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UBIQUITOUS LEARNING AS A LEARNING METHOD FOR ACHIEVING VOCATIONAL COMPETENCIES IN HIGHER EDUCATION DURING THE COVID-19 PANDEMIC

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ABSTRACT

Learning behavior at the higher education level has been disrupted more quickly since the outbreak of the Covid-19. The student-centred learning method which has become a culture in higher education cannot be implemented properly. The purpose of this study was to analyze the effectiveness of online learning by applying the ubiquitous learning method. The effectiveness in this study is to analyze the implementation of learning and the achievement of vocational competencies that can be achieved by students. The research was conducted using a quasi-experimental method. The sample in this study were students of the Informatics Education undergraduate program, Muhammadiyah University of Riau which consisted of 30 students in the control class and 30 students in the experimental class. The instruments used are learning outcomes tests, learning observations and questionnaires. The results obtained from the research, namely the ubiquitous learning method can be used in online learning at the Muhammadiyah University of Riau and in accordance with the learning information system that has been developed. The results of the ubiquitous learning effectiveness test in terms of the statistical test of the average comparison of the posttest results of the experimental and control classes were carried out, it was obtained that $t_{count} = 3.425 > t_{table} = 1.295$ at a significance degree of 0.05. As a form of e-Learning learning method, U-Learning is able to help students to study and attend lectures in areas with low internet network infrastructure during the Covid-19 pandemic.

Keywords: U-Learning, Covid-19, Vocational Competence, Higher Education

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INTRODUCTION

Learning is a key aspect in organizing an educational process. Learning is carried out by educators to students so that there is a process of transformation of knowledge in order to form students' insights and knowledge. In the world of education, learning is carried out with methods and approaches designed to be implemented in achieving the expected learning objectives. The view of the concept of learning that is fundamental and developed by educational experts is the concept of behaviorism and constructivism.

In the view of constructivism, learning is given to facilitate students to build their knowledge by being facilitated by teachers or lecturers through learning activities (Olusegun, 2015). In addition, in learning with a constructivist model, learning activities prioritize the active participation of students in learning (Hamzah, 2009). Based on this theory, it can be stated that with learning activities that focus on students, it can improve the ability of students to understand learning materials and build knowledge concepts comprehensively.

Constructive forms of learning have been carried out at the higher education level in Indonesia. At this level, students take education according to the field of expertise they are interested in, so that mastery of conceptual and practical knowledge is important. The constructive approach taken is to apply the Student Centered Learning (SCL) learning model. The SCL method focuses on student learning activities to be able to synthesize and implement the theory that has been given by educators in this case lecturers to solve related problems (Brouwer, 2019). In addition to this opinion, SCL is also applied through classroom learning in the form of discussions, practicums and experiments with the aim that students are accustomed to dealing with problems ranging from conceptual to contextual from the field of science they are engaged in (Unin & Bearing, 2016; Hamid, et.al, 2013).

Learning behavior at the higher education level has been disrupted more quickly since the outbreak of the Covid-19. The virus outbreak made people unable to move and gather as usual to get the learning process on campus. All higher education campuses have started to implement online learning processes in accordance with the direction of the minister of education and culture since the end of February 2020. Of course, the rapid adaptation greatly impacts the learning culture in Indonesia, which in general still organizes face-to-face or offline learning activities (Erliana, 2021; Sumarmi, 2021). For the reason of preventing the Covid-19 practicum, discussions and experiments cannot be carried out directly.

Based on the researcher's observations on the implementation of online education at the Informatics Education Study Program, Universitas Muhammadiyah Riau, it was found that there are lecturers and students who have not been able to follow the online learning process properly. Some lecturers have to adapt to the conditions and change the Lesson Plan– that has been previously designed. At least there are several problems in the implementation of online learning in higher education. Problems that arise from the results of observations include the uncertainty of learning planning that must be adapted to the condition of lecturers and students, learning that is very dependent on the internet network, decreased student activity in learning and the implementation of learning evaluations that are difficult to do because lecturers are not familiar with online learning evaluations.

Based on these problems, the SCL method which has become a culture in higher education cannot be implemented properly. Educational institutions need to design online learning methods that can be planned to be implemented and their success measured standardly and can facilitate student learning activities. One of the online learning models that can be applied to higher education is the Ubiquitous Learning model (U-Learning).

A ubiquitous learning environment is a situation or setting of pervasive education. Education is happening all around the student, but the student may not even be conscious of the learning process. Source data is present in the embedded objects and students do not have to do anything in order to learn. The implementation of the U-Learning model can improve students' ability to state problems and improve student learning outcomes (Hwang, et.al., 2020).

