

ICT Digital Teaching Module on the Preparation of Interactive Student Worksheets

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ABSTRAK

Permasalahan modul ajar ICT yang masih bersifat konvensional serta kurang maksimalnya pemanfaatan teknologi menyebabkan siswa kesulitan dalam belajar. Tujuan penelitian ini untuk mengembangkan modul ajar digital pada mata kuliah ICT dengan materi penyusunan LKPD Interaktif. Penelitian ini merupakan penelitian pengembangan yang dilaksanakan menggunakan model ADDIE. Subjek penelitian ini adalah para ahli dan praktisi sedangkan objek penelitian ini adalah modul digital. Dalam penelitian ini pengumpulan data dilakukan dengan kuisioner dengan memberikan lembar penilaian kepada para ahli dan praktisi. Instrumen penelitian berupa angket. Teknik analisis data menggunakan analisis deskriptif kualitatif. Hasil penelitian yaitu validitas skor menunjukkan skor validitas isi ahli materi sebesar 90% dengan kualifikasi sangat baik, skor validitas ahli media sebesar 92% dengan kualifikasi sangat baik dan validitas ahli desain sebesar 92% dengan kualifikasi sangat baik. Sedangkan tingkat pencapaian praktisi modul digital sebesar 94%, dengan dengan kualifikasi sangat baik, dari uji perorangan sebesar 97% dengan kualifikasi sangat baik, dan uji kelompok kecil sebesar 98% dengan kualifikasi sangat baik. Berdasarkan hasil uji validitas dan kepraktisan tersebut, maka dapat disimpulkan bahwa modul ajar digital ICT pada penyusunan LKPD interaktif diinterpretasikan layak dan praktis digunakan.

ABSTRACT

Problems with ICT teaching modules that are still conventional and the lack of optimal use of technology causes students difficulties in learning. This study aims to develop digital teaching modules in ICT courses with Interactive LKPD preparation material. This research is a development research carried out using the ADDIE model. The subjects of this research are experts and practitioners, while the objects of this research are digital modules. In this study, data collection was carried out using a questionnaire by providing assessment sheets to experts and practitioners. The research instrument is a questionnaire. The data analysis technique uses descriptive qualitative analysis. The result of the research is the score validity content validity score of the material expert is 90% with very good qualifications, the media expert validity score is 92% with very good qualifications, and the design expert validity is 92% with very good qualifications. The achievement level of digital module practitioners is 94%, with very good qualifications; on the individual test, it is 97%, with very good qualifications, and on the small group test, it is 98%, with very good qualifications. Based on the validity and practicality of test results, digital ICT teaching modules in preparing interactive worksheets are interpreted as feasible and practical to use. with very good qualifications. Based on the validity and practicality of test results, digital ICT teaching modules in preparing interactive worksheets are interpreted as feasible and practical to use. with very good qualifications. Based on the validity and practicality of test results, digital ICT teaching modules in preparing interactive worksheets are interpreted as feasible and practical to use.

1. INTRODUCTION

Advances in science and technology today have slowly changed the face of the world from the conventional era towards internet-based development (Hasana et al., 2021; Muhammad, 2022). In this era, change will certainly change several aspects of life, especially in Indonesia, where social, economic, development and educational aspects will adapt to these changes. (Hasibuan, 2019; Kurniawatik et al., 2021). In the world of education, technological development is followed by changes in globalization so that technology in education is not left behind (Maulana, 2022; Riyadi et al., 2021). Education is a universal activity for human life. Education is a planned process to create an atmosphere for the learning process

(Indy, 2019; Pane & Dasopang, 2017). In accordance with the function and goals of national education, namely to create quality education, planning and seriousness are needed in making it happen (Karsiwan et al., 2021; Sujana, 2019). Education is basically a conscious and planned effort carried out to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, the nation's community and country (Aryanto et al., 2021; Astawa & Sukerti, 2021). Apart from that, education is also carried out as an effort to change behavior for the better and to develop knowledge to become an intelligent and high-quality young generation (Herdiansyah et al., 2021; Lestari et al., 2021).

