
The Effectiveness Of Adobe Flash Interactive Collaborative Module Learning Media In Improving Learning Outcomes In The Mathematics And Economics Course

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Abstract

The purpose of this study is to determine how learning using the Adobe Flash interactive collaboration module improves learning outcomes in the mathematical economics course. The method used in this study is the development method. The results of this study: the module requires conceptual content arrangement to further motivate students. There are several ways to organize conceptual content, as follows: *first*, information density. The writing of this module begins from material known to students to material that is not yet known to students as well as providing a list of difficult words and concrete presentation of concepts with examples. *Second*, additional simulations. The writing of the module should be able to provide stimulation by adding questions and activities that can be analyzed and carried out by students.

Keywords: Learning Media, Adobe Flash, Learning Outcomes

INTRODUCTION

The word media is the plural of '*medium*', which literally means intermediary or messenger. Several experts have provided definitions of learning media. Schramm argues that learning media is a message-carrying technology that can be used for learning purposes. Specifically, the term can be defined as a communication tool used to convey information from one source to a recipient. According to Gerlach and Ely (1971), media, broadly understood, are people, materials, or events that create conditions that enable students to acquire knowledge, skills, or attitudes. Therefore, teachers, textbooks, and the school environment are media (Saputra et al., 2024).

Media that convey messages or information that have instructional purposes or contain teaching purposes. Learning media include tools that are physically used to convey the content of teaching materials, consisting of books, tape recorders, cassettes, video cameras, video recorders, films, slides (pictures), photographs, drawings, graphics, television and computers. In conclusion, media is anything that can be used to convey a message from sender to receiver, thereby stimulating students' thoughts, feelings, attention, and interests in such a way that the learning process occurs (Z. S. H. Rosmiati, 2016).

A module is a single program unit that can measure objectives. A module can be viewed as a program package structured into specific units for learning purposes. According to Goldschmid, "*... a module is a self-contained, independent unit of a planned series of learning activities designed to help the student accomplish certain well-defined objectives*." ... a module is a type of planned learning activity unit designed to help students accomplish certain objectives. According to the Module Preparation Guidelines book, what is meant by a module is the smallest unit of a teaching and learning program which outlines in detail (1) learning

objectives, (2) the main material to be studied and taught, (3) the position and function of the unit in a broader program unit, (4) the role of the teacher in the teaching and learning process, (5) the tools and resources which will be used, (6) the teaching and learning activities which will/must be carried out and experienced by students in sequence, and (7) the worksheets which will be carried out during the learning process (Cece Wijaya, et al., in Sukiman's book, 2012: 132).

Increase the current speed, considering that the cross-sectional area of the Lagan River at the catchment point in Lagan Tengah Village is quite large. River flow is included in the group of new renewable energy. The energy possessed by river currents will continue to be renewed, meaning that this energy will never run out unless the river dries up. The greater the discharge of a river flow, the greater the potential energy it has, and the faster the flow speed of a river, the greater the mechanical energy that can be produced. This means that these two main components are very important in producing mechanical energy from a river (Nurdin, Sembiring, Phongsavath, Rahmawati, & Hutabarat, 2022).

LITERATURE REVIEW

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From the description above, it can be understood that the characteristics of a module are: first, a module is a unit of learning material that is specifically designed so that it can be studied by students independently, second, a module is a complete learning program,

systematically arranged with reference to clear and measurable learning objectives or competencies, third, the module contains learning objectives/competencies, materials and activities to achieve the objectives as well as evaluation tools for achieving the learning objectives, and fourth, modules are usually used as independent learning materials in distance education systems which are intended to overcome difficulties for students who cannot participate in conventional face-to-face learning activities in class (Zuhri Saputra Hutabarat, 2018).

Teaching materials are all forms of materials used to help teachers/instructors in carrying out teaching and learning activities in the classroom. The materials in question can be written or unwritten materials. (National Center for Vocational Education Research Ltd/National Center for Competency Based Training) in the 2009 KTSP Technical Guidance (2009: <http://bandono.web>). In other words, teaching materials are learning tools or facilities that contain materials, methods, limitations, and evaluation methods that are designed systematically and attractively to achieve the expected competencies. Teaching materials will reduce the burden on teachers in presenting materials (face to face), so that lecturers have more time to guide and help students in the learning process (Z. S. H. Rosmiati, 2016).

Wahidin stated that instructional materials are the knowledge, skills, and attitudes that students must learn in order to achieve predetermined competency standards. Specifically, the types of instructional materials consist of knowledge (facts, concepts, principles, procedures), skills, and attitudes or values. Many people assume that instructional materials are the same as textbooks, when in fact, they are two different things. Instructional materials are different from textbooks (Nurdin et al., 2022).

RESEARCH METHOD

This research uses the research and development (R&D) method. The R&D method is a research method used to produce a specific product and test its effectiveness. Research and development is a process or steps to develop a new product or improve an existing product. The research on this problem-solving-based question instrument uses Research & Development (R&D). According to Sugiyono (2017), the R&D method is a research method used to produce a specific product and test its effectiveness. A similar opinion was also expressed by Borg and Gall, who define development research as a process used to develop and validate products.

