

# Implementation of the Introduce Connect Apply Reflect Extend (ICARE) Model Learning Flow in developing online modules based on U-Learning Class LMS

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**Abstract:** Online learning has started to be used since the emergence of internet technology and became increasingly popular when the Covid 19 pandemic hit. Online learning during the pandemic has given rise to many unique problems for both lecturers and students, such as limitations in presenting material in the sense that the material presented is monotonous and uninteresting, the difficulty of building activity, the difficulty of creating interaction between lecturers and students and between students. Online learning is more stressful than studying in a regular classroom because students are trapped studying alone, the absence of clearly structured learning steps makes it difficult for students to focus on studying. The aims of this research are: to determine the design of an online learning module with an ICARE learning flow based on the U-Learning Class LMS, to determine the feasibility of an online learning module with an ICARE learning flow based on the U-Learning Class LMS. This research uses a Research and Development (R&D) for Education design with the stages of Analysis, Design, Development, Implementation and Evaluation. All stages have been completed and resulted in an online learning module with an LMS-based ICARE learning flow in the Learning Media course which has met the eligibility criteria as a learning resource for use in learning.

**Keywords:** ICARE; Online module; LMS U-Learning Class

## Introduction

When the Covid 19 pandemic hit, learning systems throughout the world, including in Indonesia, were forced to change completely. Before Covid 19, schools, colleges and training institutions rarely conducted online learning (Arasaratnam-Smith & Northcote, 2017; Dirckinck-Holmfeld et al., 2010). It was very different during the Covid-19 pandemic, many schools and universities had implemented online-based learning policies (Basilaia & Kvavadze, 2020; Taha et al., 2020). This is a form of quick response from schools and universities to minimize the transmission of Covid-19 in the campus environment.

The use of online learning is practical because it can be done anywhere and at any time (IK Suartama, Setyosari, Sulthoni, & Ulfa, 2020, 2019). But online learning during the pandemic raises many unique problems for both lecturers and students. The results of research conducted by Irfan et al. (2020) shows that the challenges faced by lecturers in implementing online learning include: limitations in presenting material in the sense that the material presented is monotonous and uninteresting, difficulty building activity, creating interaction between lecturers and students and between students. Online learning is more stressful than studying in a regular classroom because students are trapped studying alone, the absence of structured

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learning steps makes it difficult for students to focus on learning (Yusnilita, 2020).

Online content is all theoretical and does not give students the opportunity to practice and learn effectively, mediocre online content is also a major problem (Dhawan, 2020). Complete learning (learning completion) cannot be completed online (Adnan, 2020). The results of this research can be used as a reference to find a way to overcome the obstacles faced by lecturers and students when online learning is implemented to make it more interesting and meaningful. Pedagogical factors have the greatest influence on success and student intentions and behavior in online learning which include providing richer content, structured learning strategies or steps, and a learning environment that can improve student learning performance (Hao, Dennen, & May, 2017). Students learn in different ways with different preferences. Providing various types of media that students can choose from, providing clear learning steps is one way to ensure students keep learning (Dhaliwal, Simpson, & Kim-Sing, 2018). Systematic planning is needed to determine and determine these pedagogical factors in the design of online learning materials.

Online learning modules mean that teaching materials are arranged systematically, measurably, interestingly and easily understood by users, which have the characteristics of being able to be accessed and used without space and time constraints as long as they are connected to the internet network and accessed using gadgets such as cellphones, tablets and PCs. . Online learning modules are learning materials built from various online resources that are integrated in a meaningful way (Hill, Sharma, & Johnston, 2015). Online learning modules allow for interactive learning, assessment and adaptive feedback (Phillips, 2015). Online learning modules are teaching materials designed to support students' independent learning in diverse environments (Mamun et al., 2020). The transition of teaching materials from a face-to-face learning format to online learning is a challenge because lecturers in online learning are no longer present in real-time to assess and direct their learning. So, the way online learning modules are organized, the clarity of the written information provided, and the clarity of the learning steps all correlate strongly with the effectiveness of online learning (Cobb, Watson, & Ellis, 2018). A learning module design is needed that can show learning steps in a structured, can be used in large classes, encourages students to reflect on subject

content, and allows students to formulate their thoughts before sharing them privately with others.