To realize quality education, educational aspects are needed in the learning process provided to an educational institution. Just like educational institutions, there are levels of education starting from elementary school education to tertiary education. Higher education general education is an educational unit organization that carries out educational levels to carry out research and serve society (Karim, 2020; Simatupang & Yuhertiana, 2021). College is the final stage for someone to pursue education. In higher education, technology is greatly used in learning with the aim of being able to use it during teaching or community service (Firdaus & Husni, 2021; Susilawati, 2021). The era of globalization is synonymous with technology, especially in the field of education. ICT (information communication and technology) is technology used in the field of education which includes text, images, graphics, audio and animation which is used as a special platform in education. (Das et al., 2019; Marjuni & Harun, 2019). Information and Communication Technology (ICT) or more familiarly known as Information and Communication Technology (ICT) has enormous potential for us to utilize in the world of education. (Lawrence & Tar, 2018; Mahendra, 2022). Technological developments by utilizing ICT can help the teaching and learning process run more practically and efficiently (Riyadi et al., 2021; Siregar, 2022). In general, ideal education is able to keep up with developments with technology (Idhamani, 2020; Latifa & Pribadi, 2022). With the development of advanced educational technology, technology should be able to develop. Technology-based learning processes such as developing teaching modules. Teaching modules are instructions for teaching something so that it is easy to understand (Indariani et al., 2018; Setyawan & Wahyuni, 2019). The application of teaching modules in this era of technological development can be realized with the help of ICT-based technology.

However, the reality that occurred was not as expected, where the use of technology in the world of education, especially in ICT courses, was not utilized optimally by the lecturers. So the problem that occurs is the lack of maximum use of technology and learning resources such as modules, books, teaching materials are still conventional. This is in line with the results of observations carried out with lecturers who teach ICT courses. The observation results show that in the ICT course the modules used are still conventional, especially in the material for preparing interactive LKPD. And based on interviews with 12 PGSD students who have taken ICT courses and the results of observations by researchers who have taken ICT courses, it is clear that the teaching modules used in the learning process are still conventional so they are not easy to understand. If this is allowed to continue, this will certainly have an impact on students' low ability to apply learning technology.

One effort that can be made to overcome this problem is by developing digital teaching modules. Modules are learning materials where readers can learn independently (Aulia et al., 2022; Winatha et al., 2018). By combining technological developments with teaching modules, this has developed into a digital teaching module (Farhana et al., 2021; Kimianti & Prasetyo, 2019). It is further explained that digital teaching modules are conventional modules that have been modified to be more modern (Widiastuti, 2021; Wulandari et al., 2021). Digital modules will be able to increase technological capabilities after the module is validated by a team of experts (Amini & Saniyah, 2021). This digital teaching module is also equipped with teaching videos so that it will make it easier for students in the learning process (Agung et al., 2020; Widiastuti, 2021). With the development of digital teaching modules in ICT courses, it focuses on the material for preparing interactive LKPD which is explained through audio, video and images which can make it easier for students to understand the material. The digital teaching module was developed in relation to Edgar Dale's theory by applying teaching modules in the learning process, so that students gain experience through digital teaching modules by observing, listening and understanding through the media (Masrurroh & Agustina, 2021; Pramana et al., 2020). Teaching modules presented digitally will be able to increase students' motivation and enthusiasm for learning, this is because the modules are able to contain interesting and varied color, image and movement components. (Nugraha & Widiana, 2021; Puspita & Raida, 2021; Melinda et al., 2017).

Several previous studies have revealed that the application of digital teaching modules allows students to be able to learn independently and have scientific approach steps, namely observing, asking, gathering information, associating and communicating. (Alperi, 2020). Other research results also reveal that Digital teaching modules can improve learning outcomes and provide independence in the learning

process (Yulaika, 2020). The research results further reveal that digital teaching modules can improve digital literacy skills through digital teaching materials so that they can improve learning outcomes (Hotimah et al., 2020). Based on several research results, it can be said that digital learning modules have been able to improve student and student learning outcomes through their attractive presentation. It's just that in previous research, there have been no studies that specifically discuss the development of digital ICT teaching modules in the preparation of interactive LKPD which are developed using text, images and videos. So this research is focused on this study with the aim of developing digital teaching modules in ICT courses with material for preparing interactive LKPD.

2. METHOD

This research is classified as a type of development research, which was developed using the ADDIE model. The ADDIE development model consists of analysis, design, development, implementation, and evaluation stages. The analysis stage is carried out through analysis of material characteristics, analysis of student needs and analysis of good digital teaching modules. Meanwhile, the design stage is carried out through the process of determining material, compiling learning outcomes and indicators, designing and compiling digital teaching modules, and designing instruments. The development stage is carried out through the process of developing digital teaching modules, instrument testing and media expert testing. The implementation stage at this stage was not carried out due to time constraints,

The subjects of this research are 2 material experts, 2 design experts, 2 experts for media validity, while for media practicality there are 2 lecturers who have expertise in ICT subjects, 3 students from the Primary School Teacher Education Study Program who have different abilities as an individual test, and 9 nine students of the Primary School Teacher Education Study Program who have different abilities as a small group test. The data collection methods used were observation, interviews and questionnaires with research instruments in the form of closed questionnaires using a rating scale. The data obtained in the research was then analysed using quantitative descriptive and qualitative descriptive analysis techniques. The research instrument grid can be seen in Table 1, Table 2, Table 3, Table 4, and Table 5.