RESULTS AND DISCUSSION

High-quality, competent, and competitive human resources (HR) play a crucial role in facing increasingly fierce competition, particularly in the current era of the ASEAN Economic Community (AEC). Indonesia must be able to compete with other ASEAN countries in the face of free trade. One effort the Indonesian government can take to prepare for competition in the AEC era is to continuously improve the quality of its human resources. Therefore, education plays a strategic role in developing high-quality and competitive HR (Manik et al., 2023) and (Sumatera, Simarmata, & Hutabarat, 2024).

Education is a long-term investment in human resources that has strategic value for the continuity of human life. Education is not only the most important pillar in efforts to educate the nation's life, but also an absolute requirement for improving the welfare of a just society. This is stated in Article 28C paragraph (1) of the 1945 Constitution which states that "Everyone has the right to develop themselves through fulfilling their basic needs, the right to receive

education and the benefits of science and technology, art and culture in order to improve the quality of their lives for the welfare of humanity (Phongsavath, Andriani, & Saputra Hutabarat, 2022)."

Education can essentially be achieved through three paths: formal education, non-formal education, and informal education. Formal education is an educational path consisting of elementary education (SD/MI/SMP/MTs), secondary education (SMA/SMK/MA/MAK), and higher education (Academy/Polytechnic/School). College/Institute/University). Non-formal education is an educational path outside formal education (course institutions, training institutions, study groups, community learning activity centers, and so on). And, informal education is education within the family and environment (R. Rosmiati & Hutabarat, 2019).

Higher education is a form of formal higher education in Jambi Province. The success of higher education is determined, in part, by the quality of the lecturers. This is because lecturers are one of the human elements in education, playing a crucial role in the learning process at higher education institutions. Therefore, a lecturer must possess pedagogical, professional, personal, and social competencies to implement the Tri Dharma of Higher Education, including those related to education and teaching activities (Rustantono et al., 2024). Implementing learning in higher education requires lecturers to be able to create active, innovative, creative, and enjoyable learning processes. This is because the quality of the learning process depends heavily on the creativity and innovation possessed by lecturers in designing the learning. Therefore, professional lecturers must prioritize learning quality over *material-oriented learning* (Almaududi, Simarmata, Hutabarat, & Teffu3, 2023).

Mathematics and Economics is a required course for students in the Economics Education Program, Mathematics Education Program (Faculty of Teacher Training and Education), and Management Program (Faculty of Economics) at universities. Mathematics and Economics is a subject that involves working with numbers, requiring students to be able to engage in the game of numbers. Most students find Mathematics and Economics difficult to learn because they are unfamiliar with numbers (Halal, Declare, Pratiwi, & Hutabarat, 2024).

Based on interviews with lecturers teaching the Economic Mathematics course in the Economics Education Study Program, researchers discovered that some students still achieve low learning outcomes. This is reflected in the students' final semester exam (UAS) scores. of 25 (twenty five) students, only 11 (eleven) people completed or around 44%. Based on the researcher's interviews with several students of the Economic Education Study Program, information was obtained that one of the factors causing the less than optimal UAS scores was that the learning media used by the lecturer in charge of the Economic Mathematics course tended to be monotonous, so that students easily got bored and were less interested in following the learning process. In addition, students also rarely reviewed the Economic Mathematics lecture material at home, so that when the UAS came, they forgot the calculation methods they had learned (Almaududi et al., 2023).

To minimize the problems experienced by these students, one of the efforts made by researchers is to design learning media. According to Hamdani (2011: 244), "Learning media is anything that can convey messages, stimulate students' thoughts, feelings, and desires, thereby encouraging the creation of a learning process in students." In other words, the use of learning media can increase student motivation and interest, thus realizing a more effective learning process (Hutabarat & Ekawarna, 2023).

The learning media developed by the researchers aligns with developments in Science and Technology (IPTEK). This is because developing learning media using technology can improve the quality of learning. This is in line with Sadiman's (2011: 17) opinion, which states

that "The appropriate and varied use of educational media can overcome students' passive attitudes. In this regard, educational media is useful, among other things, for fostering enthusiasm for learning."

As science and technology advances rapidly, learning media are becoming more extensive and interactive. Furthermore, *the range of software* available for use in learning is growing, including *Adobe Flash*. *Adobe Flash* has a main interface that contains text, images, sound, animation, video, and films as needed, complete with interactive buttons, making the learning process more meaningful and improving student learning outcomes (Agustina & Hutabarat, 2023). Advances in science and technology are increasingly driving innovative efforts to utilize technological innovations in the learning process. The impact of technology, both software *and* hardware, has become integral to modern human life. In today's technological and information age, utilizing advanced technology for learning purposes is nothing new. One learning medium that is increasingly shifting the role of educators is multimedia technology, available through computers (Suratno, Saputra Hutabarat, & Sari, 2018).

