Interactive Electronic Module: Is it Beneficial for Learning?

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A R T I C L E   I N F O

A B S T R A K

Rendahnya motivasi dan hasil belajar mahasiswa pada mata kuliah metodologi penelitian. E-modul memiliki potensi besar untuk dapat meningkatkan motivasi dan hasil belajar mahasiswa pada mata kuliah metodologi penelitian. Tujuan penelitian ini adalah untuk meningkatkan motivasi dan hasil belajar mahasiswa tata rias dan kecantikan pada mata kuliah metodologi penelitian melalui implementasi modul elektronik interaktif. Penelitian ini merupakan penelitian quasi eksperimen dengan rancangan pretest posttest control group design dengan subjek penelitian mahasiswa mata kuliah metodologi penelitian. Pengumpulan data dilakukan dengan menggunakan instrumen berupa angket tertutup, angket terbuka dan tes. Analisis data yang digunakan adalah analisis deskriptif kuantitatif, analisis daya pembeda dengan menggunakan Uji T dan analisis deskriptif kualitatif. Hasil penelitian ini menggambarkan bahwa terjadi peningkatan motivasi belajar siswa sebesar 10,17% pada kelas eksperimen yang menggunakan modul e interaktif sedangkan kelas kontrol yang menggunakan modul cetak hanya meningkat sebesar 2,08%. Hasil uji-t menunjukan pada kelas eksperimen terdapat perbedaan yang signifikan Sedangkan nilai Sig (2-tailed) pada kelas kontrol membuktikan tidak terdapat perbedaan. Dapat disimpulkan bahwa modul e terbukti mampu meningkatkan motivasi dan hasil belajar siswa secara signifikan dan modul dapat digunakan untuk pembelajaran metodologi penelitian.

A B S T R A C T

Low motivation and student learning outcomes in research methodology courses. E-modules can greatly increase student motivation and learning outcomes in research methodology courses. This study aimed to increase the motivation and learning outcomes of cosmetology and beauty students in research methodology courses by implementing interactive electronic modules. This research is quasi-experimental with a pretest-posttest control group design with research subject students in research methodology courses. Data was collected using instruments like closed questionnaires, open questionnaires and tests. The data analysis used was quantitative descriptive analysis, discriminating power analysis using the T-test and qualitative descriptive analysis. The results of this study illustrate an increase in student motivation by 10.17% in the experimental class using the interactive e-module, while the control class using the printed module only increased by 2.08%. The results of the t-test showed that there was a significant difference in the experimental class, while the Sig (2-tailed) value in the control class proved that there was no difference. The e-module is proven to increase student motivation and learning outcomes significantly, and the module can be used to learn research methodology.

1. INTRODUCTION

The development of technology that dominates every side of life has an impact on change, including learning activities (Barari et al., 2020). Technology creates an effective and efficient information delivery process in learning (Imansari & Sunaryantiningsih, 2017). Technology is also able to initiate online-based learning updates to learning and teaching methods in education (Humida et al., 2022). This reform then resulted in a rapid transition of the education system (Leonardi, 2020). The tangible manifestations of the current educational transition include changes from conventional learning to online learning that utilizes various information technology features (Arriany et al., 2020). The phenomenon of

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shifting that aims to improve the quality of learning does not only occur in basic education, but also occurs in higher education (Bubou & Job, 2022; Schweighofer et al., 2019).

Technology features not only change the social pattern of education, but also provide opportunities for educators to design learning media that support the achievement of learning goals and quality (Qiu et al., 2022; Urokova, 2020; Wulandari et al., 2021). This condition is in line with the demands of educators who must be able to create creative and innovative learning and with the help of technology, the role of educators is only focus on to be facilitators (Bygstad et al., 2022; Ramdani & Simamora, 2022). The results of the study corroborate that creative and innovative learning based on information technology balanced with good student learning readiness in technology-based learning is proven to contribute to student learning achievement and satisfaction (Amin et al., 2022; Tang et al., 2021). For example, the implementation of android-based mobile learning is able to contribute to learning outcomes (Rahmiati et al., 2020).

