

Enhancing Educational Courses through A Collaborative Learning Management System: A Study on Effectiveness

by Tukiyo Tukiyo

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Enhancing Educational Courses through A Collaborative Learning Management System: A Study on Effectiveness

Tukiyo*

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Universitas Widya Dharma Klaten, Jawa Tengah, Indonesia; tukiyo@unwidha.ac.id

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ABSTRACT

The aim is to determine the effectiveness of cooperative models based on learning management systems in each educational course. The low student learning outcomes in education courses are due to the lack of development of the models and media used. One of the success factors in learning is the model and use of media. There is an urgency to research and develop the E-Learning learning model, because there are differences between facts, expectations, and theory. ADDIE model research and development (R&D) method. Subjects Courses Educational Subjects and Objects There are 35 education students. Data collection techniques, expert validation, lecturer validation, student assessment with instruments, pre-test and post-test. Data analysis techniques require analysis, design, development, testing, and evaluation. Validation results until the product is declared valid, practical, and effective. The results of the instruments and pretest and posttest assessments were analyzed for the mean and interpreted. As a result, the technology expert's score was 92.13, the learning model expert's score was 91.43, and the peer assessment was 94.02 which was interpreted as very good. In small-scale trials, the average was 88.40. Large group trials averaged 90.83. In conclusion, the product developed has implications for significantly improving learning outcomes and student understanding in each course in educational management education.

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Corresponding Author:

Tukiyo ⁴³
tukiyo@unwidha.ac.id

1. INTRODUCTION

Technology is used as a tool in the learning process in higher education (Vergara et al., 2022); (Gamage et al., 2022); and (Tao & Gao, 2022). Media technology is the most effective tool for conveying information in the learning process of courses in tertiary institutions (Antonietti et al., 2022); (Hurajova

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et al., 2022); (Haleem, Javaid, Qadri, et al., 2022) and (Bruggeman et al., 2022). But the fact is that there is a problem of low student learning outcomes in educational Management courses. Low learning outcomes start when obstacles and difficulties arise when the learning process is carried out, starting from the media used is unstable, devices in the media are disturbed, the media tools used do not support the learning model used to difficulties in operating the media used (Laksana, 2021); (Susanty et al., 2021); (Alt, 2017); (Chen et al., 2009) and (Lapitan et al., 2021). Education currently uses a lot of media such as Zoom, Teams, and Google Meet as a means and is the easiest for students to accept. (Stecula & Wolniak, 2022); (Estrella, 2022); and (Li et al., 2022). However, it is different from tertiary institutions, tertiary institutions have a lot of administration that must be prepared and media as a tool in storing all learning information starting from lesson plans, materials, assessment rubrics, videos and student assignments that must be stored properly and the suitability of the model used (Tamrin et al., 2017); and (Chawinga, 2017). Currently universities use the Media Learning Management System and the learning model used is cooperative learning models with the hope of increasing learning outcomes and the effectiveness of the learning process in courses (Almarashdeh, 2016); and (Laflen & Smith, 2017).

But in fact, in 2021 the learning process in tertiary institutions has decreased, from the survey that was a 36% decrease and 67% thought it was difficult to use media. Meanwhile, students argue that the use of a learning management system requires a fairly long process and the courses must be in the materials and models prepared by the learning management system (Al-Kumaim et al., 2021); (Chan et al., 2021) and (Espinosa-Navarro et al., 2021). Another fact, in 2022, found in a survey the use of learning management system is still far from expectations. There are 62% of students who think they still experience difficulties in the learning process using the media learning management system. Students said that in addition to difficulties in communicating, students also experienced difficulties in saving assignments and accessing material provided by lecturer. While the lecturers themselves experience problems in compiling material and including it in the learning management system. The opinions of lecturers and students are in line, that there are problems in using the learning management system.

In the needs analysis, this study asked the lecturer about the problems that were often encountered, the lecturer answered that the use of the learning management system learning plan started from the modules, assessment rubrics, models used, division of tasks, group assignments and a collection of student assignments. The impact of students is not optimal in the learning process. Needs analysis was also carried out by looking at the learning outcomes of students taking the Education Management course, out of 30 students there were 18 people who had problems and the expected results were not in accordance with the target. When students are asked about the constraints and difficulties they face, these obstacles and difficulties are accessing material from courses in the learning management system and adjusting the learning model used by lecturers.