Daryanto (2011: 49) states that "Learning multimedia is a multimedia application used in the learning process to convey messages (knowledge, skills, and attitudes) and stimulate the choices, feelings, attention, and desires of students, so that the learning process occurs intentionally, is purposeful, and is controlled." Multimedia can be classified into 2 (two), namely: 1) Linear multimedia is multimedia that is not equipped with any control devices that can be operated by the user. For example, TV and films, 2) Interactive multimedia is multimedia equipped with a user-operated control device, allowing users to select what they want for the next process. For example, interactive learning and *game applications* (Ilham & Saputra Hutabarat, 2018).

Warsita (2008: 154) states that "Interactive learning multimedia is a combination of various media that are packaged (programmed) in an integrated and interactive manner to present certain learning messages." Furthermore, Warsita states that interactive learning multimedia has several advantages, namely: 1) It's flexible, both in terms of providing the opportunity to choose the content of each subject, as well as its variety and placement for access. Furthermore, it's flexible in its use, being able to be used in class, individually, or in small groups. The flexibility of time management is also a prominent feature, making it suitable for everyone, 2) *Self-paced*, which caters to the individual's learning pace. This means that the speed at which it is used depends largely on the abilities and readiness of each individual student, 3) *Content-rich*, meaning it's rich in content. This means the program provides a wealth of information, even enriching and in-depth learning materials. It also provides further details or elaborations of the content specifically designed for students with specific interests or who want to learn more, 4) Interactive, meaning it's two-way communication. This means the program provides opportunities for students to respond and engage in various activities, which the multimedia program can then respond to with *feedback*, 5) Individual, meaning it caters to the individual's learning pace. This means that multimedia programs are designed and provided to meet the interests and learning needs of individual students (Suci Rahmadani, 2021).

Nasution (2010: 205) explains that "A module is a complete unit that stands alone and consists of a series of learning activities designed to help students achieve a number of objectives that are formulated specifically and clearly". Meanwhile, Hamdani (2011: 219) states that "A module is a learning tool in written or printed form that is systematically

arranged, containing learning materials, methods, learning objectives based on basic competencies and competency achievement indicators, instructions for independent learning activities (*self-instructional*), and provides opportunities for students to test themselves through exercises presented in the module". Thus, an interactive module is a module that is developed and equipped with several results from *software programs* , so that the module becomes interactive.

The procedure used by researchers in developing interactive module learning media using *Adobe Flash software* refers to the ADDIE development model. The steps in the ADDIE development model are as follows:

1. Analysis

The analysis is conducted to determine learning needs, what will be taught, and what competencies students are expected to master after completing the course. A description of each stage of this analysis is as follows:

a. Needs analysis

The researcher obtained the needs analysis through observation. Based on the observations, the researcher obtained information that the lecturer in charge of the Mathematics Economics course in the learning process only uses the lecture method with the use of a whiteboard as a learning medium. In other words, the lecturer in charge of the Mathematics Economics course has not used innovative learning media, especially computer-based ones. In fact, each classroom has an LCD, which can be used during the learning process. In addition, most students also have laptops that can be used effectively to support the learning process. Therefore, the development of interactive modules using *Adobe Flash software* is expected to improve the quality of learning and student learning independence in the Mathematics Economics course.

b. Material analysis

The material analysis was obtained through discussion activities carried out by the researcher with the lecturers in charge of the Economic Mathematics course. The researcher conducted discussions 3 (three) times. *First* , the discussion was carried out with the lecturers in charge of the Economic Mathematics course in the Economic Education Study Program (Pratiwi Indah Sari, M.PdE) and the Mathematics Study Program (Ayu Yarmayani, M.Pd). *Second* , the discussion was carried out with the lecturer in charge of the Economic Mathematics course in the Management Study Program (Anisah, SE, MM). The implementation of the discussions above discussed the material presented in the Economic Mathematics course in each Study Program. *Third* , the discussion was carried out with the research members. The implementation of this discussion discussed the material that will be described in the interactive module with *Adobe Flash software* . By considering the results of the previous discussion, it was decided that the material that will be described in the interactive module with *Adobe Flash software* is Linear Series and Functions.

c. Competency analysis

After determining the material to be presented in an interactive module using *Adobe Flash software* , the researchers formulated the supporting competencies for the series and linear function material.

2. Development

a. Making learning media

Based on the design, the researchers created an interactive module learning media. This interactive module learning media was created using *Adobe Flash software. CS 6*. All

~~components compiled during the design phase are assembled into a unified whole. The learning materials, exercises and answers, buttons, images, backgrounds, and music used in the learning media are imported into Adobe Flash CS 6. Files created using this software are in the form of flash documents (.fla) and can be operated outside the Adobe workspace. Flash after publishing into flash movie (Masni & Hutabarat, 2019).~~

CONCLUSION

Adobe Flash is a software that can be used in combination with other programs. Pranowo (2011: 15) states that " *Flash* can be seen as software . *Adobe Flash* as software is used in creating or building applications, information systems, and creating animations. According to Madcoms (2008: 1) "Learning media with the *Adobe Flash* program is good for supporting interactive learning because the software has superior capabilities compared to other software in displaying media, combining graphics, animation, sound, and has interactivity with users."

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