Ceddi Journal of Education
Vol. 1 No. 1 June (2022)
https://doi.org/10.56134/cje.v1i1.11

ISSN: 2830-0017 (print)
ISSN: 2830-0025 (online)

Development of Learning Media for Introductory Information and Communication Technology Courses

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Abstract

This research aims to (1) assess the current learning conditions in the "Introduction to Technology of Information and Communication" course within the Electrical Engineering Education Department at Makassar State University; (2) outline the developmental stages of web-based learning media tailored for this course; and (3) evaluate the validity of the developed learning media based on assessments from material and media experts. The study employs the ADDIE development model, focusing on the phases of Analysis, Design, and Development. Conducted at the Electrical Engineering Education Department at Makassar State University, the research involved material and media experts as informants, with data gathered through observations and questionnaires and analyzed using descriptive techniques. The findings reveal the structured developmental process of the web-based learning media, which encompasses the Analysis, Design, and Development phases. The validation results show that the material experts rated the media's feasibility at 82.81%, while design experts gave it a rating of 89.58%, indicating a high level of effectiveness. The use of the Research and Development (R&D) approach in this study has proven successful in creating a robust educational tool that can significantly enhance the learning experience in the course. This research contributes to the broader field of educational technology by demonstrating the effectiveness of web-based learning media, particularly in technical education. Its implications extend to improving student engagement, fostering interactive learning, and providing scalable educational solutions in higher education, thereby advancing the quality of education in the digital age.

Keywords: Learning media; Electrical Engineering; Web Learning; E-learning.

Received: 20 April 2022 Revised:14 May 2022 Accepted:31 May 2022

Introduction

The rapid development of technology at this time has brought a positive influence almost comprehensively in all circles and all fields, one area that is not spared from these developments is the field of education. According to (Oke & Fernandes, 2020) the world of education must be able to carry out positive innovations for the advancement of education, not only innovation in the field of curriculum, and infrastructure, but comprehensive innovation using information technology in educational activities(Serdyukov, 2017). The development of technology in the digital era as is now growing faster from day to day, month to month to the year ahead. Indirectly, the use of this technology has increased sharply.

Education is a source of national progress which greatly determines the nation's competitiveness because education plays an important role in preparing human resources in the future. Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System Chapter 1 Article 1 states that "Education is a conscious and planned effort 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 character, and skills needed by himself, society, nation, and state"(Helda & Syahrani, 2022).

The emergence of technology certainly provides many benefits for survival. One example of technology that is really useful today is Google. Technological developments require educators to make learning more interesting and innovative, thus encouraging students to learn optimally both in individual learning and in the learning process in the classroom. Efforts to achieve interesting and innovative learning is one of them by using learning media that can be used by educators in the teaching and learning process(Redjeki & Affandi, 2021).

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The use of facilities, equipment, or assistive devices in the form of learning media is very important in the learning process. This is because the quality of learning cannot only be determined from the competence of adequate educators, but quality educators must be supported by tools that are able to facilitate an educator in deliver material to students(Saputra & Pasha, 2021). Of course, the goal is to make it easier for students to understand the material presented by the teacher. In addition, the learning process delivered using learning media can also make the teaching and learning process more efficient, students more easily grasp the material presented and of course more fun. So that students are not bored in class. Therefore,

Introduction to Information and Communication Technology is a compulsory subject that must be mastered by prospective educators in the field of electronics because it is one of the courses that contains all technologies related to handling information. This handling includes retrieval, collection, processing, storage, dissemination, and presentation of information. So, ICT is a technology that deals with the retrieval, collection, processing, storage, dissemination, and presentation of information. To organize active, creative, effective and fun learning, lecturers who are effective in the subject need to design lesson plans. A lecturer before carrying out the learning process in class first prepares interesting learning media so that students do not get bored during lectures.

The amount of material that must be accepted by students is faced with the limited implementation time. Educators provide learning materials face-to-face only once a week for 135 minutes in one meeting. The time allocation is deemed less than optimal and efficient which causes students to find it difficult to follow the subject matter given, because the relatively long time lag makes students forget easily coupled with the many other courses they have to take, even though students need a deeper understanding of the subject. this course in order to improve their skill competency. So it takes a representative media that can be repeated at any time. Therefore it is necessary to develop a new and portable learning media that can be used at any time, anytime, and anywhere. The innovative learning media offered by researchers to support student learning about the introduction of information and communication technology is web learning learning media(Fitriana et al., 2021).

