUCTION

Education is one of the elements that cannot be separated from human beings. Starting from the womb to maturity, humans will experience the educational process. Education is a light that can guide humans in determining the direction, purpose, and meaning of life, bearing in mind that education is a source of knowledge that arises from a person's deepest awareness of new problems (Sukarini & Manuaba, 2021; Komang Suardi Wiradarma et al., 2021). Current technological developments associated with the development of the world of education must be connected to the development of science (Darmawan Harefa, 2020; Suparmi, 2018). The development of science carried out by scientific scientists has a positive impact on technological developments, with the creation of equipment that is a product of technology (Lubis et al., 2021; Watini, 2019). This technology product will bring scientific progress (Rimawati & Wibowo, 2018; Sari & Atmojo, 2021). Concerning the learning process in college or at school. Science is often associated with Natural Sciences (IPA) subjects. Science learning in elementary schools is required to be able to apply science to produce products that can be justified. Lecturers

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must apply scientific knowledge supported by competence to create a conducive learning environment. The main purpose of learning science is how to solve life's problems so that it can instill the habit of thinking and behaving scientifically, critically, creatively, and independently.

Science is related to how to understand nature systematically, so science is not only limited to mastering a collection of knowledge (scientific products) in the form of facts, concepts, and principles but rather as a process of discovery (Candra Dewi & Negara, 2021; K. S Wiradarma et al., 2021). Science learning is expected to be a vehicle for elementary school students or prospective teachers to learn about themselves and their environment and prospects for further development by applying it to their daily lives (Gunarta, 2019; Putri et al., 2018). The science learning process should emphasize providing direct experience to develop competence in exploring and understanding nature scientifically (Dewi, 2018; Sri Kartika Dewi et al., 2019). Science learning is directed at inquiry and action to help elementary school students or prospective teachers to gain a more meaningful understanding of the natural world around them. One way is to do a practicum. Practicum is done to prove and experience something he is learning by conducting experiments (Atminingsih et al., 2019; Dewi, 2018). The science learning process is expected to foster a scientific attitude in elementary school students/prospective teachers. Efforts to achieve learning competence and a scientific attitude in science learning are important to do the practicum. Practicum allows elementary school students/prospective teachers to prove a theory, find one, or elucidate one. These activities can increase the understanding of elementary school students/prospective teachers towards a subject that has rationalized this phenomenon. In addition, practicum activities are also able to form illustrations for science concepts and principles and easily understand abstract concepts if accompanied by real examples (Guswita et al., 2018; Rosarian & Dirgantoro, 2020). Practicums can also emphasize a scientific attitude to elementary school students/prospective teachers.

However, the reality is that science subjects are because learning activities only use fifth-grade thematic books, and teaching materials that use technology have yet to be used, such as e-book teaching materials to support students' high-level thinking skills. The existence of teaching modules containing only text and images has yet to meet the demands of learning, resulting in a lack of scientific attitude. The availability of teaching modules is yet to meet learning demands. It is evidenced by the results of the discussion I held with the lecturers of the Integrated Elementary Science course, stating that the percentage level of awareness of 3rd-semester students of the PGSD Study Program to carry out practicums still needs to be improved. Due to the limited time for preparing teaching modules, conventional modules can only be designed so that practicum modules have yet to be created in this Integrated Elementary Science course. Seeing this phenomenon, the existing teaching modules cannot make students study independently to achieve learning goals. The learning process uses the module as a reference for ongoing learning and achieves optimal learning competencies. The module is designed to benefit students or prospective elementary school teachers. It contains a series of learning activities by the competencies that must be achieved. Module development requires certain procedures for achieving objectives, a clear structure of learning content, and the applicable criteria for learning development (Darmaji et al., 2020; Nisa et al., 2020). Modules are teaching materials presented systematically and interestingly, including material content, methods, and evaluations that can be used independently (Kulagina et al., 2021; Simamora et al., 2019).

