The Development of Digital-Based Teaching Materials to Improve Student Ability in Developing Economic Learning Tools

Thamrin
State University of Medan
E-mail: thamrin@unimed.ac.id

Article Info

Article History
Received: April 2023
Revised: May 2023
Published: May 2023

Keywords:
Digital-based teaching materials, student ability, learning tools.

Doi:
http://dx.doi.org/10.23960/E3J/v6i1.1-7

Abstract

Education personnel institutions (LPTK) are suspected of not being able to produce competent teacher candidates. The teaching materials used are still conventional, therefore information and communication technology (ICT) in the learning process is necessary to apply through digital-based learning. This research aims to: (1). identify the learning needs of the economics learning planning course desired by students. (2). test the feasibility of the developed digital-based economic learning planning teaching materials (3). tested the effectiveness of using digital-based economic learning planning teaching materials which were developed to improve students' ability to develop economic learning tools. This study used research and development (R & D) methods. The population were 115 students consisting of classes A, B and C who were attending economic learning planning courses. The sample for this study were students in the third semester of the business education study program, which consisted of two classes A and B. Class A consisted of 40 students as an experimental class and class B as a control class consisting of 40 students. The sampling technique used a random sampling technique. Data collection was carried out by conducting formative evaluations and limited trials one by one after the learning process. The results of this study indicate that digital-based teaching materials are appropriate and effective for use in planning economic learning. The t-test at α 0.05 states that the learning outcomes of planning economic lessons taught using digital-based teaching materials are higher than the group of students who are taught without digital-based teaching materials.

INTRODUCTION

Every educator expects the learning process can achieve the objective with an effective, efficient, interesting and fun way that students have satisfactory competence (Tomlinson, 2014). To achieve these expectations, educators must prepare and design learning tools according to attitudes and experiences. knowledge, skills and all available resources to support the optimal achievement of ongoing learning.

The Economics Learning Planning course at State University of Medan in Economics faculty of business education study program is no exception. The economics learning planning course is part of the curriculum which is a compulsory educational subject in the Education Study Program at the Faculty of Economics, Unimed with a credit weight of 2 credits. This course is very important considering that this course is an educational subject whose competencies must be possessed by students holistically as prospective professional economics teachers after completing their studies.

In an effort to maximize learning for the Economics learning planning course, teaching materials in the Business Education Study Program are available in the form of textbooks compiled by the course teaching team, but these teaching materials have not been packaged in the form of textbooks with an ISBN and have not gone through a research and development process (R&D). Besides, the teaching materials for economic learning planning have not been packaged in a digital-based form so that students can learn anytime, anywhere, not limited by place and time by utilizing the computers and smartphones.

The consequence of this condition has an impact on student competence which is less than optimal, especially in developing economic learning tools that students need when they become teachers. This is

because the lack of credit weight which was only 2 credits which is considered not enough to practice to developing economic learning tools is very minimal in an offline classes. This condition can be seen from the data on student learning outcomes in the previous batch showing that class A with a total of 39 students, 3 people got E grades, 5 people got C grades and 8 people got A grades and the rest got B grades. Another phenomenon can be seen through discussions with lecturers KDBK micro teaching and the experience of researchers in teaching guided teaching courses (internship 2) one of the weaknesses is the lack of students' ability to develop economic learning tools according to the demands of 21st century learning, namely critical thinking, creativity, collaboration, communication and designed learning that has not reached the ability category higher order thinking (HOTS) and have not implemented TPACK in designing economics studies. This condition is suspected because when students attend lectures on economics learning planning they do not have enough study time in class to practice so they do not have optimal competence.