Researchers using web-based learning media are based on the research journal (Siahaan et al., 2021) entitled "Android-Based Learning Media Development Strategies During Pandemic Times To Improve Student Science Literature". Based on the results of the study, it was found that the results of testing the effectiveness of the model showed that the web-based e-learning learning model with the principle of e-pedagogy could improve students' ability to understand economics subject matter better as evidenced by the increase in learning outcomes achieved.

The web learning media in this study is an online-based application that is created and used in introductory information and communication technology courses and will be tested for feasibility. Web learning in its development is made more interactive by using a WordPress application that is equipped with competencies, materials, images, animations, videos, discussion forums, audio, exercises, and profiles. The resulting application is expected to provide benefits for users, especially students, in obtaining information related to the Introduction to Information and Communication Technology course. Based on the background presented, the authors are interested in researching these problems in the thesis, with the title: "Development of Learning Media for Introduction to Information and Communication Technology in the Department of Electronic Engineering Education, Faculty of Engineering, Universitas Negeri Makassar".

Method

This research uses Research and Development (R&D) research methods. Research and development methods or in English Research and Development are research methods used to produce certain products and test the effectiveness of these products(Ikhlimah et al., 2021);(Pitnawati et al., 2022). The learning model must be programmed with systematic sequences of activities in an effort to solve learning problems related to learning resources that are in accordance with the needs and characteristics of the learner. The ADDIE model relies on each step being performed in a given sequence (Mardianto et al., 2022). Visually, the stages of the ADDIE model can be seen in the following figure:

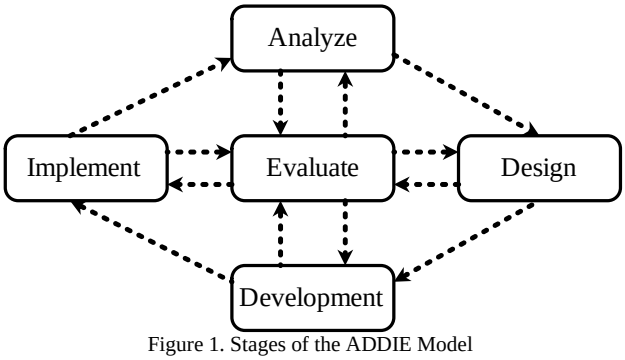

Figure 1. Stages of the ADDIE Model

The procedure carried out in research on the development of web learning learning media using CMS Wordpress in introductory Information and Communication Technology courses uses the ADDIE development model which consists of 5 stages. Before starting to develop any learning content strategy, you should analyze the current situation in terms of learning, knowledge gaps, etc. The first stage we create a series of questions to understand the current situation and also understand the learning objectives themselves. The design phase deals with learning objectives, assessment instruments, exercises, content, subject matter analysis, lesson planning and media selection. The develop phase will detail and integrate the technology that will be used to achieve the objectives of the program itself, which includes materials, media, and the blueprint for planning. The implementation phase will run the program that has been prepared to see the system and instructors are ready to use, the data obtained will be used to carry out the next improvement process. The evaluation phase will make improvements for a better system by processing the data that has been obtained from the previous phases that have been run.

The product trial design is carried out through 2 (two) stages, namely: (a) trials by material experts (b) trials by media experts. There are two types of data obtained, namely quantitative data and qualitative data. Quantitative data were obtained from questionnaire scores for media experts, and material experts in the trial, while qualitative data was obtained from the results of filling out questionnaires in the form of suggestions and comments from material experts, media experts and students on the media. The data collection instrument used in the development of this media is an assessment sheet in the form of a questionnaire/questionnaire. The qualitative data will be analyzed descriptively qualitatively. While the quantitative data were analyzed descriptively quantitatively, this analytical technique was used to process the data obtained through a questionnaire in the form of a descriptive percentage.

