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Development of e-learning in improving student understanding of education management subjects based on cooperative learning

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ABSTRACT

The research objective was to determine the effectiveness of learning in improving student learning outcomes in Education Management courses by developing a learning management system (LMS). The decline in educational administration student learning outcomes in courses is because the media used so far has not been optimal. This is the initial cause of low learning outcomes. Urgency, there is a gap between theory, reality and expectations, so, it is necessary to develop E-Learning to improve the learning process for Education Management and Educational Psychology Orientation courses. Research and Development (R&D) research method with the ADDIE strategy. The research subjects were the Educator Management course and the objects were 35 postgraduate educational administration students. Data collection techniques with product validation, instruments, pre-test and post-test. Engineering analysis, needs analysis, design, development, testing and evaluation. Data validation results, tests and assessment instruments are analyzed in stages until the product is declared valid, practical and effective. As a result, the score of the technology expert is 92.13, the learning model expert is 91.43, the peer assessment is 94.02, and all the assessments given are interpreted very well. In small trials, the mean post-test result was 88.40. Large group trial mean 90.83. The difference in the scores of students who use the product and those who do not use the product has a difference of 18.63. In conclusion, the developed product is capable of significantly increasing student learning outcomes in education management courses using E-Learning and is very effective.

KEYWORDS

E-Learning Development; educational management; psychological orientation

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Introduction

Technology becomes a tool in the learning process (Yang et al., 2022). Technology is a means of communicating with students in teaching and teaching staff can convey the entire administration of the educational process through technology (Haleem et al., 2022). But not a few found the problems faced by students and teachers when communicating (Le et al., 2022). Difficulties arise when the learning process is carried out, starting from the internet which is often disconnected and devices in the media which are disrupted (Jääskä & Aaltonen, 2022; Kasneci et al., 2023; Davy Tsz Kit, Luo, and Chan, & Chu, 2022). Education currently uses a lot of media such as Zoom, Teams, and Google Meet as a tool and is the easiest for students to accept at school (Stecuła & Wolniak, 2022; Estrella, 2022; Zen, Reflianto, Syamsuar, & Ariani, 2022; and Fujs, Vrhovec, Žvanut, & Vavpotič, 2022). Whereas higher education provides a lot of administration and requires media that can store all information starting from lesson plans, materials, assessment rubrics, videos and student assignments that must be stored properly (Al-Amin, Zubayer, Deb, & Hasan, 2021; Baumann & Lucy, 2021; Lapitan, Tiangco, Sumalinog, Sabarillo, & Diaz, 2021). In higher education today many use the media learning management system (LMS) (Y. H. S. Al-Mamary, 2022a). Every tertiary institution uses a learning management system (LMS) in the hope of improving the learning process and improving student learning outcomes (Almutairi et al., 2022) . But the facts are different, in 2021 the learning process in tertiary institutions has decreased learning outcomes, from the survey there was a 36% decrease and 67% reported difficulties in using media. The lecturer believes that the use of a learning management system (LMS) requires development (Espinosa-Navarro et al., 2021; and (Saide & Sheng, 2021). Another fact, in 2022, the use of a learning management system (LMS) is still far from expectations, 62% of students think they will still experience difficulties in the learning process by using a media learning management system (LMS). Students have difficulty communicating, saving assignments and accessing material provided by lecturers (Öğrencilerinin ', Vatandaş' Kavramı, & Görüşleri, 2013; Smirani, Yamani, Menzli, & Boulahia, 2022 and Gopinathan, Kaur, Veeraya, & Raman, 2022). While the lecturers themselves experience obstacles in preparing material and putting it into the learning management system (LMS) (Sulaiman, Mahomed, Rahman, &

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Hassan, 2022; and (Y. H. S. Al-Mamary, 2022b). The opinions of lecturers and students are in line, that in the use of learning management systems (LMS) there are quite serious problems.