The learning model used so far in education management courses is cooperative learning. But the fact is that during the online learning process, group discussions have decreased and interest in learning. The cooperative learning model is a model that combines all the understandings involved in the discussion (Najmaei & Saadinejad, 2023); (Matos et al., 2022); and (Owojori & Okoro, 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 et al., 2022). In overcoming this problem it is very urgent to do development research, because there is a difference between the expectations of students asking for understanding using media and models, the theory says that media and models are tools used in conveying lecture material and facts of learning outcomes in low education management courses.

According to Spatioti, Kazanidis, & Pange, (2022) produce the right products and models in online learning, must follow the development steps. In this study, the development step carried out was ADDIE development with Analysis, Design, Development, Application and Evaluation. This development theory is able to solve all student problems and provide solutions to improve expected learning outcomes through products used to help students (Stolz et al., 2022); and (Tukiyo et al., 2023).

The model that is developed in the media used and includes the model in the material presented will be able to construct students' minds in understanding the material through an ongoing discussion process (Phungsuk et al., 2017); and (Haleem, Javaid, & Singh, 2022).

The aims of this study were: 1) to find out the form of the E-learning method and the cooperative model, 2) to know the effectiveness and practicality of the product and 3) to know the increase in understanding and improvement in learning outcomes for education management courses.

2. METHODS

The research method used is research and development (R&D) with the ADDIE model, namely analysis, design, development, Implementation and evaluation (Johnson et al., 2022); (S. Yu et al., 2022); and (Kumar et al., 2022). The subjects in this study were the Educational and the object of research were 35 Education Management students at Widya Dharma University Klaten. 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 research instruments on E-Learning products and models that had been tested on students (Flores et al., 2016); (Campillo Ferrer et al., 2020); (Bryan & Karshmer, 2013); and (Ritonga et al., 2022). The first stage analyzes the needs of educators and students to support the learning process of educational management courses. Everything is recorded and forms the basis for designing the materials, media, and models that form the basis of the problem. The second stage of product design. At the research design stage designing cooperative models and materials and incorporating them into the media used by E-Learning. The third stage of Development. The research validates subject matter experts, colleagues, and students. Selective experts are technology experts, learning experts, and learning model experts. While the lecturers selected were lecturers in educational management courses to carry out validation. The fourth stage is Implementation. The research conducted a two-stage trial, namely a small-scale trial and a large-scale trial. Small group trials of 18 students and large one-class group trials of 35 students. Before the trial the research also conducted a pre-test and after the implementation was completed a post-test was carried out. The final stage is Evaluation. At this last stage, evaluate the effectiveness of learning. In this evaluation an assessment was also carried out by looking at the mean post-test and became the basis for seeing that the product was practical and effective.

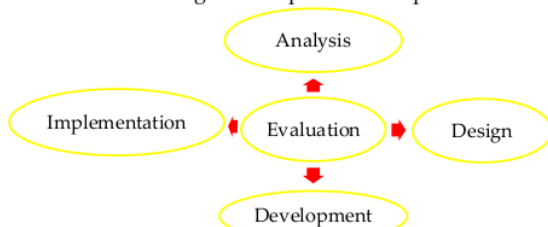


Figure 1. Flow in Research (S. J. Yu et al., 2021)

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 evaluates the E-learning and cooperative models by 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 was used for calculations (de Vries et al., 2022); (Tenório et al., 2016); and (Cachero et al., 2023).

$$P = \frac{S}{N} \times 100\% \tag{1}$$

P = Percentage of Success (%)

S = Total value acquisition

N = Maximum number of values

Table 1. Rating Scale of Research Instruments

Alternative Answers	Score Weight
Very good	5
Good	4
Enough	3
Not good	2
Not very good	1

The data obtained is then measured by the interpretation of the score as follows:

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

The results of data analysis from validation and trial questionnaire instruments will be displayed in. Individual Learning Mastery. To determine individual learning mastery can be calculated using the following equation:

$$KI = \frac{X}{X_{Max}} \times 100\% \quad (2)$$

Information:

KI = individual learning mastery

X = total score obtained by student participants

Xmax = total maximum score

The minimum mastery criteria that apply at the trial site are a reference for stating individual learning mastery. Individual learning completeness if the percentage of correct answers by student participants is $\geq 70\%$. Mastery of Classical Learning. To determine the mastery of classical learning can be calculated using the following equation:

$$KB = \frac{NS}{N} \times 100\% \quad (3)$$

Information:

KB = classical learning mastery

NS = number of student participants using a value ≥ 75

N = number of student participants

Table 3. Classification of Individual and Classical Learning Mastery

Presentase	Interpretation
0% - 39%	Very low
40% - 59%	Low
60% - 74%	Currently
65% - 84%	Tall
85% - 100%	Very high

3. FINDINGS AND DISCUSSION

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Stages of student needs analysis and needs analysis. The students were asked about the constraints and difficulties in the education Management course. The students argued that this course was not enough just theory but blinded direct practice. When studying online, practice is reduced. Students hope that there will be the development of E-Learning with the right model before and

when the education management course is implemented. Students argue that when online learning is carried out, understanding and learning outcomes decrease because the media and models used are not appropriate. When this study asked about lecturers' constraints and difficulties in preparing and implementing courses, the lecturer answered the constraints on using 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. Student pre-test results show in their learning outcomes

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 Table 4 Student Pre-Test Results

Class A	Pre-Test Score	Class B	Pre-Test Score
1	55	1	48
2	25	2	15
3	47	3	32
4	60	4	35
5	70	5	35
6	65	6	25
7	23	7	10
8	17	8	44
9	25	9	15
10	45	10	30
11	65	11	45
12	45	12	23
13	40	13	56
14	35	14	62
15	47	15	42
16	45	16	43
17	60	17	62
18	27	18	32
Total	44,22	Total	36,33

The subject matter is compiled and designed using a cooperative learning model and included in the ceiling of the learning management system used in the learning process so far. This study includes lesson plans, materials, cooperative assignments, project assignments, assessment rubrics and evaluation of each component. When designing the model, this research paid attention to the expectations of students and lecturers during the needs analysis. The design process lasts 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.

Research provides products for tech experts to judge. The validation process is carried out for 2 months until the technology expert evaluates the product as fit for testing by other experts. Based on table 5 it can be seen that the technology expert gave a mean rating of 92.13, this could mean that the media development carried out in this study was included in the very good category.

Table 5. Results of Technology Expert Assessment

Indicator	Presentation	Category
Learning Component	93.12	Very good
Contraction	92.03	Very good
Model Fit	91.30	Very good
Serving Method	92.10	Very good
Average	92.13	Very good

Validation by learning model experts. Learning experts validate 5 times over 2 months. By looking at Figure 2, the learning model expert gave a very good response to the product being

developed. Learning model experts assess the suitability of material indicators 91.12, written 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.