Some of the benefits of information technology can ideally improve the quality of learning, especially learning motivation which can then stimulate improved learning outcomes. However, these ideal hopes and expectations have not been able to be realized properly. This can be seen from some of the problems that occur in learning. For instance, technology-based learning cannot always run ideally. On the one hand, technology-based learning is not a single learning structure, but a set of systems that are integrated with technology (Sandars et al., 2020). On the other hand, the implementation of technology in learning also takes commitment and time to create a learning atmosphere that has good flexibility and can be adjusted to the level of student learning speed (Damşa et al., 2019; Law, 2021). This condition eventually triggered the failure of the transformation process and the failure of the technology-based learning goals (Jackson, 2019; Sulistyaningsih et al., 2018).

Other learning problems that does not meet educational expectations also arise amid the massive development of information technology in learning. Several studies describe that low student motivation dominates current learning issues (Awwaliyah et al., 2021; Hutagaol et al., 2022; Ramdani & Simamora, 2022). This condition is caused by several factors such as limited and sometimes irrelevant learning resources (Rahiem, 2020), there is no proper learning media innovation, learning still seems conventional, and does not involve elements of connection and virtual in learning (Moustakas & Robrade, 2022). This condition is also reinforced by educators' complaints stating that increasing student learning motivation is not a simple thing so innovative actions are needed in designing interesting media and learning materials (Alqahtani & Rajkhan, 2020; Munzil et al., 2022; Ramdani & Simamora, 2022).

Low learning motivation can be observed from indicators of less active learning situations, students are passive and do not take the initiative to find learning resources other than those provided by the teacher. This then results in a decrease in student learning outcomes (Zaharah & Susilowati, 2020). Learning outcomes are important to pay attention to because this is a standard for measuring student achievement in mastering teaching material (Imansari & Sunaryantiningsih, 2017).

Low learning motivation and learning outcomes can be triggered by several factors such as learning is still carried out traditionally (Sulistyaningsih et al., 2018), Learning resources have not developed according to technological advances (Munandar et al., 2021), lack of interactive and innovative learning media (Pramana et al., 2020; Ramdani & Simamora, 2022), as well as teaching materials that are not in accordance with the character and needs of current students (Wulandari et al., 2021). This condition then closes the opportunity for students to learn independently and increase understanding through technology that develops rapidly in the process of absorbing teaching materials (Puma et al., 2022).

Problems related to low motivation and learning outcomes are also in line with the results of preliminary studies conducted by the author. This problem also occurs in students of Cosmetology and Beauty, Faculty of Tourism and Hospitality, Universitas Negeri Padang. However, low motivation and learning outcomes occur in research methodology courses. This happens because the research methodology course is one of the courses that is difficult for students to understand. This condition should no longer occur in the era of information technology which provides a lot of convenience in learning.

In response to existing learning problems, it is necessary to have the right learning alternatives for current students (Munandar et al., 2021). This research offers a solution in the form of implementation of e-modules to increase student motivation and learning outcomes. E-module can be defined as a module in electronic form equipped with images, text, animation, video features that have the opportunity to overcome space and time limitations (Mutmainnah et al., 2021). E-module is predicted to contribute to solving these problems because students have the opportunity to actively learn according to their own learning speed and way of learning (Arriany et al., 2020). The features presented in the e-module also make it easy for students to increase their understanding of the material without barriers of place and

time (Wulandari et al., 2021). Furthermore, the contribution of e-module is not only improved in terms of cognitive, but also able to maximize the achievement of the affective side of students (Asrial et al., 2022).

Furthermore, e-module is arranged simply, systematically, measurably, interestingly, interactively and equipped with clear learning stages that lead students to achieve understanding (Suartama et al., 2022). The completeness of e-module in the form of introductions, material presentations, self-evaluation sections, and conclusions also provide a clear learning direction for students (Abdunabiyevna & Mansur, 2019). These various facilities will be able to increase student learning motivation which continues to improve learning outcomes (Zaharah & Susilowati, 2020).