Data formula per item

$$P = \frac{n}{N_1} \times 100\%$$

Information:
P :Percentage
n : Respondent's answer in one item
N1 :The number of ideal scores in one item
100% :Constant

The formula for processing data as a whole item

$$P = \frac{\sum n}{\sum N_1} \times 100\%$$

Information:
P : Percentage
n : Respondent's answer in one item
N1 : The number of ideal scores in one item
100% : Constant

The validity criteria used in determining whether the validated learning media (assessed) is quite valid (decent, good) or not. then, the learning media is determined from the match of the empirical validation results with the specified

validity criteria and if the learning media is not or less valid based on the theory and input for validator improvements, then the learning media needs to be improved. To determine the criteria is done in a way like table 1.1 as follows:

Table 1. Eligibility Level Criteria

Category	Percentage	Qualification	Equivalent
A	80 – 100%	Very good	Very Worthy
B	60 – 79%	Well	Worthy
C	50 – 59%	Pretty good	Decent enough
D	0 – 49%	Not good	less worthy

Results and Discussion

Result

The stages of research that have been carried out, where the development model used in this study uses the ADDIE development model which consists of 5 which are then modified to adjust the formulation of the problem and the objectives of the research to be achieved so that this research only consists of 3 stages, namely Analysis, Design (Design) and Development (Development). The results of developing web learning media using CMS WordPress for introductory information and communication technology courses are in the form of online-based applications that can be accessed via smartphones and computers. The learning media is named "Information Warehouse". The media contains material about introductory information and communication technology courses and consists of several discussions.

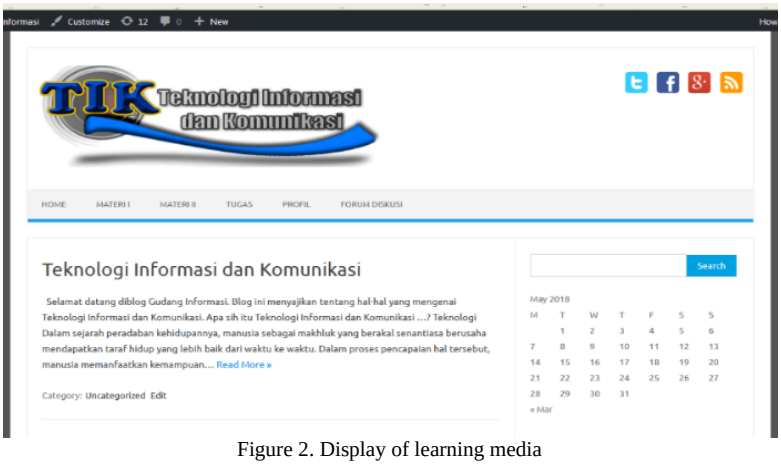

Figure 2. Display of learning media

Discussion

Based on the results of the expert test, data were obtained that can describe the feasibility level of the learning media developed, whereas in the material expert trial from the two aspects assessed, the data obtained showed that the developed media was in a very feasible qualification with a percentage of 82.81%, while data from media expert trials from three assessed aspects, the data obtained shows that the developed media is also in a very decent qualification with a percentage of 89.59% so it can be concluded that web learning media uses WordPress cms in introductory technology courses The information and communication developed is stated to be very suitable for use at the implementation stage in learning. The results of the assessments of material experts and media experts can be seen in the following graph:

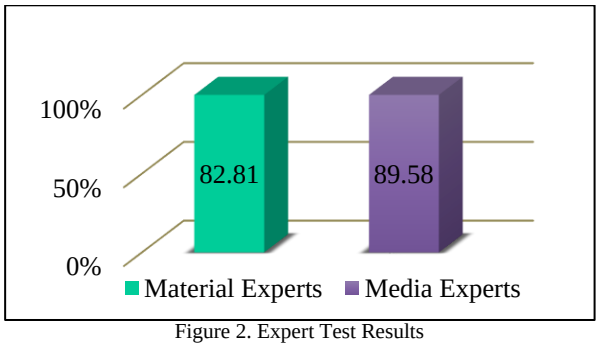

Figure 2. Expert Test Results

Conclusions and Suggestions

Conclusions

Based on the results of the study, it can be concluded that: (1) Web learning learning media introduction to information and communication technology was developed through 3 stages, namely: (a) Analysis Phase (Analyze); (b) Design Phase (Design); (c) the Development Phase and all these stages have been carried out properly; (2) The results of the material expert's assessment are in a very decent qualification, and the results of the media expert's assessment are also in a very decent qualification. Based on the results of the expert's assessment, it can be concluded that the web learning media using wordpress cms introductory information and communication technology courses developed is declared very suitable for use for the implementation stage in the learning process.

Suggestions

Suggestions for future researchers to complete this research by building a system that can accommodate all Android-based university courses and multi-user.

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