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Development of Teaching Materials on Learning Economic Models to Improve Students' Cognitive Achievement

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ABSTRACT

The objectives of this research are to produce products of Learning Economic Models' teaching materials and find their effects on students' cognitive achievement. Dick and Carey's model was used for the concept of the development model. Formative tests were used to measure the effectiveness of teaching materials-and they were used to test one evaluation, small group evaluation, and field trial. The data collected was analyzed through mean, standard deviation, and z-test statistics. The research showed the products of teaching materials, with all being covered from Chapter 1 through Chapter 8 in order: 1) the theory of teaching and learning, 2) the basic concept learning models, 3) science-based learning models, 4) innovative learning models, 5) cooperative and collaborative learning models, 6) a model of problem-based learning, 7) contextual-based learning models, and 8) integrated learning models. The findings revealed that students with the teaching materials performed better than those without. The null hypothesis was tested at a 0.05 level of significance, indicating a significant difference between the cognitive achievement scores of those taught with the teaching materials and those taught without.

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1. INTRODUCTION

There are several factors that affect student learning outcomes, one of which is the accessibility of teaching resources used by educators (Hanushek, 2011). Teaching materials should be created with learners' requirements in mind since they must fulfil that requirement (M. O. Martin & Mullis, 2003). There is no set method for creating teaching materials arguing that educators must come up with original teaching materials based on the curriculum and the needs of their students (Roncolato & Koh, 2017). Teachers have a choice from a variety of instructional materials when deciding which is ideal for their students' learning. Instructional materials are crucial and vital for teaching and learning academic content to increase teacher effectiveness and boost student achievement (Adalikwu & Iorkpilgh, 2013). Learning is more fascinating thanks to the teaching materials and learning school subjects to improve teacher efficiency and improve student performance (Rukmini, 2008). The teaching materials make learning more interesting, practical, realistic and interesting. Teaching materials also allow teachers and students to participate actively and effectively in each lecture session. Teaching materials provide space

for the acquisition of skills and knowledge and the development of self-confidence and self-actualization (Alawamleh, Al-Twait, & Al-Saht, 2022). Described teaching materials as objects or tools that help teachers present their lessons in a logical and sequential manner to learners. (Coffield, Moseley, Hall, & Ecclestone, 2004) Acknowledged that teaching materials used by teachers can assist in the explanation and make learning the subject matter easy for students to comprehend during the teaching and learning process.

Since each level of Bloom's taxonomy evaluates learning at a different depth, the first three levels-knowledge, understanding, and application can be used in particular to examine cognitive outcomes (Escuenta, Quan, Nickow, & Oreopoulos, 2017). The most fundamental level (i.e. knowledge) mainly evaluates students' retention of study content through inquiries that invite them to name, define, or describe a subject (Klaus Schwab, 2016). Students must rewrite the knowledge in second-level items (comprehension, for example) in a meaningful way to demonstrate their understanding of the subject matter (Riyanto & Alexon, 2019). Applications from the third level ask students to apply knowledge to novel phenomena or structures, demonstrating their ability to choose relevant information (Robert Coe, Aloisi, Higgins, & Major, 2014).

The updated cognitive domain taxonomy is presented in three dimensions by Rex Heer of Iowa State University's Center for Excellence in Learning and Teaching in 2012. Even when cognitive and knowledge process aspects are depicted as hierarchical phases, it is not always evident where one category ends and the other begins (Heer, 2012). For instance, every procedural knowledge must conform to the specified aim and should not be more abstract than all conceptual knowledge (Robert Coe et al., 2014). The cognitive learning domain includes knowledge and the improvement of cognitive abilities. Recognition of facts, procedural patterns, and particular notions that aid in the improvement of skills and talents are included in this (Darling-Hammond, Flook, Cook-Harvey, Barron, & Osher, 2020). The test of achievement is an assessment given at the conclusion to determine how much a student has learned or accomplished a goal required certain clarification or had a particular skill (Chai & Kong, 2017).

Teaching is a set of events that facilitate learning, while design means creative patterns or consecutive rational and logical processes intended to solve problems (Marham & Rusmono, 2021). Thus, instructional design (ID) can be defined as "a systematic process for translating the principles of learning and teaching into teaching materials and instructional activities" (Peng, Feng, Zhao, & Chong, 2021). That instructional design can be defined as a process, discipline, science, and reality (Hanushek, 2006). (Uzunboylu & Koşucu, 2017) Established the well-known ADDIE model with the following five logical processes after analyzing a dozen ID models to find five common elements: Analyze, design, develop, implement, and evaluate are the first four steps. The ID Project is then introduced in ten steps. The following steps are included in the management model: Setting the project's scope, organizing the project, gathering information, developing the blueprint, creating draft materials, testing those materials, producing master materials, duplicating those materials, distributing them, and evaluating the results are the first steps. Model ID makes instructional materials manageable so that developers may concentrate on learning the subject and creating vision. The ID approach generally prioritizes the design and creation of educational materials over more significant administration or management issues such as budget and staffing (Ajoke, 2017).