Based on the elaboration of the benefits of e-modules in learning, the e-module has great potential to be able to increase student motivation and learning outcomes in research methodology courses. So, the purpose of this study is to increase learning motivation and learning outcomes of students of the Department of Cosmetology and Beauty, Faculty of Tourism and Hospitality, Universitas Negeri Padang in research methodology courses through interactive e-module. The novelty of this study lies in the feature e-module of the research methodology to be implemented. Previous studies developed e-module with image and video features only, but in this research methodology module is equipped not only with pictures and videos but also added podcasts that discuss methodological material with a more relaxed and fresh presentation.

The novelty of the podcast feature in this research module is based on the results of research which states that learning podcasts are easily accessible, increase engagement, and can be listened to along with doing other activities (Riddell et al., 2020). Posdcast also creates learning with full comfort, fun and can be repeated according to learning needs (Barnes et al., 2020; Fatika & Rahayu, 2021). Furthermore, podcasts can also create edutainment, which is a learning activity as well as entertainment which of course remains efficient in absorbing learning material (Malecki et al., 2019).

The purpose of this study is to improve student motivation and learning outcomes through e research methodology module. The hope of this research is that the convenience facilities provided by information technology can improve the quality of learning such as achieving motivation and learning outcomes with an e module approach packed with information technology features. Furthermore, the results of this study are expected to provide solutions for educators in overcoming educational problems in the form of low learning motivation and learning outcomes.

2. METHOD

This research type is a quasi-experimental research. The approach used in this study is a mixed research approach that combines quantitative and qualitative approaches. The research design used was pretest posttest control group design. This research process begins with a pretest activity to measure student motivation and understanding related to research methodology. Furthermore, students in experimental classes will be given learning treatment by utilizing e module of research methodology. While in the control class, learning is designed with conventional learning concepts with printed modules. After the learning treatment process, students will follow the posttest stage to measure motivation and learning outcomes after treatment. The participants of this study were the students of the Department of Cosmetology and Beauty, Faculty of Tourism and Hospitality, Universitas Negeri Padang. Students involved in this research are students who are members of the Research Methodology course with a total of 15 students in the experimental class and 15 students in the control class.

Data collection is carried out by using three types of instruments. The first instrument is a closed questionnaire that serves to measure the level of student learning motivation while the second instrument is a test that aims to measure student learning outcomes. Multiple choice test questions (objective) are used to measure students' achievement before and after using the e modul. Then, the third instrument is an open questionnaire which aims to analyze student responses in experimental classes to the implementation of interactive e-module to increase student motivation and learning outcomes. The instrument grid will be displayed on Table 1, dan Table 2.

Table 1. Instruments Grid of Closed Questionnaire Measuring Learning Morivation

No	Aspect	Indicator	Item Number	Total Item
1	Desire to succeed	Spirit of self-learning	1	3
		Study outside of class hours	2	
		Hone skills for future preparation	3	
2	Learning needs	Choose teaching resources as needed	4	3
		Looking for alternative learning resources	5	
		Utilize a variety of learning resource formats	6	

No	Aspect	Indicator	Item Number	Total Item
3	Initiative	Utilizing information technology in learning	7	2
		Choosing the right learning media	8	
4	Hope	Taking the time to study the material	9	3
		Explore the material to prepare for the future	10	
		Adapt to technological developments in learning	11	
5	Perseverance	Take the initiative to train yourself with material questions	12	5
		Repeating learning materials	13	
		Complete tasks on time	14	
		Add learning resources	15	
		Prepare well for exams	16	
6	Toughness	Looking for ways to overcome learning difficulties	17	4
		Listen well to the material	18	
		Looking for alternatives in overcoming learning difficulties	19	
		Prepare understanding well to face the future	20	
Total				**20**

Table 2. Instruments grid of Open Questionnaire Measuring Student's Responses

No.	Aspect	Indicator	Item Number	Total Item
1	Media	E module cover design	1	4
		Material layout design	2	
		Quiz view	3	
		Display of learning video presentations	4	
2	Material	Clarity of learning outcomes	5	5
		Suitability of the material with the learning outcomes	6	
		Suitability of the order of presentation of learning material	7	
		Suitability of quizzes with the material and learning outcomes	8	
		Compatibility of video material with learning material and learning outcomes	9	
3	Use	Level of ease of access and use	10	6
		The level of clarity of learning instruction	11	
		The level of ease of explanation of the material to understand	12	
		Use of language	13	
		The level of ease of access to learning quizzes	14	
		The level of ease of access to learning videos	15	
Total				**15**