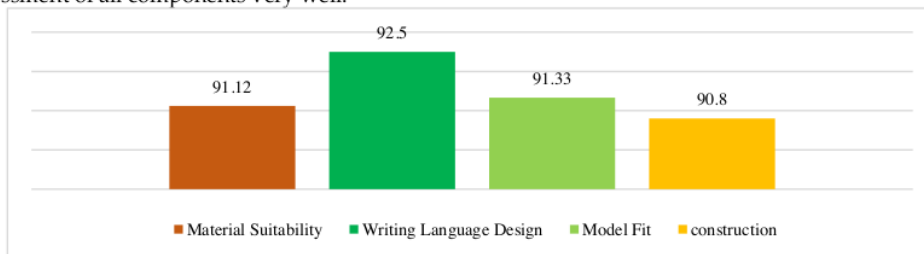


Figure 2. Expert Validation Assessment Learning model

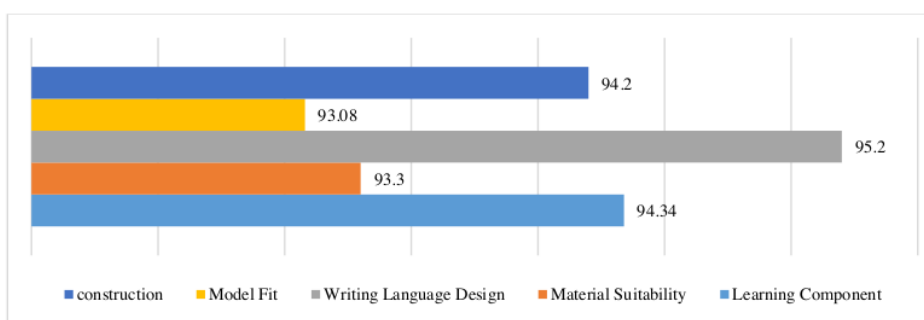


Figure 3. Peer Validation Assessment

Validation for lecturers in Figure 3 shows that colleagues also provide very good assessments of all product components that have been developed in this study. Peers gave scores for the written language component 94.20, material appropriateness 93.30, written language design 95.20, model appropriateness 93.08, and construction 94.20. Of all the assessment components given by colleagues interpreted very well.

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 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. Table 6, it can be seen that the learning outcomes obtained by students when small groups were carried out got very good results. This is because the product being developed, namely E-Learning and the model that has been validated by experts, has shown optimal results with the results obtained by students during trials on ten people. The value of 88.40 can be interpreted very well. The results obtained by small group students during the trial are as follows:

Table 6. Student test results in small groups

Student	Pre-Test Score
1	89
2	95
3	89

4	90
5	89
6	89
7	84
8	86
9	84
10	89
Average	88.40

Figure 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.

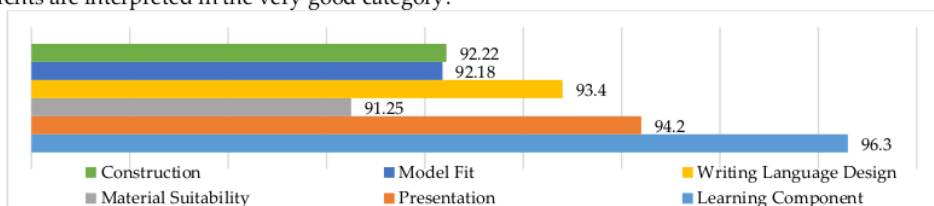


Figure 4. Student Assessment

Large Group Trial. In the large group trial phase, students are given learning with the help of products that have been designed, validated and have been piloted on a small scale to students. Before the learning process is given, a pre-test is given to all students. Then proceed with the implementation of the implementation with the help of existing products. During the learning process this Education management course lasted for 4 months and during this time materials, models and other equipment were recorded and corrected in the online media used. Table 7 comparison before and after the learning process with the help of products with a mean before 40.27 and a mean after 90.83.

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 Table 7. Student Post-Test Results

No	Pre-Test Score	Post-Test Value
1	55	98
2	25	88
3	47	95
4	60	95
5	70	100
6	65	89
7	23	95
8	17	85
9	25	95
10	45	96
11	65	97
12	45	90
13	40	93
14	35	93
15	47	92
16	45	88
17	60	95
18	27	89
19	48	98
20	15	80
21	32	85
22	35	88
23	35	85
24	25	85

25	10	95
26	44	88
27	15	86
28	30	92
29	45	88
30	23	85
31	56	92
32	62	89
33	42	84
34	43	89
35	62	93
36	32	95
Average		40,27
Average		90,83

Evaluation

Figure 5 shows the difference in learning outcomes for student classes who use the product and student classes who do not use the product. The mean of learning outcomes that use the product is 90.83 and students who do not use the product with a mean of 72.22. Students also make an assessment of the instruments that have been provided and the results are as shown in Figure 6, 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 in the 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 is a solution to previous problems in educator management courses.