The problem of this research was that teaching materials for economic learning models are not yet available, leaving this resource's development highly urgent (Aronsson, 2009). Thus, the teaching materials developed in this research are the subject matter of the economic learning models. The development of this resource is an integral part of instructional design (ID) (Dahal, 2017). (Munzenmaier & Rubin, 2013) are just a few examples of instructional design models that can be utilized today to create teaching materials, but they must be chosen or created to match the demands. Analyzing, identifying, contextualising, integrating, designing, developing, validating, trying out, implementing, and evaluating are the typical stages of the instructional design model used in this study (Ferguson, Bovaird, & Mueller, 2007) & (Dahal, 2017). ID aims to boost employee performance as well

as corporate effectiveness and efficiency. While efficiency is typically regarded as the ratio between the resources required to accomplish the result (input) and the value of the result, performance refers to the outcome of talent, knowledge, and attitude (output) (Ajoke, 2017). On the other hand, effectiveness typically denotes a fit between the results attained and what is required or desired (Rob Coe, Rauch, Kime, & Singleton, 2020). The problems studied in this research are: (a) what are the ways to create teaching materials that can be used for the lectures on economic learning models? and (b) can the materials developed effectively improve student cognitive achievement?

2. METHODS

This research used research and development design. The development model used is the Dick and Carey learning design model Dick and Carey. Further, the research subjects include the expert design of teaching materials (design experts), subject matter experts (learning subject experts), learning models, and students. In addition, the design and material expert is a lecturer/professor with more than 25 years of doctoral qualification as a permanent lecturer of Teacher Training and Education Faculty Jambi University. The selected students are economics education study program students who meet the qualification, are officially registered in the 6th semester, are contracting courses in economic learning models, and have a GPA of ≥ 3.25. The data collection instruments used include a questionnaire and (b) test. The test was arranged in the form of multiple choice with 4 answer options. The tests were given to the students during product trials (formative tests), small groups and field trials. The tests were also given to the students in the form of summative tests to measure the effectiveness of the developed product. All data were analyzed using descriptive statistics (Sastra Wijaya, Kamaruddin, & Ficky Duskarnaen, 2019).

The popular instructional design model used was the Dick and Carey Systems Approach Model. This model was first published in 1978 by Walter Dick and Lou Carey in his book, "The Systematic Design of Instruction". Dick and Carey stated that "components such as instructors, learners, materials, instructional activities, delivery systems, and learning and performance environments interact with each other and work together to produce desired student learning outcomes". Dick and Carey offered the following sample methods: a) Develop instructional techniques, b) identify instructional goals, c) conduct instructional analysis, d) examine learners and situations, e) write performance objectives, develop assessment tools, and identify instructional goals, f. Create and choose instructional materials, g) instruction must be designed and evaluated formatively, h) it must be revised, j) it must be summatively evaluated (Sappaile, 2007).

3. FINDINGS AND DISCUSSION

Adopting the Dick and Carey learning design model Dick and Careymade it possible to describe the teaching material design of the courses of the economic learning model, which has been summarized as below :

1) Identify Instructional Goal
   a. 100% Students as teacher candidates need the improvement of pedagogic competence, that is, mastering study material of the economic learning model.
   b. 100% of students need the competence to apply, study, and design by utilizing science and technology (IPTEK) study materials of innovative economic learning models
2) Conduct Instructional Analysis. Based on the identified objectives and competencies, the students must master the : 1. concepts, theories, and principles of learning, 2. learning models, 3. scientific-based learning, model, 4. innovative learning models, 5. cooperative and collaborative learning-based learning model, 6. problem-based learning models, 7. contextual-based learning model, and 8. integrated learning model
3) Analysis Learners and Contexts.

a. General characteristics: students are in semester 6, have a mean GPA of ≥3.25, and an average adult age of 22.34 (SD = .34)
b. Specific entry competencies: students have 120 credits, and have passed the prerequisite courses following the lectures of economic learning models (Learning Planning, Teaching and Learning Strategy)
c. Learning styles: most (65%) have a visual learning style.