Table 1. Expert Instrument Grid Digital Module Contents

No.	Aspect	Indicator	No. Item	Number of Items
1	Self-instruction	Clarity of learning outcomes.	1, 2	2
		Packaging of learning materials.	3, 4	2
		Learning material is supported by examples and illustrations.	5	1
		Presents the preparation of interactive LKPD that is relevant to the material, activity context and student environment.	6, 7, 8	3
		Use of good, simple and communicative language.	9	1
2	Self Contained	Availability of complete learning materials.	10, 11	2
3		Adaptive	Digital teaching modules adapt to technological developments.	12, 13
4	User Friendly	Easy to understand instructions.	14	1
		Ease of use of information.	15	2
Total				15

Table 2. Media Expert Instrument Grid

No.	Aspect	Indicator	Item No	Number of Items
1	Appearance	The attractiveness of the digital module display.	1	1
		Regularity of digital module design.	2	1
		The choice of font type and size supports digital modules to become more attractive.	3	1
		Ease of reading text or writing.	4	1
		Colour selection.	5	1
		Suitability of material to appearance.	6	1
		Presentation of digital modules.	7	1
2	Media Presentation	Sequence of presentation of material in digital modules.	8	1
		Presentation of images in accordance with the material.	9	1

No.	Aspect	Indicator	Item No	Number of Items
3	Visual	The attractiveness of the image to the material.	10	1
		Suitability of digital module illustrations with learning materials.	11	1
		Accuracy of illustrations with student characteristics.	12	1
		Suitability of digital module background to student characteristics.	13	1
		Layout suitability.	14	1
		Integration between type of writing, type of page and material in digital modules.	15	1
Total				15

Table 3.Design Instrument Grid

No.	Aspect	Indicator	Item No	Number of Items
1	Learning outcomes	Learning outcomes correspond to 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
		Use of sentences.	5	1
		Appropriateness of language use.	6	1
		Suitability of digital learning modules.	7	1
		Color accuracy.	8	1
3	Method	Accuracy of learning strategies.	9, 10	2
		Systematic serving.	11	1
		Giving examples.	12	1
		Presentation of digital learning modules.	13, 14,	3
			15	3
Total				15

Table 4.Practitioner Instrument Grid

No.	Aspect	Indicator	No. Item	Number of Items
1	Presentation of ICT digital modules in preparing interactive LKPD.	The technical quality of the media.	1, 2, 3, 4, 5	5
		The quality of the material content in the media.	6, 7, 8, 9, 10	5
2	Quality of ICT digital modules in preparing interactive LKPD.	Clarity of steps for preparing interactive LKPD in digital modules.	11, 12, 13, 14, 15	5
Total				15

Table 5.Individual and Small Group Test Instrument Grid

No.	Aspect	Indicator	No. Item	Number of Items
1	Presentation of ICT digital modules in preparing interactive LKPD.	The technical quality of the media.	1, 2,3,4	4
		The quality of the material content in the media.	5, 6	2
2	Quality of ICT digital modules in preparing interactive LKPD.	Clarity of steps for preparing interactive LKPD in digital modules.	7. 8	2
Total				8

3. RESULT AND DISCUSSION

Result

This research produces a digital ICT teaching module for preparing interactive LKPD. This development process follows the ADDIE development model. At this development stage there is a development process that is in accordance with the ADDIE development stage which influences the product feasibility results. In developing the ADDIE model there are five development stages so that the product developed is declared valid, namely analysis, design, development, implementation and evaluation. The ADDIE model was chosen because it is flexible and able to adapt to various conditions, as well as providing a structured framework. The results of each development stage are as follows: the first stage is the analysis stage which is carried out by analyzing material characteristics analysis, good digital teaching modules and analysis of student needs.