The feasibility test process of the questionnaire instrument is carried out in two ways, namely validity tests and reliability tests of instruments. Then, the feasibility of the instrument test is carried out by analyzing the level of difficulty of the questions and the differentiation between test questions. The data analysis used in this study was classified into three based on the type of data obtained. The first data analysis is quantitative descriptive data analysis. This data analysis was applied to closed questionnaire data describing the level of student motivation. The results of this analysis will describe the level of student motivation before and after learning in the experimental class and also the control class.

The second data analysis uses T test analysis, namely paired sample t test and also independent sample t test. This test is applied to test result data that will measure learning outcomes. Test data includes pretest and posttest in experimental class and control class. This T test aims to analyze whether there are significant differences from each component of the test data. Before the T Test is carried out, an

analysis prerequisite test is first carried out which includes a data normality test and a data homogeneity test.

The paired sample t test is used to analyze the difference between pretest and posttest values both in the experimental class and in the control class. Furthermore, the independent sample t test is used to analyze whether there is a significant difference between the posttest results in the experimental class and the control class. The last data analysis is qualitative descriptive analysis. This analysis was applied to data obtained through open questionnaires. This analysis aims to describe student responses, suggestions and input to the implementation of research methodology e-module in order to increase student motivation and learning outcomes.

3. RESULT AND DISCUSSION

Result

The results of quantitative descriptive analysis describe the level of student learning motivation. This condition is measured before and after students participate in a series of lecture activities both in the experimental class and in the control class. In the lecture process, students will experience the implementation of the interactive e-module of research methodology in the experimental class and also the printed module in the control class. The results of the descriptive analysis related to the average value of student learning motivation are presented in Figure 1.
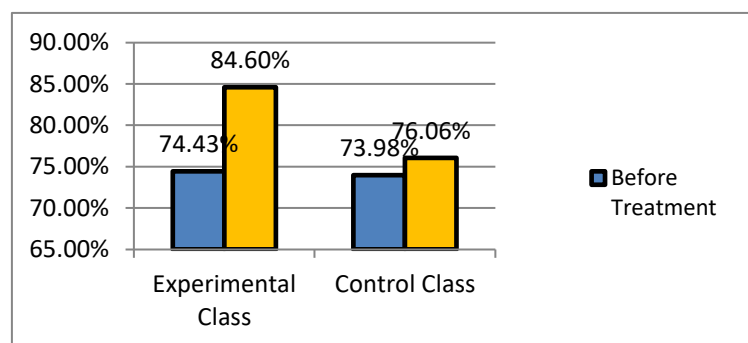

Figure 1. Diagram of the Level of Student Learning Motivation

Data on student motivation levels were then compared with category tables. Through this comparison process, it can be known the category of student motivation levels. The data also showed that there was an increase in student motivation by 10.17% in the experimental class. Before the treatment was carried out, the level of student motivation was in the good category then after being given treatment the level of student motivation increased in the very good category. Student motivation in the control class also increased by 2.08%. However, on the category side, student motivation in the control class did not increase in terms of category, namely the level of motivation before and after treatment was still in the same category, namely the good category.

The prerequisite test of the analysis is carried out before the hypothesis test stage is carried out. The prerequisite analysis tests used in this study include normality tests and homogeneity tests. The normality test and homogeneity test were carried out with the help of the IBM SPSS application program. The Normality test is performed with the Shapiro-Wilk test. The results of the normality test showed in Table 3.