The Introduce Connect Apply Reflect Extend (ICARE) learning model is a learning model that shows systematic and structured learning steps that can be applied to make students more active in learning, directing students to draw conclusions from the lessons given (Siahaan et al., 2020). The ICARE model ensures that students have the opportunity to apply what they have learned so that learning becomes more meaningful and students can grasp the essence of learning (Latifa, Nur, & Rizal, 2020). Online learning modules can be developed using a Learning Management System (LMS) (Dhaliwal et al., 2018). Research conducted by Matthew Perkins (2006) shows the benefits of an LMS which allows teachers to easily send assignments, lesson plans, announcements and other learning documents. In this research, LMS Moodle was used, because it has been proven that the use of LMS Moodle can increase student involvement in learning outside the classroom (online) and have a positive influence on students' thinking and innovation skills (Chootongchai & Songkram, 2018; Georgouli, Skalkidis, & Guerreiro, 2008; Govender, 2009; Henderson, 2011).

## Method

### *Research design*

This research uses the Research and Development for Education (R&D for Education) method, namely a method for producing a product and testing the suitability of a product for education (Borg & Gall, 1983). The product developed in this research is an LMS-based online learning module with the ICARE learning flow. The steps taken in developing products adapt the steps of the ADDIE development model proposed by Lee, WW, & Owens (2004) which include the Analysis, Design, Development, Implementation and Evaluation steps. This model is used because it is simple, complete, and has been tested.

### *Procedure Study*

By adapting the Lee & Owens development model, the procedure for developing LMS-based online learning modules with the ICARE learning flow is described in Table 1.

**Table 1.** Steps for developing LMS-based online learning modules with ICARE learning flow

Stage	Activity
Analysis	Need assessment, namely identifying problems that cause the learning process and results to not be optimal Front-end analysis, including identification of student characteristics, technology or learning support facilities provided on campus, conditions of the learning environment, as well as competencies that students must master This activity is carried out through interviews, observations, documentation studies, and questionnaires filled out by lecturers and students
Design	Designing a development schedule Determine hardware and software specification requirements Determine learning materials and strategies Design and map existing resources and activities in the LMS into the ICARE stages in the form of a mapping program
Development	Creating an online module, this step consists of: Create a portal with steps: get a server, change the portal identity (site name, site description), Setting up the Moodle mobile app, change the theme, create categories, and create and elevate user status. Create a learning media course with the steps: create and change course settings, enter resources (Book,Files,Folders,LMS Content Packages, Label, Page, URLs), and create an activity (Assignments,Chat,Choice,Databases,Feedback,Forum, Glossary,Lessons,LTI/External Tools,Quiz,SCORM, Surveys,Wiki,Workshops), Product validation by media experts and material experts, Carry out product revisions
Implementation	Conduct trials on students
Evaluation	Final revision and product evaluation (summative)

*Product Trial*

In developing online learning modules with the ICARE learning flow based on the U-Learning Class LMS, product trials carried out were divided into two types, namely trials to determine the suitability of the product and trials to determine the effectiveness of the product. To determine the feasibility, the product developed goes through a validation process by material experts, validation by learning design experts, validation by media experts, and field trials. The data obtained is then analyzed and used to improve or perfect the product being developed. With a product testing process like this, it is hoped that the quality of the media being developed will be better. Effectiveness testing through summative evaluation is carried out after the program has been formatively evaluated and revised. This effectiveness test was carried out to determine the effectiveness of learning in the form of measuring cognitive learning outcomes after using the product being developed. Product trials in research and development include:

*Trial Design*

The trial design carried out in this research intended; to obtain data that will be used as a basis for revising the online learning module with the LMS-based ICARE learning flow through formative evaluation, to find out the effectiveness of the online learning module with the U-Learning Class LMS-based ICARE learning flow which was developed through summative evaluation. The trial design includes:

*Formative Evaluation*

After receiving validation by material experts and media experts, the next stage is to carry out a formative evaluation. Formative evaluation is carried out through field trials. The purpose of this trial is to determine whether the product produced is suitable for use in learning. Based on the results of field trials, the media is improved and further refined to become the final product, and then the product can be implemented. The procedure for carrying out this field trial is as follows: Select students who can represent the population, as many as 12 students; Explain to students the purpose and objectives of conducting field trials; Ask students to use online learning modules with the ICARE learning flow based on the LMS U-Learning Class; Providing and asking students to fill out a questionnaire to find out their responses to the online learning module with the ICARE learning flow based on the U-Learning Class LMS; Analyze the data obtained (response scores on the quality of the product being developed, the time required, repair of problematic parts, required enrichment and so on);Based on the data analysis, the online learning module with the LMS-based ICARE learning flow was further refined, resulting in a final product which was then implemented.

*Summative Evaluation*

Before the final product is widely implemented, a summative evaluation is carried out. This summative evaluation was carried out to determine the

effectiveness of the product, namely how much the product developed can improve the quality of learning in the form of increasing student achievement of learning outcomes after using the online learning module product with the developed LMS-based ICARE learning flow. To find out that the product being developed can truly realize effective learning, the effectiveness test through summative evaluation will be used by Master of Learning Technology students in the second semester of the 2021-2022 academic year using the final product that has been developed. Before carrying out learning activities using online learning modules with the LMS-based ICARE learning flow, a pre-test is first given, then continued by using online learning modules with the U-Learning Class LMS-based ICARE learning flow in learning, finally students will be given a post test. The difference in learning outcomes (pretest and posttest scores) will show the effectiveness of the online learning module with the ICARE learning flow based on the developed LMS U-Learning Class. To determine the difference in pretest and posttest learning outcomes, a paired t-test will be used. The procedure for implementing this summative evaluation is as follows:

#### *Preliminary stage*

Determination of classes that use learning with online learning modules with the ICARE learning flow based on the U-Learning Class LMS; Hold a pretest in classes that will use learning with online learning modules with LMS-based ICARE learning flows

#### *Implementation stage*

Carrying out learning in classes using online learning modules with the LMS-based ICARE learning flow.

#### *Final stage*

Carry out the posttest; Analysis of learning outcomes data using paired t-test to determine differences in learning outcomes from pretest and posttest scores.

#### *Subject Try*

The parties who were used as test subjects in developing this paired t-test involved one material design expert and one media expert at the media validation stage. In the product trial at the formative evaluation stage (feasibility test) the test subjects were 10 students of Masters in Learning Technology at Unipar Jember who had taken learning media courses, while in the summative evaluation stage (effectiveness test) the test subjects were Masters students. Learning Technology at Unipar Jember who are currently taking the learning media course are students in the second

semester of the 2021-2022 academic year.

#### *Data Type*

The data taken in this research is qualitative data and quantitative data. Qualitative data in this research is data obtained from responses regarding aspects of material/learning, display and programming from various sources, namely material experts, media experts and students. This qualitative data is scored (scoring) so that the qualitative data in this assessment turns into quantitative data. Other quantitative data is obtained from student scores on the pretest and posttest as well as scores from student learning outcomes.

#### *Data Collection Instrument*

The instruments used to collect data in this research were questionnaires and learning outcomes tests. The questionnaire was prepared with the aim of determining the feasibility of online learning modules with the U-Learning Class LMS-based ICARE learning flow. The learning outcome test is used to obtain pretest and posttest learning outcome scores in classes that use online learning modules with the ICARE learning flow based on the LMS U-Learning Class. To produce quality development products, quality instruments are needed and are able to explore what is desired. One indicator of the quality of an instrument is that the instrument must have good validity. The activities carried out by researchers to obtain an instrument that has good content validity are as follows: Document analysis; Creating a specification table (grid); Consultation with experts (material and media); Consult with colleagues; Instrument writing; The following describes in more detail the instruments used in this research.