In another study, it was shown that through U-Learning, students can adjust the learning material given to their learning style (Guabassi, et.al., 2018). In addition to personalizing the material, the achievement of learning outcomes and the ability of students to ask and solve questions, U-Learning can also provide flexibility for students to interact in learning. When learning by using the U-Learning model students could reduce the use of time, and could build a better perception of the material, but in this study there has been no discussion about increasing the student's achievement in vocational competencies (Kong, et.al., 2017). U-Learning can also be a solution for lecturers in exploring problems related to contextual learning materials so that students in this case students can be trained in their ability to do problem solving contextually (Phumeechanya & Wannapiroon, 2014).

Based on the explanation of the problems along with several solutions related to the implementation of U-Learning, in this study the application of U-Learning is implemented as one of the solutions for implementing online learning in the midst of the COVID-19 pandemic to be

able to increase student learning activities and have an impact on vocational competency that were achieved. This research hopefully could provide recommendations for the U-Learning learning model that can be used as a substitute for the SCL method in the vocational learning process in universities during the covid-19 pandemic.

METHOD

The study was conducted to obtain data on the effectiveness of learning with the U-Learning model in terms of the level of student activity and cognitive learning outcomes. To support the implementation of this research, the research was conducted by applying a quasi-experimental method (quasi-experimental) with a two group pretest-posttest design. In this design, the study was divided into a control class and an experimental class. The form of this research design can be described as follows in Table 1.

Table 1. Class division in research

Class	Pretest	Treatment	Post-Test
Experiment	O_1	X	O_2
Control	O_1		O_2

Learning for the experimental class is carried out online by applying the ubiquitous learning model that has been designed with the learning activity approach. In the control class, learning is carried out using online learning methods commonly used by lecturers who are the samples in the study. In the early stages of learning, both classes will be given a pretest in the form of an initial ability test to see the initial abilities of students towards the lecture material that is the object of research. After the pretest data was carried out, then the learning was carried out according to the class criteria and at the end of the study both classes were given a post-test to obtain data on student learning outcomes.

The population in this study is the University of Muhammadiyah Riau in the Informatics Education Study Program. The sampling technique used is simple purposive sampling. This technique is used when a consideration is needed that the sample must be from a certain population, based on characteristics that are known to the researcher. Based on these provisions, the sampling selected based on the results of the pretest that has been given will then be grouped based on the class average. The sample in this study were students of the Informatics Education Study Program class 2020. The subjects that were the object of this research were multimedia technology, which is a group of subject areas of competence in the multimedia field of expertise. The details of the state of the sample in this study are as in the following Table 2.

Table 2. Sample Classification

No	Class	Number of participants	Desc.
1	1A1	30	Experiment Class
2	1A2	30	Control Class

The selection of multimedia technology courses as objects in the application of the ubiquitous learning method because it is a subject with learning outcomes students are able to apply graphic design principles in designing and developing multimedia technology. The learning model applied in this course is project-based learning (PjBL). In the PjBL model, students develop a design campaign project from several issues that are currently happening in the community.

Stages of implementation of the proposed research can be described in the form of a plan of activity stages along with the indicators achieved from each activity. The research was carried out during the period from August to December 2020 which coincided with the implementation

of the 2020/2021 Odd semester learning at the University of Muhammadiyah Riau. The details of the activities in question can be made with the following details in Figure 1.

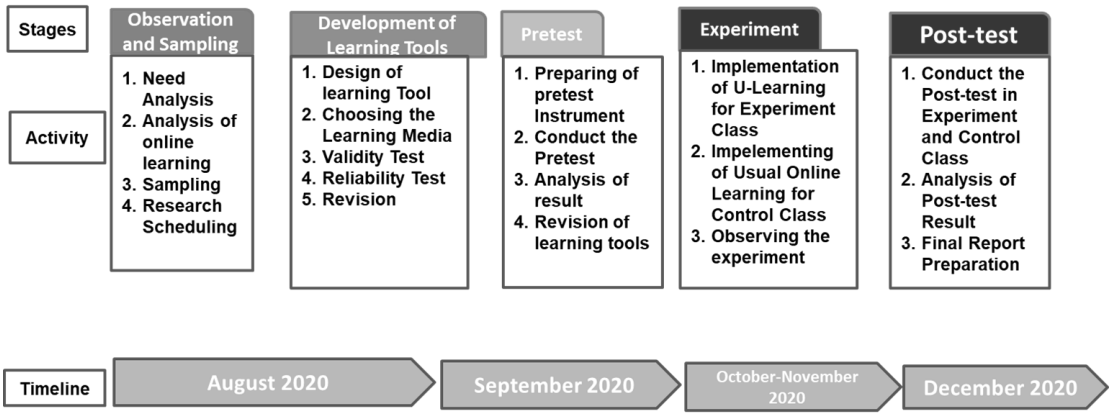

Figure 1. Research Stages

To obtain the data needed in conducting research, a research tool or instrument is needed. The research instrument is a set of tools that can be used to measure something, especially in this research is to measure the effectiveness of a learning. The instruments used in this study include questionnaires, observation sheetsa and Competency Test Questions. The results of testing the research instrument before use can be seen in Table 3.

