

Development of Learning Media based on Digital Comics in The Microeconomic Theory Course of Economic Education Study Program, Universitas Negeri Medan

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Abstract. The purpose of this study is to evaluate the viability and efficacy of using digital comics as instructional media to enhance student learning outcomes for the subject in the microeconomic theory course. This research uses research and development (R&D) methods using the ADDIE model. A quantitative data analysis technique is used. The results carried out are in the form of digital comic learning media can be accessed from smartphones through a webtoon application that can be downloaded on the Play Store. The media development received a good assessment from experts with an average feasibility score of 3.9 in the very decent category. In the practical test, students also gave a positive response with an average overall score of 3.3 in falling into the very practical category. In the effectiveness test, students also gave a positive response with an average overall score of 3.3 in falling into the very effective category.

Keywords: Microeconomics, digital comic media, teaching materials.

1 Introduction

A new era driven by a revolution in the field is near in terms of information and communication technology. The development of the digital world is no longer just influencing, even changing people's behavior and habits. The digitalization of life that is growing rapidly in the future is what the world of education must read so that it can equip our children with important skills to deal with it [1]

Right now, a COVID-19 pandemic has been happening all around the world. Work From Home (WFH) becomes the policy that has been made by government. The good news is that after the government made it mandatory for Indonesians to participate in a vaccination program starting from children aged 12 years to the elderly, the wave of COVID-19 gradually slowed down and was followed by a booster vaccine program. The Ministry of Education in Indonesia made a policy, namely Face-to-face Learning (PTM) on a limited basis starting from elementary school to university. The university, in this case, Medan State University,

designs Hybrid learning. Online learning and traditional classroom instruction, such as in-person instruction during regular school hours, are combined in hybrid learning called as hybrid learning of educational model approach. [2]

In this hybrid learning design, the Main School combines traditional face-to-face learning classes with web-based online learning and/or computer or smartphone-mediated learning. Schemes and learning times inside and outside the classroom are arranged in such a way as to get the advantages of each lesson.

That's why it is very important for lecturers to be more creative and innovative. So far, based on the experience of teachers/lecturers, they tend to use conservative teaching materials, there is a lack of breakthroughs in developing digital-based teaching materials, as well as in the use of online learning media using only power points.

The creation of instructional materials for microeconomic theory is in the form of comics which will be developed with a storyline on digital-based materials and can be accessed through Webtoon and the poetrisilaban.com website. This is considered relevant as a hybrid learning solution today because it is considered more accessible on student smartphones both during conventional class meetings and online meetings.

Research on the development of digital-based comics has been studied before. Maulana Arafat Lubis (2018)[3], Azizul (2020) [4], and Rida Fironika Kusumadewi (2020) [5] the overall results of the study confirm that the development of teaching materials in the form of comics and digital-based provides effectiveness on student learning outcomes. In addition, it fosters students' enthusiasm for learning because learning is up-to-date and practical through the grip of students' smartphones.

The development of teaching materials in the form of comics and based on digital comic media is a novelty. This step is an innovative idea for a relatively easy learning strategy during this COVID-19 pandemic which has online learning opportunities until this pandemic period is over [6]

2 Theory Study

2.1 Teaching Materials

(Pannen, 1995) [7] Teaching materials are a collection of learning tools or tools that contain learning materials, methods, limitations, and ways of evaluating and are designed systematically and attractively to achieve the expected goals, namely achieving competence or sub-competence with all its complexity (Widodo and Jasmadi in Lestari, 2013: 1) [8]. Given that teachers will use the teaching materials to aid and support the learning process, it is clear that they must be created and produced according to instructional rules. The "content" of the curriculum is essentially made up of learning materials or resources.

2.2 Learning Media

According to Susilana and Riyana (2009) there are three ways of learning, including 1) verbal information, 2) real experience, and 3) media. Among the three ways of learning above which are considered to have high effectiveness, namely the use of media in the learning process.

According to Gagne (1970) said that learning media are all elements of learning those help students. Likewise, Briggs (1977) explains that media is a means used to convey subject matter to students. Furthermore, Gerlach & Ely (1971) say that learning media has a complex scope, which includes humans, materials, or studies that provide understanding to students so that they can gain knowledge, skills, and attitudes. Reinforced Asyhar (2012: 8) says that learning media are all aspects needed in the teaching and learning process, be it software or hardware [10].

2.3 Digital Comics

Digital comics, according to Lamb & Johnson (2009), are straightforward comics that are displayed in specific electronic media. As a result, it is possible to define digital comics as a type of illustrated story with a specific cast of characters that conveys information or messages through electronic means.

In the context of communication, digital means using a system that can be used by computers and other electronic equipment. Media that is distributed over networks based on broadband optical cables, satellites, and microwave systems and whose content is in the form of a combination of data, text, sound, and other forms of visuals is known as digital media (Flew, 2008).

Digital media is also defined as electronic media used to store, transmit and receive digitized information. However, digital media can also be accessed without the internet, after these media files are downloaded or stored on a computer or smartphone device.