In-depth discussions with students who have attended previous lectures obtained information that one of the causes of this condition is that the teaching materials used in lectures have not been standardized and are less attractive, because they are still conventional and have not utilized information technology. On the other hand, students want the need for digital-based teaching materials in the form of videos, power points, animations and digital-based exercises (Jannah et al., 2020) . The need for digital-based teaching materials is because competence in this course is in the form of skills in developing economic learning tools according to the applicable curriculum and they do not have enough time to practice the skills of developing economics learning tools in face-to-face classes because the credit weight is only 2 credits. In order for students to be maximally competent, students must study and practice independently through digital-based teaching materials, how to develop standard lesson plans (RPP). How to formulate learning objectives which must include ABCD and TPACK, formulate indicators according to basic competencies. Furthermore, developing media, learning models, teaching materials and HOTS evaluations.

This situation cannot be tolerated because it raises concerns that future economics and marketing teachers will lack the necessary pedagogical expertise, making it impossible to realize the alumni profiles of business education study programs to become qualified economics and marketing teachers in SMA/MA/SMK. All of these issues can be addressed by creating instructional resources for online courses in economic learning and planning. Using the Unimed LMS online learning system (SIPDA) e-learning program, this digitally based instructional content consists of project assignments, videos, PowerPoint presentations, and animations. Students may easily review and practice what they have learned using SIPDA anytime and wherever they are.

College students today are referred to be “digital natives” since they were raised with modern technology (Evans & Robertson, 2020). Computers, video games, digital music players, video cameras, mobile phones, and all the other toys and gadgets of the digital age are all they are exposed to and use during their whole lives. The importance of instant messaging, mobile phones, computer games, e-mail, and the Internet in their daily life was also mentioned (Subrahmanyam & Greenfield, 2008). Policymakers that deal with education must undertake a review of the present environment to teach the next generation in line with the times. If this phenomenon has anything to do with education, then the educational tools employed should be in step with recent advances in digital technology.

Teaching materials are a set of materials arranged in a systematic manner that allows students to learn and adapt them to the existing curriculum (Ahmed, 2017). Teaching materials are a set of materials that contain learning material or content to achieve learning objectives (Chi, 2009). A teaching material contains material or lesson content in the form of ideas, facts, concepts, principles, rules, or theories that cover subjects according to their disciplines and other information in learning (Renzulli, 2023; Çakmak & Akgün, 2018).

One type of teaching material is a module. Modules are all forms of independent learning units designed to be used by students without being guided by an instructor/lecturer. So, modules are self-study materials specifically designed so that participants can learn on their own anytime, anywhere, without the presence of an instructor/lecturer. (Dirjen Belmawa, 2018). Usually modules are packaged in printed form, otherwise known as printed modules. In contrast, in online learning, these modules can be packaged in the form of digital-based modules. With these digital teaching materials, students and

teachers can improve their ability to design multimedia (Karademir, 2021). Putri further (2020) explained that the designed digital module has the ability to increase student independence in learning because its use is not limited to the classroom. Lin (2017) also explained that digital teaching materials are effective in increasing learning outcomes by using unlimited time and space.

One type of teaching material is a module. Modules are all forms of independent learning units designed to be used by students without being guided by an instructor/lecturer (Thamrin et al., 2022; Tuzun, 2020). So, modules are self-study materials specifically designed so that participants can learn on their own anytime, anywhere, without the presence of an instructor/lecturer. (Dirjen Belmawa, 2018). Usually modules are packaged in printed form, otherwise known as printed modules. In contrast, in online learning, these modules can be packaged in the form of digital-based modules. With these digital teaching materials, students and teachers can improve their ability to design multimedia (Karademir, 2021; Babiker & Elmagzoub, 2015; Mantiri, 2014). Putri further (2020) explained that the designed digital module has the ability to increase student independence in learning because its use is not limited to the classroom. Lin (2017) also explained that digital teaching materials are effective in increasing learning outcomes by using unlimited time and space.

Learning by using digital teaching materials has the following advantages, including students: (1). They have greater time flexibility, freedom, and convenience by working part time online from home (2). tend to interact more with lecturers and fellow students because there are many opportunities to do so both in class and online. (3) have access to the most up-to-date resources available via the Web. (4). are able to participate more in class discussions because they can choose an online or face-to-face environment in which they feel more comfortable. (5). usually receive more feedback, and more frequent feedback, from lecturers. (6). can gain useful skills from using the Internet and computer technology.