#### *Questionnaire*

In this research, three types of questionnaires are required, namely : questionnaires for material design experts, questionnaires for media experts, and questionnaires for students. Questionnaires for material experts are used to obtain data about content aspects and learning design aspects and are filled in by experts in the field of material being developed. The questionnaire for material experts was developed by referring to the theory of Walker & Hess (1984), the questionnaire for online learning media experts adapted the comprehensive standard/rubric for e-learning learning design developed by Debattista (2018). Meanwhile, questionnaires for students in trial activities are prepared based on assessment aspects from material experts and media experts by adjusting (selecting) statements related to the student's position as a user of the product being developed. There are



two types of questions in this questionnaire, namely closed ended and open ended questions. Closed ended questions are prepared using a scale of 5 (Likert scale), while open ended questions are used to ask for opinions or suggestions from experts and students regarding the product being developed.

*Test Learning outcomes*

Learning outcome tests are used to obtain learning outcome scores on pretest activities and posttestin classes that use online learning modules with learning flows ICARE is based on LMS U-Learning Class, the learning outcomes measured here are in the cognitive realm or domain of learning material which is understanding concepts.

*Data analysis technique*

Data obtained through trial activities is classified into 2, namely qualitative data and quantitative data. The qualitative data in this research is in the form of criticism and suggestions put forward by material experts, media experts, and students as well as data from observations. This data is collected and abstracted to improve the online learning module with the ICARE learning flow based on the LMS U-Learning Class. Meanwhile, quantitative data is in the form of scores on each item of the instrument which have been filled in by material experts, media experts, lecturers and students in the pretest and posttest during the summative evaluation. The technique used to provide quality criteria for the product being developed is: the data obtained from the questionnaire was first converted into interval data as presented in Table 2.

**Table 2.** Criteria for Scoring Items in the Questionnaire

Criteria	Information	Score
Very good	100% in accordance with the elements contained in the statement in the questionnaire	5
Good	80% corresponds to the elements contained in the statement in the questionnaire	4
Pretty good	60% corresponds to the elements contained in the statement in the questionnaire	3
Not good	40% corresponds to the elements contained in the statement in the questionnaire	2
Very bad	20% corresponds to the elements contained in the statement in the questionnaire	1

In the questionnaire, five choices were given to provide feedback regarding the online learning module product with the developed LMS-based ICARE learning flow, namely: very good (5), good (4), quite good (3), not good (2), and very poor good (1). If the respondent gives a "very good" response to a question,

then the score for that question is "5" and so on. The scores obtained are then added up and averaged, then converted into a value, on a scale of 5, with reference to a table adapted from Sukardjo (2010) as presented in Table 3.

**Table 3.** Conversion of Scores into Grades on Scale Five

Value	Formula	Score
Excellent	$X > Xi + 1.80 Sdi$	$X > 4.21$
Very good	$Xi + 0.60 Sdi < X \leq Xi + 1.80 Sdi$	$3.40 < X \leq 4.21$
Good	$Xi - 0.60 Sdi < X \leq Xi + 0.60 Sdi$	$2.60 < X \leq 3.40$
Average	$Xi - 1.80 Sdi < X \leq Xi - 0.60 Sdi$	$1.79 < X \leq 2.60$
Poor	$X \leq Xi - 1.80 Sdi$	$X \leq 1.79$

Information:

Ideal mean ( $\bar{Xi}$ ) :  $1/2 \times$   
 (maximum score + minimum score)  
 Sdi :  $1/6 \times$   
 (maximum score - minimum score)  
 Maximum score =5  
 Minimum score =1  
 Average ideal score ( $\bar{Xi}$ ) =  $1/2 \times (5+1)$   
 = 3 Standard deviation of ideal score (Sdi) =  $1/6 \times (5 - 1) = 0.67$   
 X = Score actual

providing an assessment of a product that has been developed, use the equation 1.

$$\bar{Xi} = \frac{\sum X}{n} \tag{1}$$

Information:

$\bar{X}$  = Average score  
 $\sum X$  = Total score  
 n = Number of respondents

To find the average score (average score) in

In this research, a minimum feasibility value of "good" was determined, as a result of assessments from

media experts, material experts, as well as assessments from students. If the final (overall) assessment results for each learning aspect, content aspect, media aspect are with a minimum score of "good" by experts, then the product resulting from the development is considered suitable for use as a learning resource. The technique used to determine the effectiveness of the product being made can be seen in the form of differences in pre-test and post-test scores. The pretest and posttest data obtained were then calculated by calculating the posttest-pretest size (score gain). The gain score shows the degree of effectiveness of using online learning modules. To calculate the score gain, the following formula can be used :

$$\text{Score Gain} = \frac{S_{\text{post}} - s_{\text{pre}}}{s_{\text{maks}} - s_{\text{pre}}} \tag{2}$$

Information:

S post: Posttest score S pre: Pretest score

S max: Ideal maximum score

The criteria for obtaining gain scores use a table reference adapted from Dantes (2014) as follows.

**Table 4.** Score gain categories

Limitation	Category
$g > 0.7$	Tall
$0.3 < g \leq 0.7$	Currently
$g \leq 0.3$	Low

## Result and Discussion

### *Analysis Phase Results*

The results of this analysis stage activity are in the form of qualitative data obtained through observation, documentation studies and questionnaires filled out by students. The results of the analysis stage consist of: characteristics of students, characteristics of learning objects or courses, and conditions of the learning environment. The characteristics of Postgraduate students in Learning Technology at PGRI Argopuro Jember University are that they have the ability to operate computers, mobile devices, they also have smartphones both Android and iOS based and most of them prefer to access information via computers and smartphones. They also enjoy being able to independently explore various learning resources available in a wide environment, through social interaction with various parties who have direct or indirect relevance to the material being studied.

The characteristic of learning media courses is that they have a fairly broad range of material consisting of material that is theoretical concepts and material that is

empirically practical. Specifically, the aim of the learning media course is for students to have knowledge, attitudes and skills in the fields of design, development, utilization, evaluation and study of media in learning. The material topics in this course are: the position of media in learning, the basic concepts of learning media which include the meaning of learning media, learning resources, teaching aids, learning tools, history of the development of learning media, uses of learning media, foundations use of learning media, characteristics of various types of learning media, which include visual media, audio media and audio-visual media, procedures and principles for selecting learning media, and development of learning media which includes design, production and evaluation of learning media. This course has a weight of 3 credits (1 credit equivalent to 50 minutes) which means that the study time provided in class is very less compared to the extensive material so this course requires more time, therefore lectures are outside the classroom (mobile). blended learning) is the right solution for completing this course.

In terms of environmental and infrastructure support, the Master's Degree in Learning Technology at PGRI Argopuro Jember University has 1 computer laboratory unit with 5 PCs, WiFi is available for internet connection, and almost all lecturers and students hold mobile devices (smartphones) and have the ability to use them. computers and adequate internet access which can be the driving force for the development and implementation of online learning modules.

### *Design Online Learning Modules with LMS-based ICARE Learning Flow*

The design of online learning modules with ICARE flows based on LMS U-Learning Class displays clear learning stages and learning materials in digital format. The learning steps refer to the ICARE model stages which consist of introduction, connection, application, reflection, and extend. Learning materials include documents (doc, pdf, xls, txt), presentations (ppt), images (jpg, gif, png), videos (mpg, wmv), sounds (mp3, au, wav), and animations (swf, gif ). The learning steps and learning materials are arranged in the form of a mapping program so that they are easy to find and use when developing online modules. The mapping program is a table containing learning steps and learning materials, where each component has a link that is connected to each other (IK Suartama, Setyosari, et al., 2020). Mapping programThe online module with ICARE flow based on Moodle LMS contains: description of learning steps, type of learning material, Moodle LMS (Mob App) features consisting

of resources and activities. Online module mapping program with ICARE flow based on Moodle L MS in Table 5.