Table 3. Research Instruments

No	Instrument	Number of Items	Reliabity Grade
1	Observation Sheet	10	0,82
2	Competency Test Questions	10	0,72
3	Questionnaire	10	0,72

The data analysis in this research is descriptive analysis and effectiveness analysis. Descriptive analysis was conducted to obtain detailed data about the results of observations and questionnaires conducted by lecturers during the learning process with U-Learning. Effectiveness analysis was conducted to obtain information about the level of learning effectiveness based on inferential statistical perspective and to answer the hypothesis of the implementation of this research.

The effectiveness analysis was carried out through the analysis of the average test. Before the analysis of the average test is carried out, it is necessary to test the normality of the research data, if the data is normally distributed, then the calculation is carried out using the t-test. The results of the t-test were used to determine the effectiveness of the learning. The decision is that there is effectiveness if $t_{count} >= t_{table}$ with degrees of freedom (db) = 2n-2 and a significance level of 5%. However, if the data is not normally

distributed, then the data analysis is carried out using the two-sample Kolmogorov Smirnov test using SPSS software.

RESULTS AND DISCUSSION

Initial Observation

U-Learning basically has criteria dimensions like other virtual learning (Yahya, et.al., 2010). The dimensions of the criteria in question can be described as Table 4.

Table 4. Comparison Between U-Learning and m-Learning

Criteria	U-Learning	M-Learning
Concept	Learning can be done anytime, anywhere, and with the right material	Learning can be done anytime and anywhere
Material Resistance	Learners can save their learning results	Learning outcomes according to the device used, and depending on the memory of the device
Accessibility	Access to learning materials and activities through cloud technology	Access to learning via wireless technology and mobile networks
Interactivity	Learning interactions can be multi-directional and multi-source	Learning interactions can be done through teachers, and experts according to the learning environment
Adaptibilitas Konteks	The learning system can be adapted to the learning environment through database technology personally and according to the environmental situation	The learning system can access the learning situation by accessing the database
Information Speed	Learners can access information quickly	Students can receive information according to the specifications of the device used

This research was conducted from August to December 2020. The initial stage that has been carried out is to conduct observations and research design. From the design that has been done, it is obtained that the implementation of online learning with the ubiquitous learning method is carried out using the SIKULI application (sikuli.umri.ac.id).

SIKULI is a digital learning platform that has been developed by the University of Muhammadiyah Riau as a quick response to the implementation of online learning during the COVID-19 pandemic. The development of SIKULI UMRI is based on the need for online learning and the ability to access the internet network owned by the Civitas University of Muhammadiyah Riau.

The decision to use the SIKULI application as an electronic learning medium in the implementation of this research is also based on the observations of the research team regarding the available SIKULI facilities and in accordance with the Ubiquitous Learning concept. Observations were made based on aspects of technology, and pedagogy. The results of the observations of each item can be described as Table 5.

Table 5. The Requirement in U-Learning

Requirement	Availability	
	Exist	No
Internet Connection	√	
Devices Adaptibility	√	
Interactivity	√	
Context Aadaptibility	√	
Personalisasi User	√	
Learnability	√	
Data Security	√	
Data Storage System	√	

Based on the data in the table, the SIKULI application that has been developed by UMRI allows it to be used in the ubiquitous learning method. This is because it fulfills the basic aspects needed in U-Learning-based learning. The display of the SIKULI application can be seen in Figure 2.

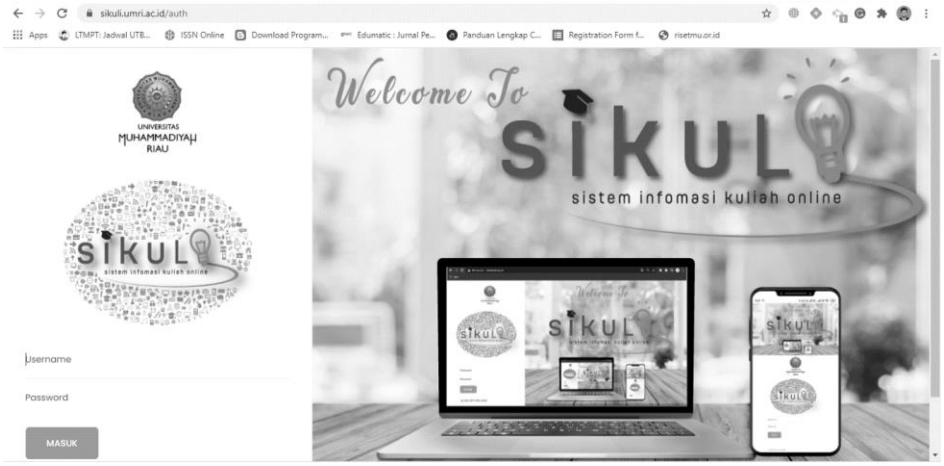

Figure 2. Login Page at sikuli.umri.ac.id

On this page, lecturers and students can access the SIKULI application to start lectures by using NIM for students and NPK/NIK for lecturers. Next, just enter the password according to the customization of each account. Furthermore, students and lecturers can directly access the homepage of their respective SIKULI accounts as shown in Figure 3.