Furthermore, She and Bidjerano (2013) explained that by using digital, students have the opportunity to interact with lecturers, students with students and this interaction significantly affects learning outcomes. The elements of this digital teaching material are the same as the printed module, but because they will be presented online, the elements of this module are presented in online media. These elements are: (1). Introduction Section; contains a brief description, relevance, study instructions and learning outcomes. All of these components are presented in the form of pieces of digital material such as descriptive text on the web, presentation slides (ppt), text (pdf), videos, animations and others. (2) Core Section; contains uratna or material explanations, examples, illustrations, exercises and others. The material is presented in the form of fragments of digital material such as descriptive text on the web, presentation slides (ppt), text (pdf), videos, animations and others. (3) Concluding Section; contains summaries/conclusions, tests, assignments, answer keys, lists of references and others. These components are presented in the form of fragments of digital material such as descriptive text on the web, presentation slides (ppt), text (pdf), videos, animations and others (Dirjen Belamawa: 20017). This digital module is assembled in such a way into the Unimed LMS e-learning learning system (SIPDA) online learning application.

METHODS

This research used development research (R&D) methods. Developmental research according to Borg & Gall aims to develop and validate products used in education (Borg & Gall, 1989). Based on this opinion, this research used the development method adopted from Dick & Carey. The stages of development implementation consist of 1). Pre-Development 2). Early Development, 3). Development of teaching materials and validation of field trials and 4). Field trials and application of teaching materials with quasi-experimental methods.

The research subjects in this study were lecturers and students of the business education study program. The research was conducted for six months at the Business Education Study Program, Medan State University. The population in this study were all students who were taking the economics planning course as many as 115 people consisting of classes A, B and C. The sample in this study were 80 students who were taken randomly. The selected sample is class A, 40 students as the experimental class and class B 40 students as the control class.

Data collection was carried out using validation instruments which were given to 3 experts as validators and one to one evaluation as well as limited trials. Furthermore, tests were given to students in the experimental class group and the control class. Data were analyzed using the SPSS application by looking at the different tests of experimental and control class learning outcomes.

RESULTS AND DISCUSSION

A. Result

The needs analysis that has been carried out obtained information that the competencies needed by students are: (1) able to describe basic concepts related to lesson planning, (2) able to describe basic concepts related to a systems approach in learning activities (3) able to design competencies and goals learning, (4) being able to design learning materials according to learning objectives, (5) being able to design learning media that are appropriate to the type of material to be taught, (6) being able to design learning strategies that are in accordance with competencies and learning objectives, (7) being able to design evaluations HOTS learning, (8) being able to design prota and prosem, (9) being able to design a learning syllabus (9). able to design lesson plans and learning modules for the 2013 curriculum and they learn (11). Able to design balanced learning learning. Teaching materials are said to be practical based on an analysis using a Likert scale according to Table 1.

Table 1. Practical classification of teaching materials

Score	Level of Validity
4,2 s/d 5.0	Very practical
3,4 s/d 4,1	Practical
2,6 s/d 3,3	Less practical
1,8 s/d 2,5	Not practical
1,0 s/d 1,7	Very Unpractical

The next step is to analyze the requirement analysis for the development of teaching materials. The complete score for the analysis of the needs of teaching materials is in Figure 1.