The solution to this problem is utilizing technological developments as they are developing rapidly, using digital modules, and utilizing technological media to improve the quality of current learning, especially in Integrated Elementary Science courses. Educators regulate the environment to create teaching and learning interactions between students or prospective elementary school teachers, lecturers, and other learning resources to achieve learning goals and develop potential. Learning resources in the form of all sources, whether in the form of data, people, or objects that can be used to provide facilities or ease of learning related to science, has long been an important and main part of improving aspects of life in other fields (Dinatha & Kua, 2019; Kuncahyono, 2018). The practicum module is needed to facilitate and assist students in carrying out practicum activities regarding concepts and practices and improve students' scientific attitudes. Practicum modules would be better using digital modules such as videos to make learning easier for students or prospective elementary school teachers, especially by getting to know the tools and practicum steps (Ameriza & Jalinus, 2021; Suryani et al., 2020). In addition, to assist the implementation of practicum in science learning, which will be used for elementary school students or prospective students to teach elementary school students later, digital practicum modules can also help improve students' scientific attitudes.

The findings of previous research stated that digital practicum modules based on the nature of science (NOS) could improve students' higher-order thinking skills (HOTS) (Dinatha & Kua, 2019). The flipbook e-module for Simulation and Digital Communication subjects are valid, practical, and effective (Ameriza & Jalinus, 2021). Project-based e-modules for photography courses in the education technology department of the Undiksha Faculty of Education are in a good category and are appropriate to use (Simamora et al., 2019). E-modules can improve students' basic science process skills (Darmaji et al., 2020). Many studies related to digital modules have been carried out. However, the research that will be carried out can help develop teaching modules into digital practicum modules with the aim that educators in tertiary institutions can implement an Integrated Elementary

Science digital Practicum module which will later be presented through a practicum. The digital practicum module developed relates to the concept of Edgar Dale's learning experience. By applying the practicum module as a learning resource, students will gain learning experience through the process of doing or experiencing what is learned, observing and listening through certain media, and also through the process of listening through language. This study aimed to create a digital practicum module for the Integrated Elementary Science course in Elementary School Teacher Education at Ganesha University of Education. This research is expected to prepare professional teacher candidates in implementing/teaching practice directly with digital practicum modules.

2. METHOD

The ADDIE development research model is used in research on developing digital practicum modules in Integrated Elementary Science courses. This model was chosen because it has systematic stages in solving learning problems, so it will be good if applied as a design for development. The subject of product validity as a result of research on the development of digital practicum modules in Integrated Elementary Science courses consists of several stages, namely conducting a review or assessment carried out by learning design expert tests, media expert tests, content expert tests, and practitioners. Test effectiveness through individual, small, and large group trials. The object of the trial in this research is the validity and effectiveness of the developed digital practicum module in the Integrated Elementary Science Science course. To determine the feasibility of teaching materials obtained from the results of the validity and effectiveness of the developed practicum module. Data collection methods used in this research are literature studies, questionnaires, and interviews. The instruments used in this study included the feasibility instrument for learning design, the feasibility instrument for learning content, the feasibility instrument for learning media, and the practitioner's response test instrument. This development research used two data analysis methods: qualitative and quantitative descriptive statistical analysis. This qualitative descriptive analysis method is used to process data in the form of criticism, suggestions, and input from expert reviews of the development of digital practicum modules in Integrated Elementary Science courses developed through questionnaires or questionnaires. The analysis results are then used to revise the digital practicum module in the Integrated Elementary School Science course. Meanwhile, a quantitative descriptive statistical analysis method was used to describe the average score of the digital practicum module in the Integrated Elementary Science Science course that was developed. Data collection methods used in this study are tests and questionnaires. Table 1, Table 2, and Table 3 present the instrument grids used in data collection.

Table 1. Instruments for Learning Content Experts

No.	Aspect	Indicator	Item Number	Total Item
1	Self Instruction	Clarity of learning objectives.	1, 2	2
		Packaging of learning materials.	3,4	2
		Learning materials are supported with examples and illustrations.	5	1
		Presenting practical steps that are relevant to the material, the context of activities, and the student environment	6	3
		Use of simple and communicative language.	7	1
2.	Self Contained	Availability of complete learning material.	8,9	2
3.	Adaptive	The Integrated Elementary Science Digital Practicum Module adapts to technological developments.	10,11	2