Second stage namely the design stage, at this stage the material for the ICT course is determined with learning sub-achievements, namely mastering how to prepare LKPD and compiling interactive LKPD. Meanwhile, the learning achievement indicators are, understanding the steps for preparing LKPD, applying the steps for making LKPD, understanding the steps for making interactive LKPD, and applying the steps for making interactive LKPD. At the design stage, the assessment instrument design process is also carried out. Interactive worksheet created using the Canva application. On the first page there is a cover as the cover for the teaching module. The background design for the teaching module is made by combining related images. The digital module layout is designed to be orderly and attractive. On the next page of the digital module there is a foreword as an introduction to the digital module, and a table of contents to make it easier for students to find discussions on the material they are looking for. On the next page, an introduction is presented containing the identity of the digital module, a brief description of the digital module and instructions for using the digital module which makes it easier for students to use the ICT digital module. Next, the discussion presents learning outcomes and indicators and videos, on the final page there is a worksheet and a list of references as a closing. a brief description of the digital module and instructions for using the digital module which makes it easier for students to use the ICT digital module. Next, the discussion presents learning outcomes and indicators and videos, on the final page there is a worksheet and a list of references as a closing. a brief description of the digital module and instructions for using the digital module which makes it easier for students to use the ICT digital module. Next, the discussion presents learning outcomes and indicators and videos, on the final page there is a worksheet and a list of references as a closing.

Third phase namely, the digital teaching module development stage is developed in accordance with the design that has been made and obtains valid results by testing the teaching module using 2 expert test judges by providing an assessment sheet for the ICT digital module judge test. After receiving input, improvements were made according to expert input. Examples of media displays that have been created can be seen at [Figure 1](#).

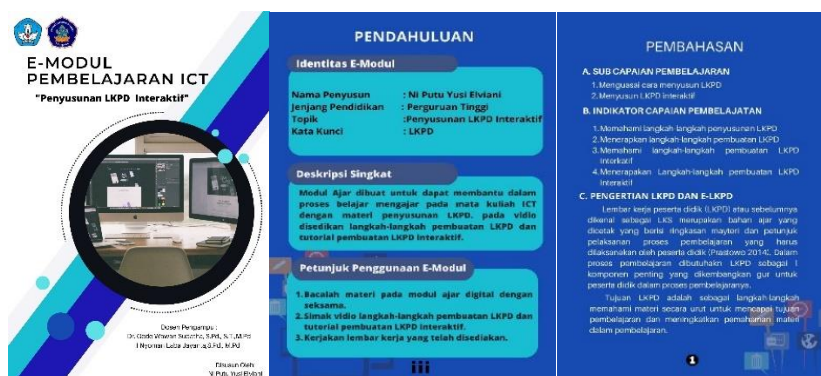


Figure 1. Teaching Module Display

The digital teaching module that has been completed is then tested for validity and practicality. The product validity test consists of material validity test, media validity test, design validity test, and practicality test. The product validity test consisted of 6 experts, namely 2 material experts, 2 media experts and 2 design experts, while the practicality test used 2 learning practitioner experts/lecturers, the individual trial took 3 UNDIKSHA PGSD students. who had taken ICT courses with different levels of ability, and a small group test was carried out by taking 9 UNDIKSHA PGSD students who had taken ICT courses

with different abilities. The data from the validity and practicality tests were analyzed using a percentage formula [Table 6](#).

Table 6. Digital Teaching Module Validity Test Results

Expert	Item	Evaluator		V	Note
		I	II		
Material	Items 1-15	92%	88%	90%	Very good
Media	Items 1-15	94.67%	90.67%	92%	Very good
Design	Items 1-15	90.67%	93.33%	92%	Very good

After being declared valid, the Teaching Module will then be tested for its practicality in the learning process. The implementation of this Teaching Module practicality test involves lecturers and students as practitioners who use the Digital Teaching Module. The results of the practicality test of the Digital Teaching Module were then analyzed to determine the practicality of the media developed using a percentage formula. A summary of the practicality test results can be seen at [Table 7](#), [Table 8](#), and [Table 9](#).

Table 7. Results of Teaching Module Practicality Assessment According to Practitioners

Practitioner	Score	Percentage	Average Percentage	Category
Practitioner I	70	93.33%	94%	Very good
Practitioner II	71	94.67%		

Table 8. Individual Trial Results

Practitioner	Score	Percentage	Average Percentage	Category
Student I	39	97.5%	97%	Very good
Student II	39	97.5%		
Student III	39	97.5%		

Table 9. Group Trial Results

Practitioner	Score	Percentage	Average Percentage	Category
Student I	39	97.5%	98%	Very good
Student II	40	100%		
Student III	40	100%		
Student IV	39	97.5%		
Student V	38	95%		
Student VI	39	97.5%		
Student VII	40	100%		
Student VIII	40	100%		
Student IX	39	97.5%		

Fourth stage namely the implementation stage. This stage was not carried out due to time constraints and will later be refined by further researchers. The fifth stage is the evaluation stage which is carried out using formative evaluation. Formative evaluation aims to collect as much data as possible by developing ongoing media. There are several inputs and suggestions during this development in general, namely, correcting incorrect writing or layout and paying attention to neatness, layout and clarity of content in digital teaching modules. Overall, this research went smoothly, although there were several obstacles, but they were evaluated and handled well.