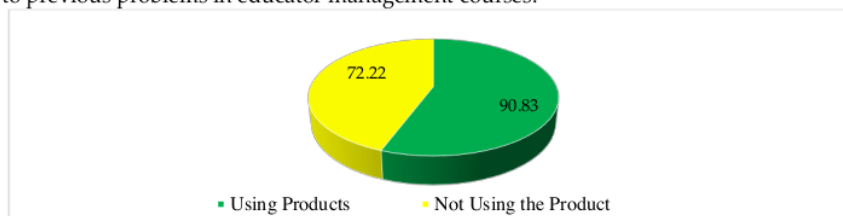


Figure 5. Comparison of learning outcomes using products and not using products

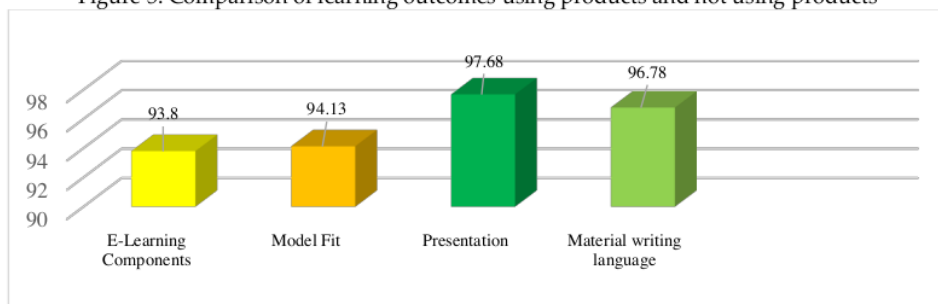


Figure 6. Student assessment of the product

Discussion:

Form valid E-learning methods and cooperative models

The form of the online method developed in this study is a learning management system. Pre-designed materials, lesson plans, methods, models, learning strategies, assignments, projects, scoring and scoring rubrics are included in the learning management system. This product is equipped with a cooperative model that divides projects and assignments into several groups and is given to students in discussing each material in educator management courses. This product has been rated by experts as 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. Given a very good score by technology experts, this study was continued with validation with 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. 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 validation, lecturers or colleagues who teach in guidance counseling rate it very well with a score of 93.25. The online method is proven and in line with the theory Crompton, Bernacki, & Greene, (2020) and Patricia Aguilera-Hermida, (2020) that the developed online media can improve understanding and learning outcomes

Effectiveness and practicality of the product

Product effectiveness and practicality can be seen from the learning outcomes obtained by students during the post-test. The effectiveness of the learning process is measured from the results of the existing post-test from table 7 with a mean value of 90.83. Meanwhile, practicality is measured from students' responses and assessments of the learning process through the results of the instruments in Figure 6. Student assessment in the e-learning component is 93.80, model fit is 94.13, model presentation and media is 97.68 and language use is 96.78. These findings indicate that in developing learning models with the help of learning management systems it has been said to be effective and practical in the learning process in the classroom by paying attention to the models contained in the material and implemented through the media learning management system. This finding is in line with the theory that the model developed in the material can be applied through a learning management system media (Nguyen, 2021), and (Wu et al., 2020).

Increased understanding and increased learning outcomes

From the large-scale trials, the research found learning outcomes in different classes, namely the class that used media, the cooperative model and the Tampa class used media and modules. The results obtained can be seen in Figure 5 from the post-test by a class that does not use the cooperative model and the media is a mean of 72.22. While student learning outcomes in educational psychology orientation courses with a mean of 90.83. This difference is very significant and the use of media and cooperative learning models is very well combined in the media learning management system. This finding also confirms that the learning process for educational management courses is very good and runs smoothly in accordance with the theory and results of previous research that the media is very good to use when learning if the models and materials are combined according to the media used (Lee & Borah, 2020); (Choudhary & Arora, 2021); (Nasir et al., 2021); and (Tukiyo, 2015).

4. CONCLUSION

This study concluded that the cooperative learning model and materials developed and included in the resulting learning management system media can improve students' understanding and learning outcomes in educational management courses. The resulting product has gone through a process, validated and tested on a small scale with a mean of 88.40. The results of the assessment of the technology experts with a mean of 92.13, the validation of modelling experts and colleagues with respective values given a mean of 91.43 and 94.02. This product has also been tested with a mean post-test result of 90.83. The evaluation results show that the product interprets very well for use in the learning process of educational management courses, both from the E-Learning and the cooperative model used. The strength of this product can be tested by replacing other similar learning models with other cooperative learning. The weakness of this product is that it has not been experimental by testing the product elsewhere. This study suggests that E-Learning products and models be mass-developed and tested on a larger scale.

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Conflicts of Interest: There is no conflict of interest in writing this article.

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