**Table 5.** Online module mapping program with ICARE flow based on Moodle LMS

ICARE flow	Learning Material Type	Resources	Moodle LMS Features
Introduction Provides an understanding of the contentlectures to students, This section contains an explanation of the objectives of the course, and what the course will achieve (goals).	Document (pdf) Presentation (ppt)	Page Files	Activities LessonsForum
Connections Connecting new teaching materials withsomething that is familiar to students. Conduct simple brainstorming exercises to understand what students already know Students share what they remember from previous lectures, or by developing activities that students can do themselves. Lecturers connect students' prior knowledge with new information through presentations or simple explanations	Document (doc, pdf) Presentation (ppt) Picture (jpg, png) Videos (MP4)	BookFiles URLs	LessonsAssignments(file submission) Chat Feedback BigBlueButtonBN (web conference) MessagesAssignments (online text) Feedback
Application Students are given the opportunity topractice and apply new knowledge and skills. Students work alone, in pairs,or in groups to complete real activities or solve real problems using the new information and skills they have acquired.	Document (pdf) Presentation (ppt) Animation (swf)Video (MP4) Multimedia (exe)	Files URLs IMS content package	ForumAssignments(file submission) Chat Feedback BigBlueButtonBN (web conference) MessagesAssignments (online text) Feedback
Reflections Students to make presentationsor write about what you have learned, a summary of learning outcomes. Give quizzes tostudents who are probing with several choices of questions adapted to the conditions	Document (pdf) Presentation (ppt)	Files URLs Label Page	Lesson Feedback WorkshopAssignments(file submission) Quiz
Extend Students read additional teaching materials, assignments or exercises to strengthen and expand the lesson material that has been completed	Document (pdf) Presentation (ppt)	Files URLs Label Page	Lesson FeedbackAssignments(file submission)

*The final product*

The final product of this development research is a portal and online learning module course which can be accessed on the U-Leraning LMS. The learning media course as the object of this research is in the Postgraduate Masters in Learning Technology category, Unipar Jember semester II. This course consists of 4 modules where each module has a different topic, namely module 1: basic concepts of learning media, module 2: classification of learning media, module 3: characteristics of types of learning media, module 4: selection of learning media. An example of a systematic display of one of the modules (module 2) is shown in Figure 1.



**Figure 1.** Systematics of one of the modules (Module 2)

From Figure 1, it shows that the presentation of each module follows systematic stages, namely the ICARE learning flow which is an acronym for systematic steps, namely: introduction, connection, application, reflection, and extend. Next, the display of the Introduction stage is shown in Figure 2.

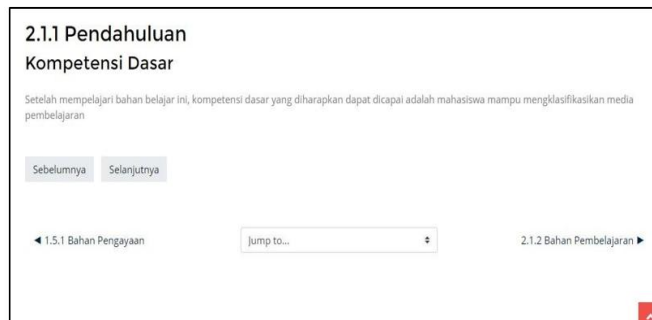


Figure 2. Introduction display

From Figure 2, it shows that the Introduction consists of two parts, namely the introduction and learning materials. The introductory section contains the delivery of learning instructions, basic competencies and learning objectives. This aims to provide students with an understanding of how to learn and the points of content of the learning material. This introduction section was built by utilizing the Lesson feature in the LMS which allows students to navigate regularly to each page. Meanwhile, the learning materials section contains a collection of files (pdf, ppt, mpg, swf, exe, etc.) which contain learning materials according to the topics in each module. Next, the display of the Connection stage is shown in Figure 3.