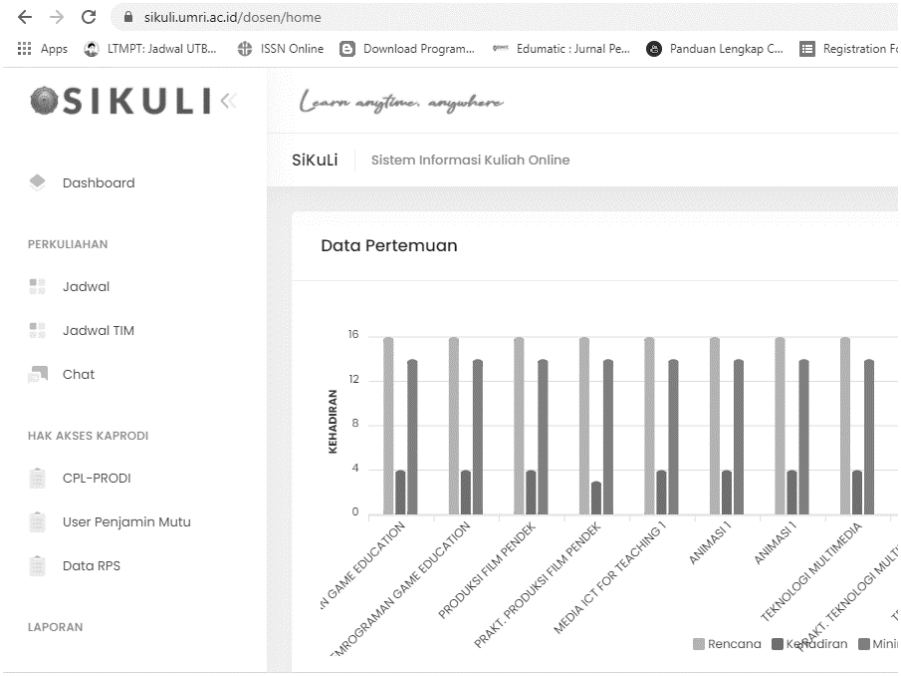

Figure 3. Dashboard of SIKULI

When the user as a lecturer enters the homepage, the lecturer can see the progress of the lecture for which he is responsible. In addition, on the home menu, lecturers can also access teaching schedules, open lecture attendance lists and add learning materials. The lecture schedule for each lecturer has been integrated with the SMART UMRI account for each teaching lecturer.

The following describes the results of observations in terms of learning aspects contained in the sikuli.umri.ac.id system which can be seen in the following Table 6.

Table 6. Requireent for U-Learning Method

Requirements	**Availability**	
	Exist	**No**
Type of Learning	√	
U-Learning Role	√	
Delimitiation	√	
Content	√	
Interaction	√	
Strategi	√	
Activities Freedom of Choice	√	
Evaluation	√	
Customized Learning	√	
Situations Consideration	√	

Pretest

At the beginning of the research, the activities carried out were pretest activities. The purpose of the pretest is to obtain initial data on students' knowledge which then becomes a benchmark in measuring the effectiveness of learning through comparison with the Post Test scores at the end of the study. The results of the pretest can be searched for the number of interval classes determined by the formula K = 1 + 3.33 log 30, the result is 6.099 rounded up to 6. While the class length is obtained from the class range divided by the number of classes (30/6) the result is 6. The distribution of the pretest frequency for the control class can be seen in Table 7

Table 7. Pretest Result : Class Control

No	Interval	F	(%)
1	30 – 41	2	11,8
2	42 – 53	5	8,8
3	54 – 65	15	29,4
4	66 -77	8	32,3
5	78 – 89	0	14,8
6	90 – 100	0	2,9
Total		**30**	**100%**

Based on the Table 7, the categories that are complete or incomplete in learning activities are determined based on the Minimum Learning Completeness (KBM) of 75. Based on the frequency distribution table for the Control Class Pretest, it can be seen that the scores are in the complete category or have fulfilled the KBM as many as 7 students or 20.5% , while the category is incomplete or has not met the KBM as many as 27 students or 79.4%.