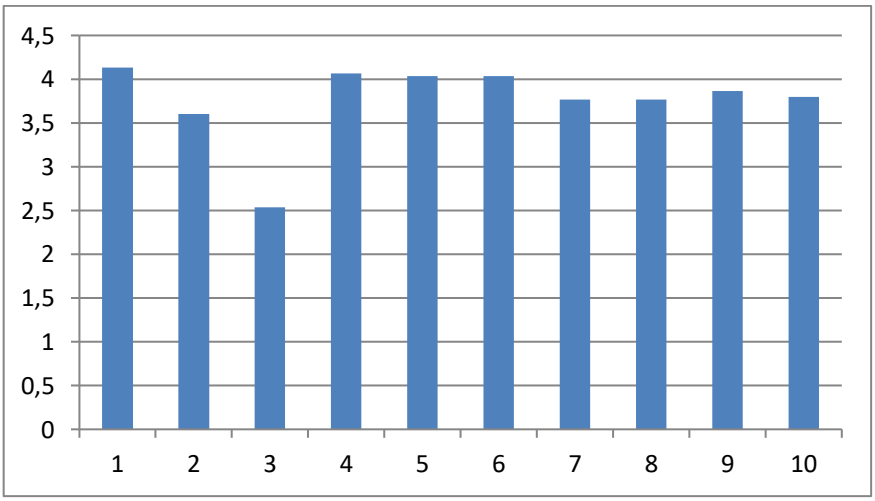

Figure 1. Mean Score Requirement Need Analysis

Teaching materials were also validated by involving three experts, namely experts in the field of economics education, experts in the field of economics learning design, and experts in IT-based media. Based on the evaluation, the average score given by the material expert validator was 3.45, design experts gave an average score of 3.7, and media experts gave a score of 3.66. Then a one to one evaluation is carried out. Three students were assigned as subjects. These three people with the criteria of one student who has abilities above average, one with average abilities and one person with abilities below average. The average score of the instruments filled out by three respondents can be seen in Figure 2.

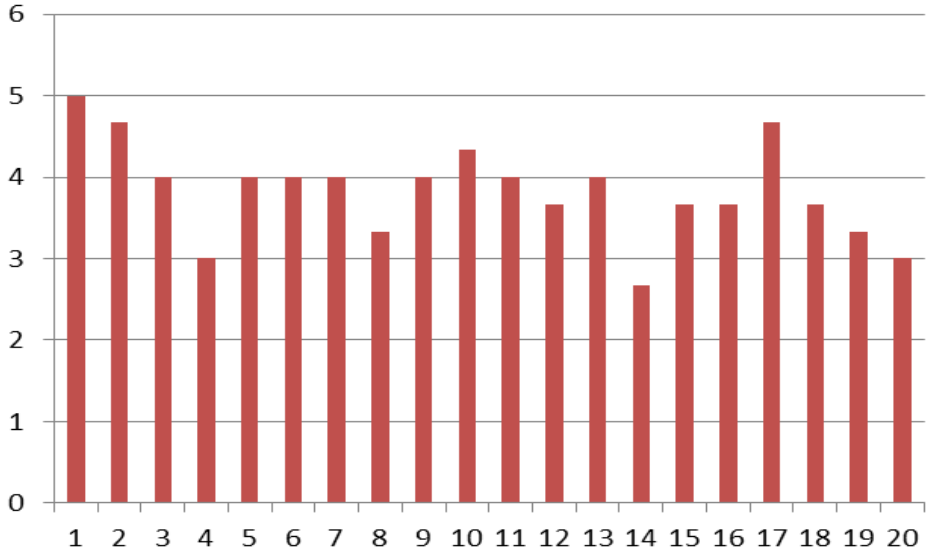

Figure 2. Average Score

Based on the results of one to one formative evaluation, it can be seen that the average score is 3.75, which means that the teaching materials for planning economics lessons are appropriate for use in learning to improve students' abilities to develop economic learning tools.

To test the effectiveness of teaching materials for planning digital-based economic learning, teaching materials were tested in two classes, namely class A as the experimental class and class B as the control class. At the end of the experiment, it was found that the average learning outcomes of students using digital-based learning planning teaching materials were higher than the average learning outcomes of class B students who did not use digital-based economic learning planning teaching materials. in Table. 2. You can see the average comparison between the experimental class and the control class.