Discussion

This research produces a development product in the form of a digital ICT teaching module in the preparation of interactive LKPD which is designed in accordance with technological developments so that this media helps lecturers in the learning process and makes it easier for students to study independently, especially for PGSD UNDIKSHA students. Success in the media development process is influenced by several factors, including: first, the material aspect of the digital module received the title with very good qualifications. The suitability of the material taken and the learning outcomes are clear, the steps for making interactive LKPD contain examples in the explanation, the use of good and correct language, the digital teaching module adapts to technological developments and the instructions in the digital module and videos

are presented clearly so they are easy to understand. (Maulana, 2022; Riyadi et al., 2021). In the process of developing a media, learning materials must be relevant to achieving competency standards and achieving basic competencies as reflected in the learning objectives (Lawrence & Tar, 2018; Mahendra, 2022). Second, based on the learning design, it received a very good qualification predicate. The digital module design is designed to be attractive which can be seen from the presentation of material, use of sentences, use of language, learning strategies that are appropriate to ICT courses, the systematic presentation of digital modules presented in a coherent manner and the appearance of digital modules that are attractive and easy to understand. The results of the review of the ICT digital teaching module in the preparation of interactive LKPD obtained very good qualification results. Teaching modules also consider what will be learned with clear learning objectives (Septianti & Afiani, 2020; Setiawan et al., 2022).

Third, viewed based on the media aspect, the digital module received the title with very good qualifications because in the digital ICT module in the preparation of interactive LKPD there was conformity in the content of the material, packaging of the material, and in terms of graphic and visual use of the digital module as seen from the display of the digital module, audio, use of video in material explanation. This module is also equipped with a video of the steps for making an interactive LKPD and practice in making an interactive LKPD with a live worksheet which aims to illustrate the process and steps that will be discussed in the module so that it will make it easier for students to understand the material. This is in line with the opinion that learning videos can make it easier for students to understand learning and improve their cognitive abilities (Ardiman et al., 2021; Siwi & Puspaningtyas, 2020). Fourth, reviewed based on practical aspects, it received the title with very good qualifications by practitioners. This assessment is seen from the practicality of using digital teaching modules which are assessed in terms of aspects of use which are considered practical for online use using links and QR. Student interest in using digital teaching modules is said to be increasing due to the ease of use in accessing ICT digital teaching modules. The delivery of material does not only rely on text aspects, but is also supported by components such as images and videos. The existence of digital modules can facilitate students in the learning process and as teaching material for lecturers teaching ICT courses on interactive worksheet preparation material (Agung et al., 2020; Amini & Saniyah, 2021; Widiastuti, 2021). The digital module has several advantages such as being easy to access anytime and anywhere and this digital module is presented in the form of a flipbook equipped with videos to make it easier for students to understand the steps for making interactive LKPD and practical tutorials for making interactive LKPD using live worksheet (Aulia et al., 2022; Indariani et al., 2018; Setyawan & Wahyuni, 2019; Winatha et al., 2018).

The results obtained in this research are in line with the results of previous research, which also revealed that the application of digital teaching modules allows students to be able to learn independently and have scientific approach steps, namely observing, asking, gathering information, associating, and communicating. (Alperi, 2020). Other research results also reveal that Digital teaching modules can improve learning outcomes and provide independence in the learning process (Yulaika, 2020). The research results further reveal that digital teaching modules can improve digital literacy skills through digital teaching materials so that they can improve learning outcomes (Hotimah et al., 2020). So based on several research results, it can be said that digital learning modules have been able to improve the learning outcomes of pupils and students through their attractive presentation.

4. CONCLUSION

Based on the results of data analysis and discussion, it can be concluded that the digital ICT teaching module is used in preparing interactive LKPD suitable for use in learning, because it can help students to learn independently. This can be seen from the results of validity and practicality tests involving experts, lecturers and students who gave good responses as well as several suggestions for improving the quality of teaching modules.

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