

Application of Computer-Assisted Instruction in Hypermedia Learning

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Abstract: Various types of applications of computer-aided technology have begun to be used in the learning process. The application when viewed from the way it is presented and the goals to be achieved include tutorials, namely the presentation of the material in stages, a drill that aims to help students master the material that has been learned before, as well as simulations and games, namely exercises in applying the knowledge and skills that have just been learned. One form of computer-based learning media that can be used is hypermedia. Hypermedia refers to computer software that uses elements of text, graphics, video, and audio that are connected, which can make it easier for users to switch to information. Communication between students and computers in Computer Assisted Instruction includes several stages, namely: (1) The computer presents the subject matter, (2) The learner studies the material, (3) the computer asks questions, (4) The learner gives a response, (5) The computer checks the response, if it is judged to be correct, the computer presents the next material, but if it is judged to be wrong, the computer gives the correct answer along with the explanation. The application of Computer Assisted Instruction in the development of learning hypermedia produces a product, namely learning hypermedia on digital image material. In testing the effectiveness of hypermedia products, students are carried out through post-testing. The results of the post-test obtained 75% of the results stated that the digital image learning hypermedia product was effective for use.

Keywords: Hypermedia, Computer Assisted Instruction, Learning, Digital Image Processing

1. INTRODUCTION

The development of Information and Communication Technology has provided many changes to the world of education, especially in the development of learning media. Learning media related to ICT which is now a concern in the world of education is computer-aided learning media. Computers as one of the products of technological developments have been used in various aspects, including administration, educational implementation, and the educational evaluation process. Various types of applications of computer-aided technology have begun to be used in the learning process. The application when viewed from the way it is presented and the goals to be achieved include tutorials, namely the presentation of the material in stages, a drill that aims to help students master the material that has been learned before, as well as simulations and games, namely exercises in applying the knowledge and skills that have just been learned. For this reason, Hypermedia will be applied to universities, especially to students as prospective teachers so that before entering the field, it is necessary to have good competence. In addition, the problem of the Covid-19 pandemic has made the world of education, especially in learning, have to adapt to the current situation. Where learning is still carried out online. For this reason, it is necessary to carry out an innovation that

supports the running of this learning, especially in the Informatics and computer technology education study program, Faculty of Engineering, Medan State University, namely by developing learning hypermedia by applying Computer Assisted Instruction which can later support a good learning process, especially in digital image processing courses. With the implementation of this applied product research, the contribution of the research is that it can help solve learning problems that occur today, namely where learning hypermedia by applying the CAI method is something new in the development of existing learning media.

2. SIMULASI MODEL

In research on the development of hypermedia learning by applying Computer Assisted Instruction, it is necessary to carry out a concept or research flow which can be seen in figure 1 below:

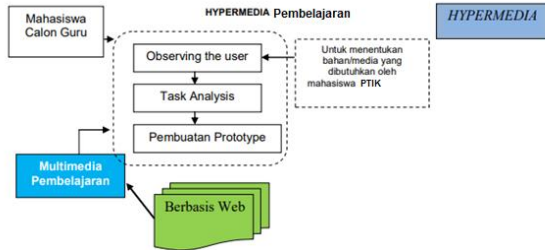


Figure 1. Learning Hypermedia Development Concept

The right idea as a problem solving needs to be developed by a medium, namely by developing learning hypermedia by applying CAI. The stages of activities to be carried out in this study can be presented in the following flow chart:

1. Observation
 The activities carried out in this stage are as follows: analysis of standards of facilities and infrastructure, preparation of research designs, determination of research sites, and preparation of research instruments.
2. Data collection
 At this stage, researchers as research implementers as well as human instruments seek data information, namely analyzing metering needs in the development of learning hypermedia in the Department of Electrical Engineering Education.
3. Data Analysis
 Data analysis was carried out after researchers made learning observations in the Information and Computer Technology Education Study Program.
4. System Design
 After observation, data collection, and data analysis at this stage, a system design will be carried out in accordance with the findings and existing needs, namely the design of hypermedia learning by applying CAI, and web-based multimedia.
5. Testing
 At this stage, the learning hypermedia developed will be tested to ensure that the media is suitable for use as a teaching medium both from the media validation test and also the material.
6. Implementation
 At this stage, the media has been integrated, demonstrated, and used by student students in the teaching and learning process.

3. RESULTS

This website is a hyperlink-based media or connect-link to help users understand digital image processing, with features including, encoding learning content in the form of interactive hyperlinks so that they can be interesting when used. Can be accessed via the internet by opening a browser via a computer/PC. Contains digital image processing materials, and hyperlinks that are displayed in the form of material per material and chapter by chapter. Then video hyperlinks and questions can immediately be raised in value, so that users know how many achievements the questions have been done, in addition to the material in the form of writing, they are also equipped with images to make them more attractive and fun to use.

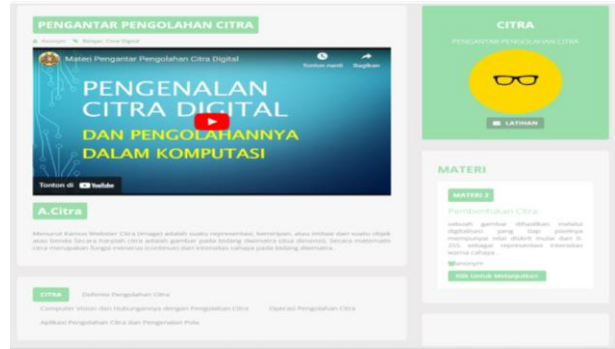


Figure 2. Display of Digital Image Processing Materials



Figure 3. Digital Image Learning Video Display



Figure 4. Digital Image Learning Exercise Display

The product produced in this study is hypermedia learning. The effectiveness of hypermedia is carried out by post-testing students. The measure of centering and dissemination of pretest-posttest result data can be seen in the following table:

Table 1. Measures of data centralization and deployment

No	Data Centering and Dissemination	Pretest	Posttest
1	Lowest Value	37.5	87.5
2	Top Rated	25.0	62.5
3	Average	32.3	75.0
4	Median	37.5	75.0
5	Mood	37.5	75.0
6	Standard Deviation	6.4	9.2

Table 2. Assessment of Practicality Aspects

No	Indicators	Sum of Values	Category
1	Ease of Use app instructions	44	Good
2	Ease of operation of hypermedia	40	Good
3	Operation of hypermedia in various environments	35	Good
4	Operation of hypermedia in various time variations	41	Good
Sum		160	Good

4. CONCLUSION

The development of WEB-based Hypermedia is carried out by paying attention to methodological aspects in making multimedia-based learning simulations to the writing of programs which then the results of the prototype are tested through the test of media experts and material experts. The product produced in this study is WEB-based software in the Digital Image Processing course. Learning using adaptive hypermedia makes it easier for students to learn image processing because the models developed can adapt to differences in student learning styles. Hypermedia products have feasibility that can help students as an alternative to learning media. This hypermedia product can support independent learning, simplify the learning process, clarify the subject matter with various visualizations and tutorials and allow learners to learn anytime and anywhere.

5. REFERENCE

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