2.4 Learning Outcomes of Microeconomic Theory

Obtaining student scores is not merely a final note for lecturers in conducting research, but more than that a lecturer will be able to identify what components influence students in learning and motivate them to achieve learning success. According to Kemp, the learning process is said to take place if a person can now know or be able to do something that was previously unknown or unable to do. Learning outcomes will be seen in the presence of new behavior at the level of thinking ability.

The study's learning outcomes refer to what students learn in microeconomic theory classes. Many concepts, principles, and methods demand exciting learning and inspire students to learn when viewed from the type of material in this course

2.5 Development of Microeconomic Theory Teaching Materials Based on Digital Comic Media

The idea of creating educational resources based on digital comics has an impact on how learning is transformed into digital form, both in terms of system and content. Digital comic-based learning materials are an invention that significantly contributes to changes in the learning process. Students now engage in a variety of learning activities in addition to simply listening to teachers describe the subject matter. According to Surjono (2013), digital-based learning media is a method of providing learning materials via the internet that can be accessed at any time and from any location. It is currently quite popular because of its flexibility and effectiveness. [11]. Digital teaching materials turn each page into a flip page like opening a book and are equipped with a dynamic background. The preparation of digital

teaching materials and the determination of the layout are adjusted to the characteristics of the module, which can be used independently and provide interest (Sari & Raharjo: 2018).

Microeconomic theory teaching materials can be studied by students in a new form, namely material in digital comics, the material is arranged into an animated image with a storyline and can be accessed anywhere and anytime.

3 Research Methods

3.1 Research Approach

The research and development (RnD) approach was employed in this study. The development design that will be used in this research is ADDIE with the implementation stages as follows: (1) Analysis, (2) Design, (3) Development and Implementation, (4) Evaluation. Mulyatiningsih (2012) describes the stages of ADDIE development design. This development research procedure adapts the ADDIE development model, including analysis, Design, and Evaluation [12]

3.2 Data Collection Techniques

Data collection techniques using questionnaires or questionnaires. Questionnaires are used to assess the quality of media based on material experts, media experts, teachers, and students.

3.3 Research Instruments

There are several instruments needed in this research, starting from the media development process to the learning media analysis process. The instruments that will be used in the research include: The expert Validation Questionnaire

3.4 Data Analysis

If the production of econometrics teaching materials satisfies the criteria for validity, applicability, and effectiveness, it will be of high quality as follows:

3.4.1 Validity/Eligibility

The following stage is to evaluate the viability of using digital comics as teaching resources according to microeconomic theory. Following the collection of the data, it is possible to determine the importance of each validator's response by computing the average score using the formula shown below (Ernawati and Sukardiyono, 2017):

Average score = total score/ number of appraisers

3.4.2 Practicality

To test the practicality, students will later be assessed to test the readability assessment of teaching materials and media on a limited sample of digital comic-based teaching materials that have been made using standard deviation calculations. Later, the total ideal standard deviation generated will be converted to a value criterion determined by the practicality of using digital comic-based teaching materials.

3.4.3 Effectiveness

To test the effectiveness of these teaching materials, trials will be carried out in small, limited groups by collecting student response questionnaire data. Testing the effectiveness of teaching materials based on digital comics learning media is carried out by calculating the ideal standard deviation on a small sample of 10 students who have completed the course.

4 Results and Discussion

The research and development procedures for this learning media adapt the ADDIE development model, including:

4.1 Analysis

- a. Analysis of curriculum and materials
- b. Analysis of user needs

Analysis of user needs is carried out to determine student interest in using digital comic-based learning media (webtoon), to determine which software should be used to make it easy to use, and to determine the appearance of the software to be interactive with students.

- c. Program content analysis

The analysis of the program content is adjusted to the RPS for the microeconomic theory course. This is done so that the content and objectives of the learning media developed are following the curriculum used.

- d. Specification analysis

At the specification analysis stage, the thing to do is to analyze the minimum requirements of a computer and a mobile device that can be used to develop a digital comic-based learning media (webtoon).

- e. Job analysis

This stage is related to the function of buttons and navigation in the learning media.

4.2 Design

Before creating learning media goods, researchers create them with the intention of creating media that is made in accordance with the needs of the subject.

Based on the results of the analysis, the next stage is the design or product design which includes:

- a. Plot Design
- b. Character Design
- c. Scenario Creation

Product Description:

Digital comics are the latest innovation in the world of education, especially for lecturers who teach microeconomic theory courses. Because they are based on digital comics, It simplifies the online learning process for lecturers as well as making it simpler for students to access course materials at any time and from any location.