The experimental class was also given a pretest to get data on student abilities at the beginning before learning with U-Learning was applied. Because the number of samples is the same, namely 30 students, the number and range of classes are the same. The results of the pretest in the experimental class are as follows in Table 8.

Table 8. Pretest : Experiment Class

No	Interval	f	(%)
1	30 – 41	2	6.67%
2	42 – 53	2	6.67%
3	54 – 65	13	43.33%
4	66 -77	9	30.00%
5	78 – 89	2	6.67%
6	90 – 100	2	6.67%
Total		**30**	**100%**

Based on the data from the pretest results above, it can be stated that in the experimental class the percentage of students who have not achieved the KKM score, which is 75, is 56.67% greater than the students who have achieved the KKM, which is only 43.33%. This result is certainly better than the results obtained in the control class.

Learning Implementation

After the pretest activity, the experimental class and control class carried out learning activities. In the experimental class, multimedia technology lectures are carried out by applying the U-Learning method. In the control class, learning is done by applying the tutorial method as in general online to students. The material given to both classes as a whole is the same, but the difference lies in the assignment model that is adapted to the lecture method. Meetings using the U-Learning method lasted for 14 meetings outside of the midterm and end-semester exams. The same applies to the control class.

In the experimental class, the U-Learning Method is carried out with the initial stage, namely the lecturer provides lecture material in the form of learning videos and modules that can be accessed by students through the online lecture system,sikuli.umri.ac.id. The material provided is designed so that students can be active and interact in the lecture process. Learning videos provided by lecturers can be accessed by students flexibly according to the ability of internet network connections. The type of interaction carried out by students with teaching materials is through activities made by lecturers in the learning process. These activities can be in the form of watching videos, recording learning activities according to the direction of the lecturer and uploading them to the learning system flexibly. In the process of uploading assignments and the comment column as a forum for virtual interaction between lecturers and students, the system is designed to be adaptive in synchronous or asynchronous online communication.

Details of the implementation of online learning by applying the ubiquitous learning method in multimedia technology courses are described in the following Table 9.

Table 9. Online Learning Plan in Multimedia Technology Course

Weeks	**Learning Material**	**Types of Teaching Materials**	**Types of Learning Tasks**
1	Lecture Contract	Contract Document	-
2	History of Graphic Design	Video	Resume
3	Basic Nirmana	Video, Modul Praktikum	Practical Results File
4-5	Color Theory	Video Conference, Tutorial	Color Analysis Videos
6	Design Objects	Video Conference, Tutorial	Paper Analysis
7	Object Analysis	Modul Online	Paper Analysis
8	Mid Test	Ujian online, Video Conference	Mid Result
9-11	Banner Production	Video, Practical Module	Production Result Softfile
12-15	Short Video Production	Video, Practical Module, Progress Report	Group Project Softfile, Progress Report
16	Project result presentation	Video Conference	Group Project Softfile

In order to support the applied U-Learning learning process, the task collection model is made so that it can accommodate various types of files making it easier for students to interact with the assigned tasks. The collection of independent or group assignments at Sikuli can be done by uploading assignments or via the Google Drive link embedded in the assignment form. Through the convenience provided by the Sikuli.umri.ac.id system, the paper has shown support for the demilitiation aspect of the ability and diversity of students in understanding and completing the assigned tasks.

In addition to various file types, in the learning process, student and lecturer interactions can also be carried out through various platforms, starting from the chat column, sending direct messages or also using the video conference integration facility. Students and lecturers can conduct video conferences by connecting directly to the video conferencing application used by lecturers. In other words, simply by opening the cycle, students and lecturers no longer need to open the third application manually, instead they will be directly connected by the e-Learning application.

Based on the results of observations obtained in students' ability to optimize system adaptability, it can be seen in the following Figure 4.

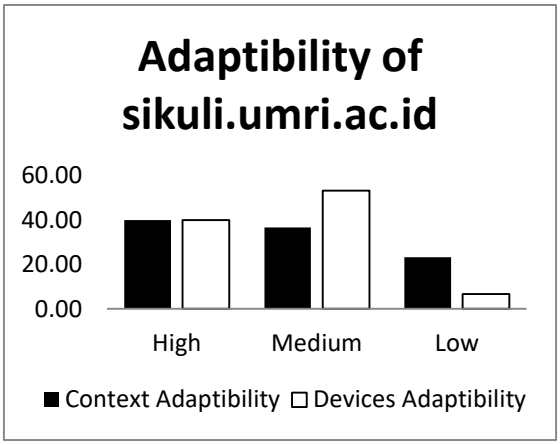

Figure 4. Adaptibility of e-Learning System

The adaptability of the devices used by students in accessing multimedia technology learning by lecturers can be seen from the variety of browsers used by students. Various kinds of browsers as shown in the following Figures 5 are the choice of students to access learning at Sikuli.umri.ac.id.