In the needs analysis, this study asked lecturers about problems that were often encountered, the Education Management lecturer answered that the use of a learning management system (LMS) required complete learning tools, such as modules or teaching materials, assessments, rubrics, division of tasks, division of groups and collection of student assignments, but the constraints so far require quite a long time to present all the expected learning tools (Hutchison, 2019; Lapitan et al., 2021; Yilmaz et al., 2022). As a result, students are not optimal in the learning process. Lecturers are aware of this problem, but due to time constraints, they still mix online and face-to-face learning methods, with the aim of being able to clarify material to students when the learning management system (LMS)-based online learning process is not understood by students. Lecturers realize that it cannot be like this continuously, there must be a solution that can develop learning tools through a learning management system (LMS) in the course Increasing Student Understanding in Education Management and Educational Psychology Orientation courses. Needs analysis was also carried out in this study by looking at the learning outcomes of students who took the Educational Management and Educational Psychology Orientation courses, out of 30 students there were 18 people who had problems and the expected results were not in accordance with the target. When students were asked about the obstacles and difficulties they faced, it was difficult to access material from courses in the learning management system (LMS). The learning process using the learning management system (LMS) is still far from what was expected. The students expect the need for material development and learning process aids and include them in the learning management system (LMS), starting from the lesson plan, materials, assignments or projects that students must work on, quizzes that must be done, assessment rubrics and assessments used in Educational Management and Psychology Orientation courses. The learning model used so far in the Education Management and Psychology Orientation courses is cooperative learning. This model is explained during the face-to-face learning process, students form discussion groups to produce a solution for each problem that exists from each material. However, during the online learning process, group discussions decreased and student learning interest decreased. The cooperative learning model is a model that combines all the understandings involved in the discussion. This model is expected to be developed in the media used (Pareto & Willermark, 2022).

Development theory says that in order to achieve success in the learning process of one subject, it is necessary to develop methods in the media used (Astadi, Kristina, Retno, Yahya, & Agni Alam, 2022; and Degner, Moser, & Lewalter, 2022). According to D'amore, Di Vaio, Balsalobre-Lorente, & Boccia, (2022); Hanzelik, Kummer, & Abonyi, (2022); Caiado, Scavarda, Azevedo, Nascimento, & Quelhas, (2022) to produce the right products and models in online learning, must follow the development steps . In development research the steps taken are the development of ADDIE dengan Analysis, Design, Development, Application and Evaluation (Kennedy et al., 2022; (Anokhin et al., 2022). According to Caporarello & Sarchioni, (2014) this development theory is able to solve all student problems and provide solutions in increasing the expected learning outcomes through products used to help students. The model that is developed in the media used and incorporates the model into the material presented will be able to construct students' minds in understanding the material through an ongoing discussion process. This research is very urgent to do because theories, facts and expectations are not in line, given the problems faced by students and lecturers alike, namely difficulties in the learning process using the media and models that have been used so far (Leidner & Jarvenpaa, 1995; Eyler, 2002).

The aims of the research were: 1) to find out the validity of E-learning and the cooperative model, 2) to find out the effectiveness and practicality of the product and 3) to find out the increase in understanding and improvement in learning outcomes in the Educational Management and Psychology Orientation Courses.

Methods

The method in this research is Research and Development (R&D) with strategies namely Analysis, Design, Development, Application and Evaluation. The development research flow used (Lawson, Longhurst, & Ivey, 2006; Johnson, Laurell, Ots, & Sandström, 2022; and Yu, Abbas, Álvarez-Otero, & Cherian, 2022):