Table 2. Descriptive Statistics on Learning Outcomes of Students in Experimental Class and Control Class

Statistic	Technology Based (Experimental class)	Conventional (Control Class)
Mean	76,37	71,80
Minimum	55,86	55,86
Maximum	94,08	85,26
Std.Deviation	10,89	7,612

To be more convinced of the differences between classes, t-test for equality of means were conducted. The complete statistical test can be seen in Table 3.

Table 3. T-Test for Equality of Means

		t	Df	Sig	Mean Difference	95 % Confidence interval	
						Lower	Upper
Learning Outcomes	Equa Variance Not assume	2,31	78,9	0,023	4,57	,645	8,50

From the statistical tests, it can be seen that the results of calculating the differences in learning outcomes for Learning Planning with hybrid learning and direct learning strategies have a sig = 0.024 with a significance level of 5%. This result means that the ability of students to develop economic learning tools between the control group with conventional learning and the experimental group with digital-based learning materials is significantly different so that the application of digital-based teaching materials has an effect on the learning outcomes of students' economics learning planning in the Business Education Study Program.

B. Discussion

Based on the results of validation by three experts and one-to-one formative evaluation, the teaching material for planning economics learning is appropriate for use in learning to improve students' ability to develop economic learning tools.

Teaching materials Digital-based economic learning planning is effectively used to improve students' ability to develop economic learning tools. This happens when teaching materials are applied in digital-based economic learning planning learning, students can study anytime and anywhere to study concepts related to the development of learning tools and practice making economic learning tools. Furthermore, students can interact with their colleagues to evaluate the devices developed using the instruments that have been prepared. This is in line with the results of Farhana's research (2021) which states that digital-based teaching materials significantly affect student learning outcomes. Furthermore, the results of this study are also in line with Thamrin's research (2022) explaining that hybrid learning teaching materials with project based learning are effective in increasing students' abilities in preparing thesis proposals. The results of Zwart's research (2017) also show that digital teaching materials can improve learning outcomes.

CONCLUSIONS AND SUGGESTIONS

A. Conclusion

Based on the results and discussion it can be concluded as follows the digital-based economic learning planning teaching materials that have been developed are suitable for use in Economics learning planning learning in FE in general and in the Business Education Study Program in particular. Teaching materials Economic learning plans that are developed effectively and significantly improve students' ability to develop economic learning tools. The effectiveness of learning by applying digital-based teaching materials is formed because students feel that the time they spend outside the face-to-face class is sufficient with the existence of these digital teaching materials and can practice anytime, wherever they are.

B. Suggestion

Based on the research results and conclusions, it can be suggested: (1) considering that the developed teaching materials are appropriate for use to improve students' abilities to develop economic learning tools even though there are still deficiencies, it is necessary that these teaching materials continue to be perfected. (2) based on the results of the study that the application of digital-based economic planning teaching materials significantly affects students' ability to develop economic learning tools in the business education study program, it is suggested that lecturers who will teach students in the economics learning planning course at other TTIs can apply it so that the learning carried out can achieve maximum goals, (3) the results of this study can be used as a reference for conducting further studies on the Development of teaching materials Planning for economic learning in particular and other subjects in general.

REFERENCES

Ahmed, S. (2017). Authentic ELT materials in the language classroom: An overview. *Journal of applied linguistics and language research, 4*(2), 181-202.

Babiker, M., & Elmagzoub, A. (2015). For Effective Use of Multimedia in Education, Teachers Must Develop their Own Educational Multimedia Applications. *Turkish Online Journal of Educational Technology-TOJET, 14*(4), 62-68.

Borg, W. R. & Gall (1989). *Educational researcher: An introduction, (4th ed.).* New York: Longman.