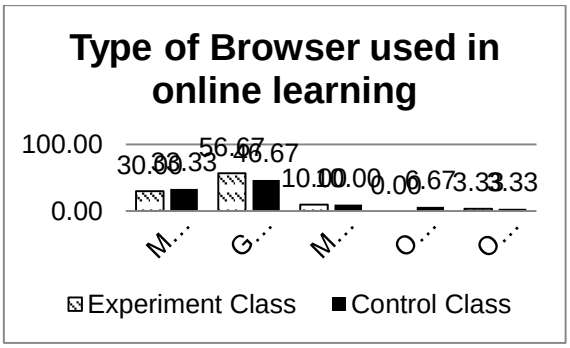

Figure 5. Type of Browser to Access SIKULI

Referring to the data contained in the image, it is found that the browsers that are more often used by students in accessing Sikuli are Google Chrome and Mozilla Firefox growers. Google Chorome is the highest choice because 80% of students in the Informatics education study program use Android-based smartphones so that Google's browser is the default choice in the Android browser system.

The time of assignment and implementation of learning on the ubiquitous learning method is carried out within 1 week. However, if it is considered that the material provided requires an extension of time, the lecturer can arrange an extension of the time of the assignment given. When students want to collect assignments, students simply open the assignment form that has been given and collect related assignments. The display of the task form that appears on the student system is as shown in the following Figure 6.

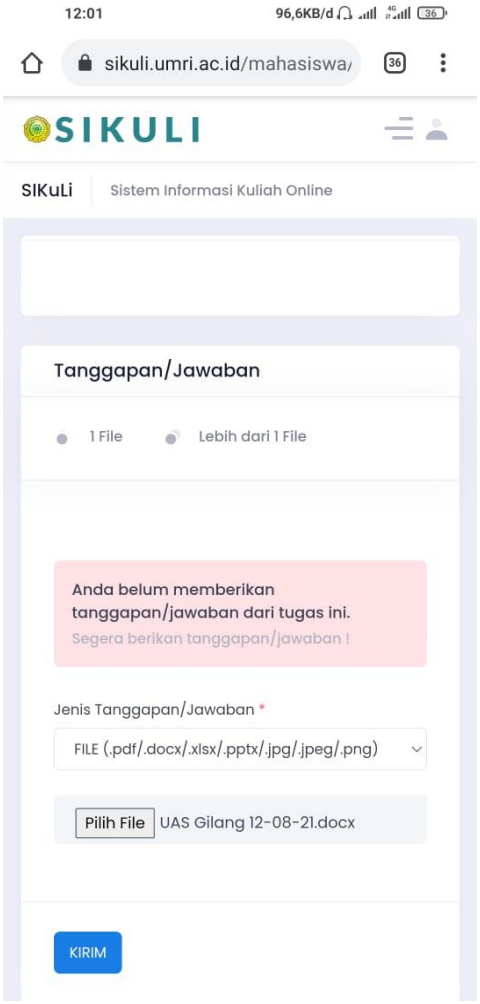

Figure 6.Display of Uploaded Assignments on Students Platform

The flexibility possessed by students in collecting assignments has an impact on the level of student participation in completing the assigned tasks which also has a fairly high number. A recapitulation of the level of collection of each given task can be seen in the following Table 10.

Table 10. Recapitulation of Tasks

Week	Learning Material	Task	Finished	%
2	Resume	30	28	93%
3	Practical Result	30	26	87%
4,5	Video of Color Analysis	30	28	93%
6	Paper Analysis	30	27	90%
7	Paper Analysis	30	30	100%
8	Mid Project	30	30	100%
9,10	Progress Report	30	30	100%
11-15,	Production Result	30	30	100%

The implementation of U-Learning is carried out so that students can adapt learning to their respective learning styles. The learning style of a student in general is divided into auditory, visual and kinesthetic learning styles.

The learning materials presented in this study have strategies so that the three learning styles can be facilitated and absorbed by all students. The strategy includes videos that are considered capable of facilitating students who have audio and video learning styles, while the practicum and activity modules aim to make students who tend to learn with a kinesthetic style can absorb the material well. Student perceptions of the diversity of learning content and facilitation of student learning styles can be seen in the following Figure 7.

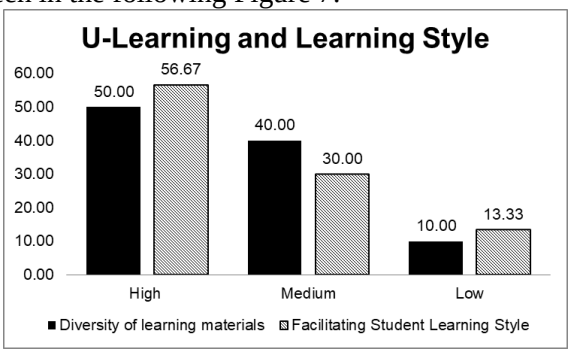

Figure 7. Impact U-Learning to Diversity of Learning Material and Learning Style

In the process of collecting assignments in the experimental class, time flexibility is important. Informatics education study program students are generally outside the city of Pekanbaru, so the time for collecting assignments can be done according to the ability of internet access in their respective areas.