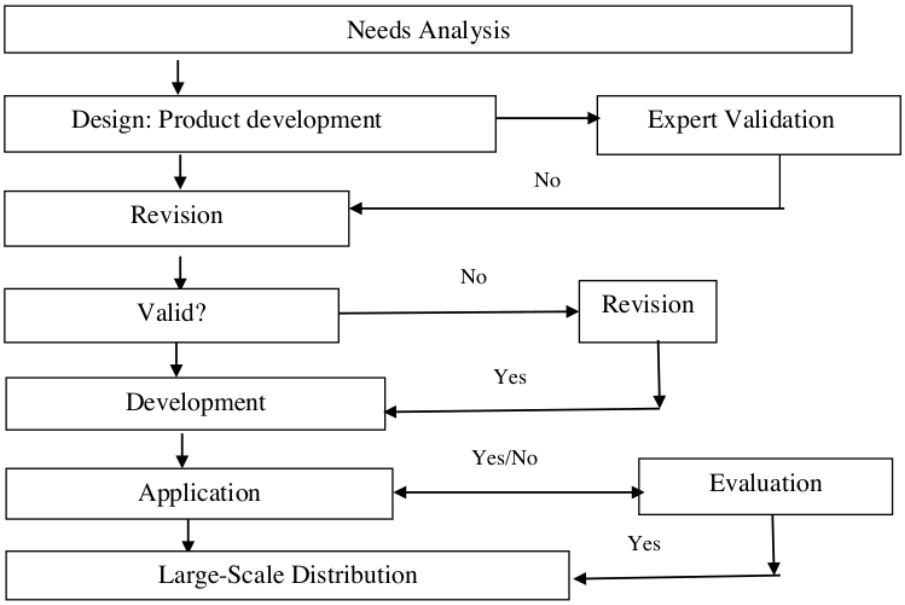

Figure 1. Research Flow

The first stage is by analyzing the needs of educators and students. Research asks educators questions about their obstacles when preparing learning tools and what difficulties they face when implementing lecture material. When analyzing these needs, everything is recorded and becomes the basis for designing the products that are made. The second stage is product design. At this design stage, research designs materials by pouring cooperative models into the materials that have been made. In this design, it is continued by pouring the material and the depth model of the E-Learning media. The third stage of Development. At this development stage, the research validates experts in their fields, colleagues and students. Experts in their chosen fields are technology experts, learning experts and learning model experts. While the selected lecturers are lecturers in the same field who have taught Education Management courses and students who carry out the validation are students who are the object of research. The fourth stage is Application. At this stage, the research conducted a two-stage trial, namely a small-scale trial and a large-scale trial. Small group trials of 10 students and large group trials of one class of 35 students. At this stage pre-test and post-test were also carried out. The final stage is Evaluation. At this last stage, evaluate the product model that has been tested. At this stage an assessment is also carried out by looking at the average post-test increase and becomes the basis for seeing that the product is practical and effective. The subjects in this study were the Education Management course and the objects of research were 35 education management students.

Data collection techniques by distributing products to be assessed and validated by learning experts, technology experts, learning model experts, lecturers as colleagues and students. Data was also obtained by giving pre-tests and post-tests to students. Tests were given to 35 students, students were also asked to fill out research instruments on E-Learning products and models that had been tested on students.

Analysis technique, analysis is carried out on E-learning products and models by analyzing the assessments given by experts, colleagues and students. Each assessment component is summed up and the final average is seen. The assessment given is made in the form of tables and diagrams and forms the basis for interpreting the results. Furthermore, the research evaluated E-learning and the cooperative model based on the results of technology validation, learning model experts, administrative management lecturers and students in small group trials. Data were analyzed using a Likert scale calculation with points 1 to 5. The percentage of success used is the calculation (Tosuntaş, Karadaı, & Orhan, 2015; and Dana, Salamzadeh, Hadizadeh, Heydari, & Shamsoddin, 2022):

$$P = \frac{S}{N} x100\% \quad (1)$$

P = Percentage of Success (%)

S = Total value acquisition
N = Total maximum value

Table 1. Rating Scale of Research Instruments

No	Alternative Answers	Score Weight
1	Very good	5
2	Good	4
3	Enough	3
4	Not good	2
5	Not very good	1

The data obtained is then measured by the interpretation of the score as follows (Doi et al., 2022; Chansanam & Li, 2022; and Fumagalli et al., 2022):

Table 2. Interpretation of Likert Scale Scores.