Table 2. Instruments of Learning Media Experts

No.	Aspect	Indicator	Item Number	Total Item
1	Organisasi	Ease of achieving learning objectives.	1	2
		Clarity of practical material	2	
2	Daya Tarik	The attractiveness of the appearance of the contents of the digital science practicum module.	3,4	2
		Clarity of practical implementation instructions.	5	1
		Neatness Digital Science practicum module	6	1
3	Bahasa	Language skills used	7,8	2
		The sentences used are easy to understand.	9	1
4	User Friendly	Easy to use instructions.	10,11	2
		Easy to use information.	12,13	2

No.	Aspect	Indicator	Item Number	Total Item
5	Adaptive	The digital science practicum module adapts to technological developments.	14,15	2
		TOTAL		**15**

Table 3. Instructional Design Expert Instruments

No	Aspect	Indicator	Item Number	Total Item
1	Learning achievement	Formulation of learning outcomes	1	1
		Clarity of learning outcomes	2	1
		Clarity of learning achievement indicators	3	1
2	Student characteristics	Presentation of material	4	1
		Sentence use	5	1
		Appropriate use of language	6	1
		Appropriateness of learning teaching materials	7	1
		Color accuracy	8	1
3	Method	The accuracy of learning strategies	9,10	2
		Serving system	11	1
		Example giving	12	1
		Presentation of learning teaching materials	13, 14, 15	3
		Suitability of the components of the Digital practicum module	16	1
		Total		**16**

This development research used two methods of data analysis: qualitative and quantitative. The qualitative descriptive analysis method was used to analyze the data on suggestions and comments from the data reviewed by validators and practitioners. Quantitative analysis includes descriptive statistical analysis and inferential statistical methods. Descriptive analysis methods are used to classify data, work on, describe, and present research data. The inferential analysis method determines the value based on the results of tests conducted on practitioners. To make a decision and give meaning to the data obtained from the expert's assessment, the attainment level conversion reference is used in Table 4.

Table 4. Conversion of Achievement Levels with a Scale of 5

Achievement Level (%)	Qualification
90 – 100	Very good
80 – 89	Good
65-79	Enough
55 – 64	Not enough
1 – 54	Very less

(Tegeh et al., 2020).

3. RESULT AND DISCUSSION

Result

This study uses the ADDIE model. The stages of this model are analysis, design, development, implementation, and evaluation. The choice of the ADDIE model is because the ADDIE model is already understood. Besides that, the ADDIE model is simple enough. The first stage carried out in this research is the analysis stage. The analysis phase is carried out by analyzing learning needs based on the results of interviews with lecturers in charge of the course and analysis of learning modules that will be developed with digital module types. Analyzing the material in conventional teaching modules then formed practicum learning outcomes that can be used as a reference for developing digital practicum modules. The selection of magnetic materials in developing digital practicum modules was based on the results of interviews conducted by researchers with lecturers supporting the Integrated Elementary Science course in the Elementary School Teacher Education Study Program.

The second stage carried out in this research is the design stage. The design stage is made by making a storyboard or video creation arrangement using Canva. The developed digital practicum module is also done by adding attractive illustrations of the material and practicum process to be delivered. Making the media begins with

making a practicum video using the CapCut application, then uploading it via the YouTube application page. The creation of the module begins with the creation of digital practicum module media using the Canva application, designing the layout of the module, then determining the learning outcomes of the material raised in the module, and adjusting the learning outcomes to the topic or practicum to be discussed. The design was made from the storyboard for making a practicum process video, then a digital practicum module design using the Canva application. The practicum module design also uses document images taken from the kemendikbud.com website and images from the Integrated Elementary Science module to make the digital practicum module more attractive. On the first page of the digital practicum module, there is a cover that adapts to the topics discussed in the module. Then on the next page, a preface is presented as an introductory word for the digital practicum module, followed by an introduction consisting of a description of the module and instructions for using the module, then continued with a table of contents page that makes it easier for module users to find pages in the learning process. The material and steps for the practicum are presented on the next page.