Riau Province with the development of internet network infrastructure that has not been evenly distributed causes there to be variations in the time students have in collecting assignments for the Sikuli application as shown in the following Figure 8.

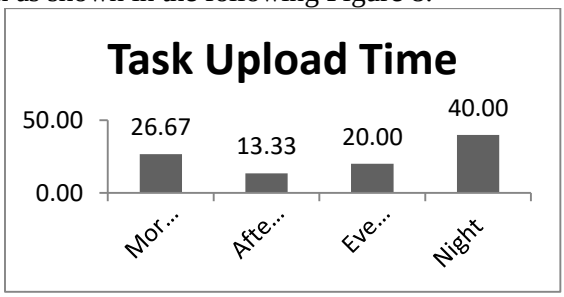

Figure 8. Time for Student to Collect the Tasks

Based on the data in the figure, this shows that most students upload assignments at night. Of course, with high adaptability and the design of a very long task feeder, it can make it easier for students to collect assignments according to the capacity of their internet network.

Learning Result Analysis

Learning outcomes are obtained from data from summative exam results conducted at the end of the semester for multimedia technology courses. The summative exam is structured based on the composition of the vocational competency test in the field of multimedia technology. The questions for each aspect of the competency test include factual, conceptual, procedural and metacognitive aspects (Pearce, 2015). The distribution of the number of questions from each of these aspects can be seen in the following Table 11.

Table 11. Distribution of Questions

No.	Aspect	Material	Num. of Question
1	Factual	Basic of Design, History of Design	3
2	Conceptual	Color Theory,Object Design	3
3	Procedural	Object Analysis, Graphical Design	2
4	Meta-Cognitive	Project Analysis and Design	2
Total number			**10**

The posttest was conducted at meeting 16 both in the experimental class and the control class. The exams are conducted online under the supervision of the lecturers and then the results of the exams are uploaded to elbow.umri.ac.id and the printed files are sent by post to the course lecturers. From the results of the research that has been documented, the Tawal stage analysis carried out is the normality test. The normality test was carried out on the learning outcomes data from the control and experimental classes. The data that was tested for normality were the data from the pretest and posttest results from each class. The results of the data normality test that have been carried out can be described in the following Table 12.

Table 12. Normality Test of Data Finding

Kelas	**Tes**	**Kolmogorov Smirnov**		
		Stat.	**Df**	**Sig**
Experiment	Pretest	,154	34	,230
	Post Test	,150	34	,230
Control	Pretest	,140	34	,230
	Postest	,167	34	,230

It is assumed that if the normality value is less than the 5% (0.05) significance level, then the data is not normally distributed. On the other hand, if the data is equal to or more than the 5% (0.05) significance level, then the data is assumed to be normally distributed. Referring to the results of the tests that have been carried out, it is found that the value of the significance level of the results of the tests carried out is greater than 0.05 (sig>0.05). After the normality test was carried out, the homogeneity test was then carried out from the distribution of the data obtained. The results of the homogeneity test from the data that have been carried out can be described in Table 13.

Table 13. Homogenity Tes Result

Group	**Test**	**Levence Statistic**	**Sig**
Experiment	Pretest	1,126	0,125
	Post Test	1,240	0,154
Control	Pretest	1,251	0,120
	Postest	1,122	0,140

Based on the normality test data obtained, with the results obtained that the data is normally distributed and homogeneous, the statistical test can be carried out using parametric statistical tests. Hypothesis testing was carried out to obtain differences in Vocational Competence in the experimental class and control class at the time of the pretest and at the time of the posttest. The difference in Vocational ability between the control and experimental classes can be seen in the following Table 14.

Table 14. Differences in Student Ability at the Pretest

Group	Mean	Var	t_{hitung}	t_{tabel}	df	Sig
Experiment	66,02	65	0,614	1,295	62	0,612
Control	64,11	63				

The results of the hypothesis test conducted indicate that the value of t_{count} is smaller than t_{table}. The interpretation of the data shows that there is no difference in the level of ability of the experimental class and control class students before the implementation of U-Learning learning. The next hypothesis test that was carried out was that there were differences in the results of critical thinking between the experimental class. The results of the hypothesis testing that have been carried out can be described based on the following Table 15.