Percentage	Interpretation
0% - 20%	Not Very Good
21% - 40%	Not Good
41% - 60%	Enough
61% - 80%	Good
81% - 100%	Very Good

Results

The results of this study are learning management system (LMS) products equipped with cooperative learning models. The product has been validated and tested on a small scale, tested on a large scale and evaluated. Products are produced in the following stages:

Needs Analysis

Stages of student needs analysis and lecturer needs analysis. An analysis of student needs was carried out by distributing questionnaires of obstacles and difficulties when preparing for learning, subjects, methods, models, strategies and media tools used as well as student learning outcomes for subjects that were considered to have obstacles. The students were asked about the obstacles and difficulties in the Education Management course, this is because this course requires the right media and methods in conveying the content of the material. The students argue, this course is not enough just theory but blinds direct practice. When learning online, practice in management courses is reduced. The students hope that there will be development of E-Learning with the right model before and when the education management course is implemented. Students feel that when online learning is carried out, understanding and learning outcomes decrease due to inappropriate media and models being used.

The second stage is an analysis of the needs of education management lecturers. When this research asked about the obstacles and difficulties of education management lecturers in the preparation and implementation of education management courses, the lecturers answered the obstacles to the use of E-Learning and the model used was not appropriate. Lecturers hope that the cooperative model that has been used so far can be developed in E-Learning which is used during the learning process. E-Learning that has been used so far is the Learning Management System (LMS). The lecturers hope that this research can develop E-learning and include the cooperative model as a tool in the learning process of education management courses. Lecturers also acknowledged the low understanding of students when learning education management courses and this study gave pre-tests to students to see students' initial abilities. The results obtained are: class A with a pre-test score of 44.22 and a pre-test for class B 36.33.

Design

Course material is compiled and designed using a cooperative learning model and incorporated into the depth learning management system (LMP) used in the learning process so far. This research includes learning implementation plans, materials, cooperative assignments, project assignments, assessment rubrics and assessments of each component. When designing the model, this study paid attention to the expectations of students and lecturers when the needs analysis was carried out. The design process runs for two months until the product is ready to be validated by experts in their fields, starting from technology experts, learning model experts, colleagues and students after the implementation process is complete. The design results are in line with the theory which says that the

product is designed according to the needs of the needs analysis (Bovea & Pérez-Belis, 2012; H. Yu, Tullio-Pow, & Akhtar, 2015; Vonderembse, Uppal, Huang, & Dismukes, 2006; Awan, Sroufe, & Bozan, 2022; Vonderembse et al., 2006).

Development

Early stages in this development, research provides a product to be assessed by technology experts. The validation process is for 2 months until the technology experts think the product is feasible to be tested by other experts. It can be seen that technology experts give ratings above 90, this can be interpreted that the media development carried out in this research is in the very good category. During product validation, experts validated 4 times and suggested many changes from the previous design. Many technology experts provide advice on saving assignments and projects to be worked on by students with the aim that students have no difficulty finding information on assignments for the next meeting. Experts provide an assessment of the learning components in the media at 93.12, media construction at 92.03, models outlined in technology 91.30 and how to present 92.10. The second stage, research provides products to be validated by learning model experts. Learning experts validate 5 times for 2 months, learning model experts provide a very good response to the product developed. Learning model experts assess the suitability of material indicators 91.12, writing language design 92.50, and model suitability in E-Learning 91.33 and model construction 90.80. Of all the components of the assessment, the learning model expert can be interpreted as giving an assessment of all components very well. Based on this assessment, the research continues validation with colleagues, namely lecturers who teach education management courses. The third stage, this research continues validation by providing products to colleagues to evaluate products that have been developed and validated by technology experts and learning model experts. It was found that colleagues also gave very good ratings of all product components that had been developed in this study. Peers gave scores for the writing language component 94.20, material suitability 93.30, Writing Language Design 95.20, Model Suitability 93.08, and construction 94.20. Of all the assessment components given by colleagues, the research can be tested on students with small-scale groups.