Product Print Screen:

1. Here's an initial view of digital comic-based learning media that can be accessed through the website https://www.webtoons.com/id/challenge/material-economy/list?title_no=776891

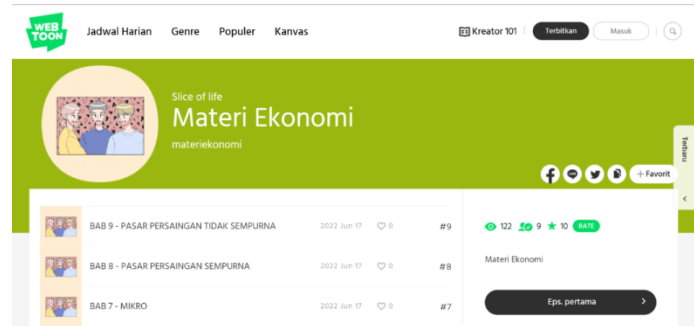


Fig. 1.initial view of digital comic-based learning media

2. After that, there is already material consisting of 9 chapters, it can be directly accessed without using a registered account, and readers/students are free to access each chapter (material)

Material 1 basic concepts of economics



Fig. 2.initial view of Material 1 basic concepts of economics

4.3 Development & Implementation

The development carried out by researchers is to make digital comic-based learning media products. The implementation of the product results in the form of learning media that can be accessed using smartphones and laptops.

The validation process is divided into two main stages, namely:

a. Design validation, or the accessibility of validation test findings documents, refers to the content of instructional materials that have been developed at the product design stage and validated through multiple phases. Draft 1 of these materials is known as design validation. Using an expert validity assessment, the first step is a test of the teaching materials' validity. The validator offers an evaluation of the appearance of the digital comic media after revising the validation sheet. The outcomes of the validator's amendment of the teaching materials are listed below.

Aspects of Content Validity of Digital Comic-based Teaching Materials

Further analysis is performed utilizing the analysis of the average total score on the value data from the validator, specifically:

$$\text{Average total score} = \frac{64}{16} = 4$$

Aspects of the Validity of Digital Comic-based Teaching Media

Further analysis is performed utilizing the analysis of the average total score on the value data from the validator, specifically:

$$\text{Average total score} = \frac{62}{16} = 3.8$$

From the data value of 2 validators, further analysis is carried out using the analysis of the average total score is:

The following formula can then be used to calculate the total validation results.

$$\text{Result} = \frac{7.8}{2} = 3.9$$

The result of the validator value is 3.9, then the feasibility category of the validator assessment results is in the very feasible category.

- a. A revised design draft that was made available as a consequence of expert design validation is known as Design Revision I (draft 2). The first change of the draft digital comic-based learning materials was made after the expert validation step, taking into account their evaluations to create draft 2.
- b. Product Trial (Implementation) which is a limited trial carried out in a small class sample, which is selected by 10 students in the third semester of class A in the Microeconomic Theory course.

4.4 Evaluation Stage

By examining the data on practicality, efficacy, and the end result of using the product, it is now possible to assess how practical the generated product is. Data on practicality is gathered in a small trial from the outcomes of student assessments. Regarding the effectiveness information gleaned from field trial test findings for student learning outcomes.

a. Product Evaluation is to measure the level of effectiveness and practicality of web-based learning applications.

1. Effectiveness Test

Based on the calculation results, it is obtained guidelines for converting quantitative values with a scale of 1 to 5 into qualitative categories to conclude how effective the level is, if the value of xi SBi is substituted, the conversion guidelines will be obtained as follows: $X \geq 3$ can be written with $3.3 \geq 3$ very good category. So, it can be concluded that the effectiveness test concluded that the development of teaching materials based on digital comics was effective.

Practicality Test

The practicality test of developing digital comic-based learning teaching materials was carried out to know the level of convenience, usability, and time effectiveness by students. By calculating the response data from the lecturer in charge of the course, it is known that the practicality test result of this product is 3.3, meaning that this product is very practical for students to use, but with little input for revision.

Product II has been improved, and as a result of the sparse test data, it is now possible to learn Microeconomic Theory through digital comics. Draft 3 of the Microeconomic Theory learning materials based on digital comics have been created and are ready for testing on a large group sample after going through the product trial phase on a small sample and a readability test for students.

5 Conclusion

A new era driven by a revolution in the field is near in terms of information and communication technology. The development of the digital world is no longer just influencing, even changing people's behavior and habits. The digitalization of life that is growing rapidly in the future is what the world of education must read so that it can equip our children with important skills to deal with it. That's why it is very important for lecturers to be more creative and innovative. So far, based on the experience of teachers/lecturers, they tend to use conservative teaching materials, there is a lack of breakthroughs in developing digital-based teaching materials, as well as in the use of online learning media using only power points. The creation of instructional materials for microeconomic theory is in the form of comics which will be developed with a storyline on digital-based materials and can be accessed through Webtoon and the poetrisilaban.com website. This is considered relevant as a hybrid learning solution today because it is considered more accessible on student smartphones both during conventional class meetings and online meetings.

The results of this research and development are in the form of microeconomic theory teaching materials based on digital comics. Where the results of the validity test by experts indicate that the development of digital comic-based teaching materials is very feasible. Likewise, the results of the practicality test assessment conducted by the lecturer in the microeconomic theory course are very practical.

And the results of the effectiveness test assessment concluded that the results of the respondent's data were very good. This shows that the teaching materials for microeconomic theory based on digital comic media have proven to be effective in improving student learning outcomes in microeconomic theory courses.

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