Table 15. Differences in Vocational Ability during Posttest

Group	Var	t_{count}	t_{table}	df	Sig
Experiment	71,2	3,425	1,295	62	0,612
Control	82				

From the results of hypothesis testing, the data obtained is that the value of tcount is greater than ttable. The interpretation of the data shows that there is a difference in the level of learning outcomes of students in the experimental class and the control class after the implementation of U-Learning learning.

Discussion

Based on the overall results and data analysis carried out, there is an increase in vocational skills in multimedia technology courses which are compulsory subjects for informatics education students at the Muhammadiyah University of Riau by applying the U-Learning method. From the dimensions of vocational skills development, the results of the comparison of pretest and posttest results in the experimental class can be seen in the following Figure 8.

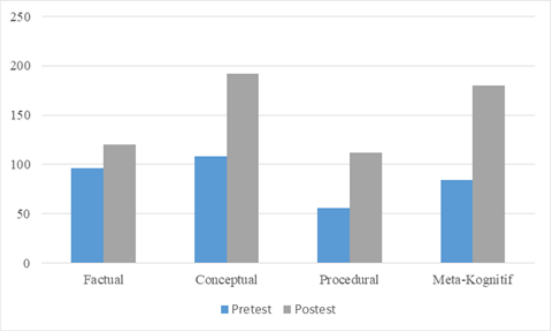

Figure 7. Comparison of Skill Dimension in Learning Activity Pretest dan Postest

These results provide details of increasing the ability of students' learning outcomes compared to research results which only provide data on student learning outcomes when answering questions but do not describe the achievement of the knowledge dimensions that form vocational abilities (Rahmawatiningrum, et.al., 2019).

The factual dimension in the formation of vocational competence is the ability of students to be able to solve problems regarding terminology, as well as detailed knowledge of history or basic foundations (Roll & Ifenthaler, 2021). While conceptual knowledge is related to knowledge about the concept of relationships and the impact of a thing. Procedural knowledge is knowledge about the technique of doing something. As well as one of the special knowledge in vocational competence, namely metacognitive, namely knowledge about the ability of students to be able to design or develop something based on the knowledge they have. In the U-Learning activities that have been applied the four kinds of competencies can generally be achieved by students in the multimedia technology course. This can be seen from the achievement of the ability to complete the task and the ability to solve the questions on the posttest.

Through increasing Learning Activities using the U-Learning method, this provides an answer to the existence of the concept that can bring innovation in learning methods with a constructive approach. Learning with the U-Learning method has a concept that can revive the ability and independence of students in learning through learning activities that lead them to be more confident in building knowledge concepts according to the principles of constructivism (DeLozier & Rhodes, 2017; Awidi & Paynter, 2018).

Constructivism in the activities carried out appears when students see and understand the material provided by educators, then students carry out independent learning activities in class through discussions, experiments and experiments that are in accordance with the concept of learning in higher education. Through these activities, this can foster analytical skills, assessment and creativity when working individually or in groups (Amineh & Asl, 2015). In the U-Learning-based learning that has been implemented, this is realized through the frequency of online discussions that are applied by course lecturers with various approaches such as presentation discussions, making videos of material from the assignments given. Of course, these types of approaches make students more analytical, creative and able to work together in building knowledge.

The application of the U-Learning method also has an impact on the ability of students to no longer depend on learning and practicum activities in the laboratory, but they are also invited to explore various answers to problems in the field of study programs, especially in the introduction and installation of computer equipment. Through U-Learning activities, students can build the dimensions of knowledge needed in competencies, namely factual, procedural and interpretative competencies (Winther & Achtenhagen, 2009, 2014; Klotz, et, al., 2014).

The realization of competency achievement is given and then measured through a package of competency exam questions that have been prepared according to the Learning Activity indicators and competency profiles for each subject. The contextual assignment model makes students able to absorb knowledge from various learning sources related to knowledge and achievement of multimedia competencies.

CONCLUSION

As a form of e-Learning learning method, U-Learning has advantages in terms of tolerance for the limitations that arise for students when they have to take online lectures, but the internet network infrastructure is inadequate in various areas other than the provincial capital. The development of U-Learning learning can be done by utilizing an online learning system that has been specifically designed to facilitate a fairly high level of this type of learning. Referring to the results of research that has been carried out, the optimization of U-Learning as an e-Learning learning method has an impact on increasing lecture activities. The achievement of vocational competence in the Informatics Education Study Program, FKIP UMRI, of course, cannot be achieved only with theoretical concepts but also requires practical and experimental activities. With high flexibility, such learning can be carried out and statistically has a significant effectiveness value. In this study, the focus of the discussion is on the analysis of activities and the ability to access learning with the U-Learning method, then these data are used together with learning outcomes to test the level of effectiveness of this model. The next research suggestion is to conduct a comparative analysis of U-Learning with other eLearning methods which may have more varied results for the development of research in the field of e-Learning methods which are currently very much needed during the COVID-19 pandemic and the industrial era 4.0.

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