Implementation

Small Group Trial

In this implementation phase, the research conducted trials by providing products to students in the learning process. Materials, models, assignments, projects, assessment rubrics and assessments have been prepared in the learning management system (LMS) media. Before the learning process is carried out, the research gives instructions to students to see and access the products that have been developed. The research went on actively for one month and I found no problems with the learning process taking place. At the end of the learning process, the research gives post-tests to students to see the improvements they can get with the help of the products that have been developed. The results obtained by small group students during the trial are as follows:

Table 3. Peer Validation Assessment

No	Indicator	Presentation	Category
1	Learning Component	96.30	Very good
2	Presentation	94.20	Very good
3	Material Suitability	91.25	Very good
4	Writing Language Design	93.40	Very good
5	Model Fit	92.18	Very good
6	Construction	92.22	Very good
	Mean	93.25	Very good

Table 3 shows student assessments of products that have been designed, validated and tested. Students' assessment of the learning component indicators was 96.30, the way of presenting received a score of 94.20, the suitability of the material was 91.25, the design of the writing language was 93.40, the suitability of the model was 92.18, and the construction was 92.22. All indicators assessed by these students are interpreted in the very good category.

Large Group Trial

In this large group trial phase, students are given learning with the help of products that have been designed, validated and have been tested on a small scale to students. Before the learning process is given, pre-tests are given to all students who are the object of research. Then proceed with the implementation of the course with the help of

existing products. During the learning process for this education management course, it lasted for 4 months and during this time materials, models, and other equipment were recorded and corrected in the online media used. In the final stage of learning this course, this research provides post-tests to measure results and sorry for giving products as learning aids. The results obtained by students are as follows:

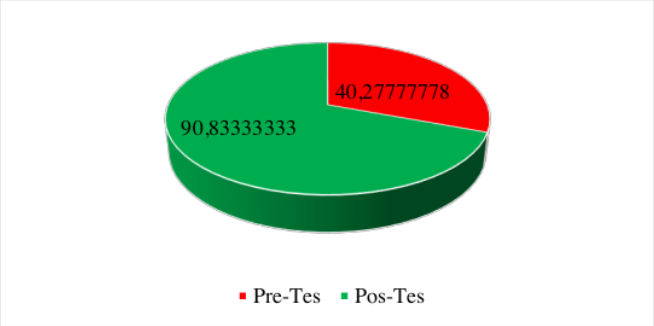

Figure 2. Comparison before and after the learning process with the help of products

In this product trial, research also teaches different classes without the help of products that have been developed. Models and media that have been developed are not used in the learning process in different classes. The results obtained are very different. In the class that did not use the product, the average score at the post-test was 72.20. Research interprets the results obtained in the good category. The difference in the average value of those who do not use the product with those who use the product is 18.63.

Evaluasi

Table 4. Recapitulation of student assessment of products

No	Indicator	Percentage	Category
1	E-Learning Components	93.80	Very good
2	Model Fit	94.13	Very good
3	Presentation	97.68	Very good
4	Material writing language	96.78	Very good
	Mean	91.98	Very good

The assessment given by students in the learning process with the help of products is very good. This can be seen from all the components of the assessment indicators given to students who scored nineties, for the E-Learning component 93.80, suitability, model 94.13, presentation 97.68, material writing language 96.78. This has a positive value for answering problems in the background and being a solution to previous problems in the educator management course. The product developed in this research is in line with the theory that a product that gets a very good value must be able to increase the interest of its users (Laukkanen & Tura, 2022; Al-Emran et al., 2022; and Liu et al., 2022)