4) Write Performances
   a. Attitude: have sincerity, commitment, and sincerity to develop attitude, value, and ability of learners
   b. Skills: able to apply, study, and design by utilizing science and technology (IPTEK) study
   c. materials of innovative economic learning models.
   d. Knowledge: able to master the study materials of innovative economic learning models
5) Develop Assessment Instrument. 8 sets of assessment points to measure students' cognitive abilities that are valid and reliable.
6) Develop Instructional Strategy. 1 set of Semester Study Plan (RPS) containing: pre-learning activities, content presentation, student participation, assessment, and follow-up activities — in the form of a holistic rubric.
7) Develop and Select Teaching Materials.
   a. (Chapter 1) learning and learning theories
   b. (Chapter 2) basic concepts of learning models
   c. (Chapter 3) scientific-based learning models
   d. (Chapter 4) innovative learning models
   e. (Chapter 5) cooperative and collaborative learning models
   f. (Chapter 6) problem-based learning
   g. (Chapter 7) contextual-based learning model, and
   h. (Chapter 8) integrated learning model
   i. Each chapter of the review material includes: Learning outcome of the course, the content of the study, summary, the content of the study, summary, formative test, the exercise assignment, the action continues
8) Design and Select Formative, Evaluation and Instruction
   One-to-one evaluation (N=4, GPA ≥ 3.25): mean pre-test = 48,31, SD = 3.7, post-test =81.24 SD = 4.2
   Small group evaluation (N=15, GPA ≥ 3.25): mean pre-test = 56.18, SD = 5.4, post-test =63.29 SD = 5.8
   Field trial (N=30, GPA ≥ 3.25): mean pre-test = 54.17, SD = 3.3, post-test = 71.42, SD = 4.6
9) Revise Instruction
   Chapter 3 are the revisions to the content or substance of teaching materials, and revisions to the methods used in using teaching materials because the average mastery of students after the post is only 46%, whereas the pre-test result is 40%, resulting in a less significant increase.
10) Design and Conduct Summative Evaluation
    The effectiveness of teaching materials compiled by Learning Economic Models Test (LEMT) was conducted through the use of 80 multiple choice questions, each with 4 answer options that have been tested in Class B (N = 20, GPA ≥3.25), with different power and difficulty "adequate". LEMT is used with quasi-experiments in order to make decisions about the effectiveness of teaching materials and the feasibility of the instructional design model (Karakoc, 2016), (Marham & Rusmono, 2021), & (Deti, Husna, & Anaperta, 2021).

The above details showed that as prospective educators, all students of the economic education program require pedagogic competence as a provision for teaching after graduation (Peters-burton & Stehle, 2019). To carry out their duties as educators, the students should master pedagogic competence in order to have the ability to prepare teaching materials that will be taught and to choose strategies, models, and learning methods that are considered relevant (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013). (Deti et al., 2021). Stated that the empowerment of educator competence affects the performance of educators and the quality of education (Tuomi, 2018). (Rokhmah & Subroto, 2019) Found that knowledge of learning strategies, attitudes, and motivation of educators directly affect the results of learning. Increasing the competence of educators is very important because educators are the spearhead in implementing education in schools (Barkley & Coffey, 2018).

Learning in Higher Education is currently based on Student Active Learning- student-centred learning so that students participate actively in the learning process (Ordu, 2021). That way, they can develop independent ways of learning and play a role in the planning, implementation, and assessment of the learning process itself (Khoiriah, Jalmo, & Abdurrahman, 2016). Students' experience is preferred in deciding the starting point of learning activities, such learning can be carried out through various learning models (Matsum, 2021). Each model applies a variety of approaches to teaching that are used

in conjunction with certain strategies and methods, as well as the various teaching mediums that are accompanied by environmental arrangement in such a way that the learning process becomes active, innovative, creative, efficient and fun. Therefore, students need study materials related to innovative learning models (Thohiri, Yuni, & Hastuti, 2022).

One of the characteristics of students found is that 100% of students have a positive attitude by seeing the courses of economic learning models as very important to support future career success (Wahyuni, Djatmika, Widjaya, & Wahyono, 2021). This shows how the development of teaching materials for this course has high urgency, and careers can be defined as a series of activities in work that provide continuity, position, and meaning in a person's life history (Rahayu, Ulfatin, Wiyono, Imron, & Wajdi, 2018). Career choice is a life choice that will determine its performance as a teacher in the future. Dekawati's research shows that further education, professional training, and participation in scientific forums together give effect to teacher performance by 61.62% (Barkley & Coffey, 2018) & (Wahyuni et al., 2021).