Table 3. Results of Normality Test

No.	Item	Sig.	Sig. Level	Conclusions
1	Pre-test of Control Class	0.576	0.05	Normal
2	Post-test of Control Class	0.923	0.05	Normal
3	Pre-test of Experimental Class	0.367	0.05	Normal
4	Post-test of Experimental Class	0.225	0.05	Normal

The normality test data described that the value of sig. On all data items value were higher than the significance level value which is 0.05. It can be concluded that all research data items are normally distributed. The next stage in the pre-analysis test is the data homogeneity test. The results of the data

homoegnitity test describe the sig value 0.923. The value is then consulted with a significance level value of 0.05. The data shows that the value of sig. the homogeneity test results are higher than the significance level value so that it can be concluded that the research data is homogeneous.

The next stage of data analysis is the hypothesis test of research data. This test can be performed because the prerequisite test of the analysis has been met. Hypothesis testing is performed using the t test. The series of hypothesis tests begins with the presentation of descriptive data from student learning outcomes based on the results of tests that have been conducted. The descriptive data showed in Table 4.

Table 4. Average Data of Pre-Test and Post-Test Scores

No.	Class	Average Value	
		Pre-Test	**Post-Test**
1	Experimental Class	55.63	71.90
2	Control Class	56.52	59.28

The description of test result describes the average value of student learning outcomes both at the pre-test stage and at the post-test stage in the experimental class and also the control class. The descriptive data certainly cannot be used as a basis for making conclusions related to the hypothesis proposed. The next step is continued with the stage of hypothesis testing with a t test. The first t test performed is the paired sample t test. This test was conducted to determine whether there was a significant difference between pre-test and post-test data pairs in each experimental class and control class. The paired sample t test results showed in Table 5.

Table 5. Paired Sample T Test Results

No.	Class	Result of Sig. (2-tailed)	Significant Level	Conclusions
1	Experimental Class	0.000	0.05	There is a significant difference
2	Control Class	0.699	0.05	There is no a significant difference

The paired sample t test data describes the Sig(2-tailed) value in the experimental class as 0.00. The value is then consulted with a significance level value of 0.05. The results show that the sig (2-tailed) value is smaller than the significance level value so that it can be concluded that there is a significant difference between pre-test and post-test in the experimental class. The test data also describes the Sig (2-tailed) value in the control class as 0.699. In line with the previous data, the results were also consulted with a significance level value of 0.05. Sig (2-tailed) values higher than significance level values conclude that there is no difference between pre-test and post-test in the control class. The hypothesis test is followed by an independent sample t test. This test aims to analyze whether there is a significant difference between the final learning outcomes of students in the experimental class and the control class. This independent sample t test was carried out on post-test results in the experimental class and control class. The test results showed in Table 6.

Table 6. Results of Independent Sample T Test

Item	t-test for Equality of Means			
	Sig	**Sig. (2-tailed)**	**Significant Level**	**Mean Difference**
Equal Variances Assumed	0.697	0.034	0.05	12.62

The data from the analysis describes a Sig (2 Tailed) value of 0.034. The value is then compared with a significance level value of 0.05. The comparison results show that the Sig (2-tailed) value is smaller than the significance level value so that it can be concluded that there is a significant difference between the experimental class posttest and the control class. The test result data also showed a mean difference value of 12.62. This value is the difference between the post-test score in the experimental class (71.90) and the post-test value in the control class (59.28).

Based on the overall results of the hypothesis test, it can be concluded that there is a significant difference between the pre-test and post-test scores of student learning outcomes in the experimental class. While in the control class there is no significant difference between pre-test and post-test student learning outcomes. So, the conclusion can be interpreted that a significant increase in learning outcomes only occurred in the experimental class while in the control class there was no significant increase in

learning outcomes. The next conclusion is that there is a significant difference between the post-test scores of student learning outcomes in the experimental class and the control class. This is also reinforced by descriptive data that shows the average post-test value of student learning outcomes in the experimental class is higher than in the control class.