Discussion

1. Form valid E-learning methods and cooperative models

The form of the online method developed in this study is the learning management system (LMS). Pre-designed materials, lesson plans, methods, models, learning strategies, assignments, projects, scoring and scoring rubrics are included in the learning management system. This is in line with previous findings that learning tools must be given to students (López-Carril et al., 2022; Hamadi et al., 2022). This learning management system (LMS) product is equipped with a cooperative learning model in which projects and assignments are divided into several groups and given to students in discussing each material in the educator management course. This is in line with the theory that the media used must be equipped with the right model (Thompson et al., 2022; Lumbantoruan, 2022). The learning management system (LMS) product with a combination of cooperative models is considered by experts to be very good. The process of evaluating this product starts with the technology expert by giving an average score for all components of the assessment indicators, namely 92.13. This product is followed by validation by learning model experts. Learning model experts carry out a very detailed validation and pay attention to the cooperative model used in the learning management system (LMS). The learning model expert at the end of the validation gave an average

score for all components, namely 91.43. In the final stage of validating lecturers or colleagues who teach in the education management study program, the results given by colleagues for the products developed are very good with a score of 93.25. The results of this validation are in line with the theoretical opinion, that the product that has been developed must be valid and must be interpreted very well (Al-Emran et al., 2022; Ratti et al., 2022).

2. Effectiveness and practicality of the product

Product effectiveness and practicality can be seen from the learning process and learning outcomes obtained by students during the post-test for all students. Practicality is assessed by students by providing assessment instruments developed from all component indicators. The post-test results obtained by students in small groups were very good at 72.22. While the effectiveness of this product is seen from the assessment of the questionnaire and post-test. The results obtained from large group trials can be interpreted very well. The results obtained by students during the post-test were 90.83 and the questionnaire scores by students were 91.98. This value can be interpreted very well for all components of the assessment. With very good grades given by students, it can be said that products that have been developed using a cooperative model can improve student learning outcomes in education management. This is in line with the theory, that every product must be said to be valid and tested on users and declared effective in improving student learning outcomes (Al-Mamary, 2022a; Calik et al., 2022; Bossman & Agyei, 2022; Nuanmeesri, 2022).

3. Improved understanding and learning outcomes in Education Management and Psychology Orientation courses.

During the large-scale trial, this study also carried out the learning process in the education management class. One class is given a product that has been validated and tested on a small scale and another class is not given a product. The results obtained from the post-test of the two classes for the class that was not given the product were 72.22. However, students who carry out the learning process in education management courses by being provided with E-Learning product assistance and equipped with cooperative models get very good and very high scores, namely 90.83. Students assess the learning process, products and models through instruments of 91.98. This confirms that the learning process for education management courses is very good, runs smoothly and effectively and gets very good learning outcomes. This finding is in line with the theory that products that have been tested on a large scale and have a positive impact can improve student learning outcomes (M. Liu et al., 2022; Y. H. Al-Mamary & Alshallaqi, 2022).

Conclusion

This study concluded that the products that have been produced can improve understanding and student learning outcomes in education management courses. The resulting product has gone through a process, validated and tested on a small and large scale. The results of the assessment from the technology expert were 92.13, validation was also carried out by the modeling expert and colleagues with each value given being 91.43 and 94.02. This product has also been tested on a small and large scale, the average post-test results for small and large groups are 72.22 and 90.83. The evaluation results show that the product interprets very well for use in the learning process of education management courses, both from E-Learning and the cooperative model used.

The strength of this product is that it is a learning management system (LMS) product equipped with a cooperative learning model and complete material in education management courses. The resulting learning management system (LMS) product can be tested by replacing the cooperative learning model with other learning models that are similar to cooperative learning models such as the small group model.

The weakness of the learning management system (LMS) product which is equipped with a cooperative learning model has not been carried out with an experimental approach. This study recommends further research by testing learning management system (LMS) products elsewhere.

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