Çakmak, Z., & Akgün, İ. H. (2018). A Theoretical Perspective on the Case Study Method*. Journal of education and learning, 7*(1), 96-102. http://doi.org/10.5539/jel.v7n1p96

Chi, Y. L. (2009). Ontology-based curriculum content sequencing system with semantic rules. *Expert Systems with Applications, 36*(4), 7838-7847. https://doi.org/10.1016/j.eswa.2008.11.048

Dirjen Belmawa 2018. *Petunjuk Teknis Pengembangan Modul Hybrid Learning PPG dalam Jabatan*, Jakarta, Direktorat Pembelajaran Direktorat Jenderal Pembelajaran dan Kemahasiswaan Kemristek Dikti

Evans, C., & Robertson, W. (2020). The four phases of the digital natives debate. *Human Behavior and Emerging Technologies, 2*(3), 269-277. https://doi.org/10.1002/hbe2.196

Farhana, F., Suryadi, A., & Wicaksono, D. (2021). Pengembangan Bahan Ajar Berbasis Digital Pada Mata Pelajaran Bahasa Inggris Di Smk Atlantis Plus Depok. *Instruksional*, *3*(1),1-17. https://jurnal.umj.ac.id/index.php/instruksional/article/view/10329/5907

Jannah, M., Prasojo, L. D., & Jerusalem, M. A. (2020). Elementary school teachers' perceptions of digital technology based learning in the 21st century: promoting digital technology as the proponent learning tools. *Al Ibtida: Jurnal Pendidikan Guru MI, 7*(1), 1-18. http://dx.doi.org/ 10.24235/al.ibtida.snj.v7i1.6088

Karademir, T., Alper, A., Soğuksu, A. F., & Karababa, Z. C. (2021). The development and evaluation of self-directed digital learning material development platform for foreign language education. *Interactive Learning Environments*, *29*(4), 600. https://doi.org/10.1080/10494820.2019.1593199

Lin, M. H., Chen, H. C., & Liu, K. S. (2017). A study of the effects of digital learning on learning motivation and learning outcome. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(7), 3553-3564. DOI 10.12973/eurasia.2017.00744a

Mantiri, F. (2014). Multimedia and Technology in Learning. *Universal Journal of Educational Research, 2*(9), 589-592. DOI: 10.13189/ujer.2014.020901

Putri, D. P., Ferdianto, F., & Fauji, S. H. (2020). Designing a Digital Teaching Module Based on Mathematical Communication in Relation and Function. *Journal on Mathematics Education*, *11*(2), 223-236. https://files.eric.ed.gov/fulltext/EJ1251981.pdf

Renzulli, J. (2023). *The multiple menu model: A practical guide for developing differentiated curriculum*. Taylor & Francis.

Subrahmanyam, K., & Greenfield, P. M. (2008). Communicating online: Adolescent relationships and the media. *The Future of Children, 18*(1), 1-27.

Thamrin, T., Hutasuhut, S., Aditia, R., & Putri, F. R. (2022). The Effectiveness of the Hybrid Learning Materials with the Application of Problem Based Learning Model (Hybryd-PBL) to Improve Learning Outcomes during the COVID-19 Pandemic. *IJORER: International Journal of Recent Educational Research, 3*(1), 124-134. https://doi.org/10.46245/ijorer.v3i1.178

Thamrin, T., Hutasuhut, S., Suharianto, J., & Aditia, R. (2022). Project-Based Hybrid Learning; Effectiveness, Quality of Writing A Thesis Proposal, Independence, and Learning Satisfaction. *IJORER: International Journal of Recent Educational Research*, *3*(6), 651-661. DOI: https://doi.org/10.46245/ijorer.v3i6.257

Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners*. Ascd.

Tuzun, U. (2020). Introduction to systems engineering and sustainability PART I: Student-centred learning for chemical and biological engineers. *Education for Chemical Engineers*, 31, 85-93. https://doi.org/10.1016/j.ece.2020.04.004

Zwart, D. P., Van Luit, J. E., Noroozi, O., & Goei, S. L. (2017). The effects of digital learning material on students' mathematics learning in vocational education. *Cogent Education*, *4*(1), 1313581. http://dx.doi.org/10.1080/2331186X.2017.131358