The last research result is a description of student responses to the implementation of the research methodology e-module. The responses of all students are grouped and categorized into three, namely responses related to access to use, material aspects and media aspects. The first response category states that the e-module methodology provides convenience in terms of access because it can be used anytime and anywhere even without using the internet network. This is because the e-module can be installed on the student's smartphone. However, the e-module still requires a little revision because on certain types of smartphones, the e-module cannot be installed like on other types of smartphones in general. The second response category states that the material of the e-module can be learned and understood easily with the support of videos and podcasts elaboration of the material in the e-module. The presentation of material in podcast packaging certainly provides a learning atmosphere with a relaxed and fresh impression. Then, the third response category describes that the media aspect in the e-module has been very adapted to technological developments. This is because the background module has been designed attractively so that it does not only seem plain white like print modules in general. Next, evaluation media in the form of quizzes can be accessed easily and automatically bring up the final results of the quiz work done by students.

Discussion

The results of the study began with a description of data on the level of student motivation. The data showed that there was a significant increase in student motivation by 10.17% in the experimental class. On the other hand, student motivation in the control class also increased by 2.08%. The significant increase in motivation levels in the experimental class is certainly a positive impact of the implementation of the research module e on learning in the classroom. E-modules are designed with clear indicators and learning objectives and facilitated by material summaries, practice questions that play an effective role in making it easier for students to learn the material and making it easier for educators to explain the subject matter(Abidin & Wulandari, 2022; Astra et al., 2020; Fisnani et al., 2020; Pramana et al., 2020).

Increasing motivation through the implementation of e modules is also widely proven from studies that have been conducted with various variations of e module designs. The results of the study stated that e modules play an effective role in increasing student learning motivation(Awwaliyah et al., 2021; Kurniawati, 2020; Ramdani & Simamora, 2022; Wulandari et al., 2021). Some features of e modules that play a role in increasing student learning motivation include images, animations and videos as a medium in delivering learning materials (Gellerstedt et al., 2018; Ramdani & Simamora, 2022). Some of the advantages of e modules further strengthen that e modules deserve to be declared valid and in accordance with the needs of learning and teaching resources for students and educators (Erfayliana et al., 2022; Hutagaol et al., 2022).

The results of the next study describe the learning outcomes achieved by students in the experimental class and control class. From the results of paired sample t test analysis on pre-test and post-test scores in each class, it was concluded that there was a significant improvement in learning outcomes in the experimental class. On the other hand, the control class showed no significant improvement in student learning outcomes. Through this research, it proves the results of the implementation of e modules that are able to improve student learning outcomes are also in line with some of the research results that have been conducted. The first research proved the improvement of learning outcomes through the implementation of e modules. The increase occurred due to the role of e modules in creating student-centered learning (Walsh et al., 2022). Subsequent research also found results in line with e module contributes effectively in improving student learning outcomes because e module can function as a flexible and interactive learning medium and resource that can also be utilized in distance learning(Imansari & Sunaryantiningsih, 2017; Munandar et al., 2021; Mutmainnah et al., 2021; Wulandari et al., 2021).

Furthermore, a study also designed an E-Book integrated with Problem Based Learning which proved feasible to improve student learning outcomes (Aristiani & Agung, 2022). Next, e module is also an effective solution in order to facilitate student learning activities so as to create contextual and meaningful learning and have an impact on improving student learning outcomes(Arriany et al., 2020; Kristalia & Yerimadesi, 2021; Widiantari et al., 2022). Other studies also state that e modules are also proven to be valid, practical and effective to be used as a medium and learning resource (Taqwina et al., 2022). One of the features in the e module that contributes maximally in improving learning outcomes is quizzes. Quis can be used as a characteristic in e modules that embody elements of self-assessment to measure the

achievement of student learning outcomes (Arriany et al., 2020). Quiz which acts as an evaluation tool is placed at the end of each material discussion and is also equipped with indicators that become standards for achieving student learning outcomes (Mahdy & Sayed, 2022; Makruf et al., 2022). With some of the advantages of modules that have been presented so that modules can be used for learning research methodology. With limited time, this module still needs refinement and input for future research related to the research methodology module.

4. CONCLUSION

There are several conclusions in this study. The implementation of the E module of research methodology is able to significantly increase student motivation. Next, the implementation of the Research Methodology E module has also proven effective in significantly improving student learning outcomes. So that students give a positive response to the implementation of the Research Methodology E module, especially on access to use, material aspects and media aspects.

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