The third stage carried out in this study was the development stage of the digital practicum module. The digital practicum module developed is by design made in the previous stage, namely the design stage. After the digital practicum module has been developed, an assessment is carried out by five lecturers as assessors for the validity of the digital practicum module. In the development stage, the design of the digital practicum module that has been developed is given an assessment carried out by four experts, namely lecturers. Four experts selected according to their fields fill out the media validation sheet developed by assessing from a score range of 1 to 5, which then looks for each expert's mean or average score. Testing the validity of this development research is reviewed from three main aspects: testing the validity of the media according to learning media experts, content/learning content experts, and learning design experts. As for the results of testing the validity of the media, the content validity percentage was obtained by 94%, so the qualification was Very Good. The percentage of validity of learning media is 94%, so it has a very good qualification. The learning design's validity percentage is 92.5%, so it has a very good qualification. The practicality test in this development research is viewed from the perspective of students who have taken an Integrated Elementary Science course. The practicality percentage of individual trials was 97.5%, so it qualified very well. It proves that the digital practicum module is feasible because it helps students carry out independent practicums.

Discussion

The digital practicum module on magnets aims to facilitate students' learning process, especially in the practicum process, so that the material studied can be easily understood. The digital practicum module on magnets was developed based on the ADDIE model. This model was chosen because it has clear and systematic stages of learning development. The stages in the ADDIE development model are the analysis stage, the design stage, the development stage, the implementation stage, and the evaluation stage. This development research produces a product in the form of a digital practicum module with the topic of magnetic material. Based on the aspect of learning content, the teaching materials have a very good predicate and are feasible to be implemented in the learning process. The suitability of the learning materials contained in the digital practicum module with learning outcomes based on problems that occur in the learning process of elementary school teacher education students. Adjustment of material with learning outcomes based on material analysis in learning activities that have not been implemented so that material deviations do not occur in the learning process based on integrated elementary science learning outcomes. Acquisition of very good grades because the concepts and material presented are clear and systematic in the digital practicum module. The learning method uses the material and learning outcomes to provide innovations. Learning is more active and independent to attract students' learning interest in the learning process using e-modules (Liu et al., 2021; Mills et al., 2021).

Second, based on an assessment of the learning design aspects of the two experts, the digital practicum module product has received a very good title and is feasible to apply in the learning process. The complete digital practicum module format and practicum steps explained by the material make learning activities more varied and exciting, allowing students to carry out practicum activities using this module. Adding animation elements to the developed digital e-module can make students happy while learning. E-Modules can display text, images, animations, and videos through electronic devices like computers to attract interest (Apriani et al., 2021; Sadimin et al., 2017). The existence of an interesting module will make students more interested in learning. This can also affect and improve student learning outcomes. In addition, the practical use of the digital practicum module received a very good title from the two experts. It was tested for feasibility to be applied in the learning process. Practitioners' response to the digital practicum module was assessed from the aspect of attractiveness. The average quality of the module was very good, so lecturers were interested in using the product. The practicum module can trigger student interest and involvement in learning because it is designed attractively. The delivery of material relies not only on text aspects but is also supported by multimedia components such as images, videos, and animations (Candra Dewi & Negara, 2021; Putra & Sujana, 2020; Valentina & Sujana, 2021). The availability of

interesting learning media, such as learning videos, will be able to increase student motivation in learning it will improve learning outcomes (Darmaji et al., 2020; Dewantara et al., 2021; Hikmah & Wibowo, 2020).

This finding is reinforced by previous research stating that e-modules are feasible and valid for learning. Biology learning outcomes increase through problem-based learning e-modules (Pramana & Pudjawan, 2020). Interactive e-module on thematic learning theme 6 sub-theme 2 Amazingly my ideals are valid with very good qualifications so that they can be used by teachers and students in the learning process (Nopiani et al., 2021). This media can be used in the learning process, especially on magnets. The results of this study are expected to have implications for Elementary School Teacher Education students and Elementary School students. To create learning to be more fun and active in doing a practicum. This digital practicum module can facilitate students in learning and carrying out practicum processes. It can motivate students to learn so that learning outcomes can be achieved optimally, and students can study independently using this digital practicum module to improve students critical thinking skills and find problems in learning. The implication of this study is the existence of a digital practicum module that can support the Integrated Elementary Science learning process.

4. CONCLUSION

The digital practicum module is suitable for use because the practicum module helps students carry out independent practicums. Recommended for students, it can increase their interest in learning in Integrated Elementary Science courses and for elementary school students to understand the practicum process on magnetic charges better. Lecturers can use this digital practicum module as a learning tool that can help improve students' skills. Institutions are expected to provide modules as learning tools that can help improve students' academic skills by ensuring they choose high-quality and relevant modules for the implemented curriculum.

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