The achievement of learning outcomes that have been set for the courses of economic learning models is in accordance with what was proposed by Yaumi (Sudarmiani, 2020). The first step in developing good learning materials is choosing the topic suitable for learners' needs, materials, ease of reach and usage (Onukwu, Tiebebedigha, & Okojide, 2020). In addition, when choosing the topic, one has to consider the aspects of attractiveness and the suitability of the topic with the content of learning materials that include sub-topics to be studied and developed (Wollman-Bonilla et al., 2008). Through this research, the materials that have been developed include 8 (eight) study materials, including: (Chapter 1) learning and learning theories, (Chapter 2) basic concepts of learning models, (Chapter 3) scientific-based learning models, (Chapter 4) innovative learning models, (Chapter 5) cooperative and collaborative learning models, (Chapter 6) problem-based learning, (Chapter 7) contextual-based learning model, and (Chapter 8) integrated learning model (Oktaviani, Cahyana, & Purwanto, 2020), (Hendri & Anugrah, 2019), & (Davis & Jones, 2014).

To measure the effectiveness of teaching materials that have been developed, formative tests were used for either one-to-one evaluation, small group evaluation, and field trial (Uzunboylu & Koşucu, 2017). The results show that the results of One-to-One Evaluation (N = 4, GPA ≥3.25): mean pre-test = 48.31, SD = 3.7, post-test = 81.24, SD = 4.2, Small group evaluation (N = 15, GPA ≥3.25) : mean pre-test = 56.18, SD 5.4, post-test = 63.29, SD = 5.8, and field trial (N = 30, GPA ≥3.25): mean pre-test = 54.17, SD 3.3, post-test = 71.42, SD = 4.6. The above calculation results show that with formative test, the following information is obtained: first, by self-study, the mastery of study materials in each chapter shows an increase although varied; and second, the study material is quite effective in serving as the subject for achieving learning outcome of the courses of economic learning models although it needs to be revised, especially the study materials Chapter-3-the increase is not significant (Rokhmah & Subroto, 2019) & (Darling-Hammond, 2017).

The second phase of research uses quasi-experiment. The experimental class was treated using 8 chapters for 8 meetings. In the 9th semester, the mid-semester exam (UTS) was based on Learning Economics Models Test (LEMT), with Students' Cognitive Achievement presented in Table 1 below.

Table 1. Differences mean scores of students' cognitive achievement taught with teaching materials and those taught without teaching materials.

Group	N	Mean	SD	Df	Mean Different	Sig. (2-tailed)	Decision
Experimental Class	37	82,2703	3,29687	36	27,27027	,000	Reject Ho
Control Class	35	78,2571	1,89958	34	23,25714	,000	

Table 1 above shows that the experiment class mean is higher than the control class mean. At 0.05 level of significance, the null hypothesis was rejected, the test of the null hypothesis shows that there is a significant difference between the mean students' cognitive achievement scores of students

with the teaching materials and those taught without teaching materials (Betzalel, Penso, Navon, & Fetaya, 2022), (Rowe et al., 2015), & (T. N. Martin, 2019).

In line with his research, he concluded that teaching materials provided students with social life (Laipaka & Sarwoko, 2011). Furthermore, the results also displayed that the resulting product can improve student learning outcomes since there are differences in learning outcomes between the classes treated with teaching materials and the classes that are not given teaching materials (Barkley & Coffey, 2018). The latter is in accordance with the study that focused on a 4-D model (define, design, develop, and disseminate) and concluded that the use of teaching materials had an impact on student learning outcomes (Rokhmah & Subroto, 2019). The first large group, which contained 86 students, gained 84.38% mastery learning. Meanwhile, the second group test, which also contained 86 students, obtained 85% of mastery learning (Changwong, Sukkamart, & Sisan, 2018).

This finding was supported by the findings of (Al-Abyadh & Abdel Azeem, 2022), (Kanokorn, Pongtorn, & Sujanya, 2014), & (Massa, 2014) that stated that teaching materials facilitated abstract concept learning by helping students to concoct ideas and also stimulate their imagination. Moreover, this finding equally confirmed the view of (Sariwulan & Pujiastuti, 2019), (Wahyuni et al., 2021), (Spoettl & Tūtlys, 2020), & (Häkkinen & Mäkelä, 1996), who previously stated that the use of teaching materials made teaching effective because it allowed learners to participate actively in teaching in the classroom, which then lead to improvement of achievement.

4. CONCLUSION

Based on the results of the article review, it can be stated that each researcher has the same goal of improving the ability to reason with students by developing test instruments. This is motivated by the phenomenon that the ability to think and the reasoning power of the Indonesian people is still relatively low. The prototype results of the questions generated in the study are valid and practical. It is hoped that with more and more research to improve students' thinking skills, an appropriate test instrument is produced. Then for the next research, it is recommended to have a study on the implementation of students' thinking skills for university students and lecturers.

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