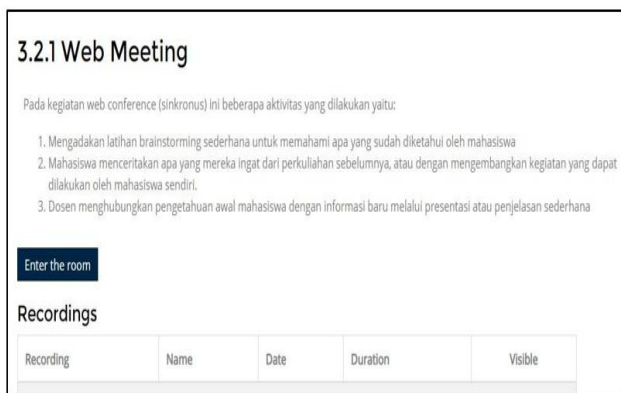


Figure 3. Connection display

From Figure 3, it shows that the connection is carried out synchronously via the web meeting (video conference) feature. This stage aims to provide apperception, namely connecting new teaching material with something that is already familiar to students. The method used is to hold a simple

brainstorming exercise to understand what students already know. Another way is to ask students to tell what they remember from previous lectures. Then the lecturer connects the students' initial knowledge with new information through presentations or simple explanations. Next, the display of the Application stage is shown in Figure 4.



Figure 4. Application display

From Figure 4, it shows that application is carried out to give students the opportunity to practice and apply new knowledge and skills. Students work alone, in pairs, or in groups to complete real activities or solve real problems using the new information and skills they have acquired. Activities at this stage are facilitated with Student Worksheets (LKM) using case-based learning methods (module 2) and project-based learning (module 6). The feature used in LMS is assignment. Next, the display of the Reflection stage is shown in Figure 5.

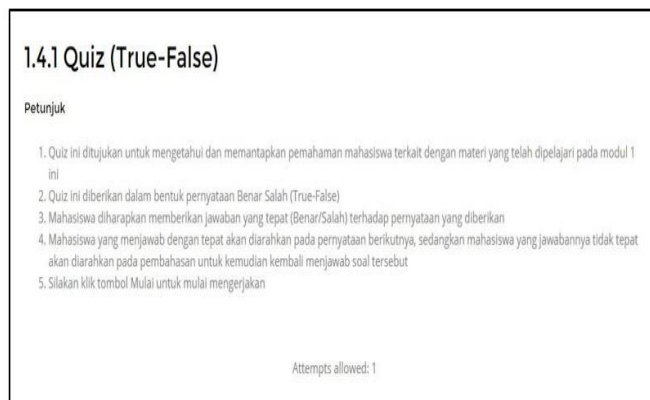


Figure 5. Reflection display

From Figure 5, it shows that reflection is carried out to check or confirm what students have learned through presenting a summary of learning outcomes. Reflection is carried out by means of a web conference and giving quizzes/questions to students that are probing in nature with several question choices



adapted to the conditions. The features used in the LMS are web meetings (video conference) and quizzes. Next, the display of the Extend stage is shown in Figure 6.

From Figure 6. above, it shows that extending is done to strengthen and expand the learning material that has been completed by reading additional teaching materials, assignments or exercises. The feature used in LMS is URL.



Figure 6. Extend display

*Product Validation and Trial Results*

After carrying out internal tests to check that the product runs smoothly, it is then continued to the validation stage, namely : validation by material experts and media experts and trials on 28 students.

**Table 6.** Results of Material Expert Validation of Online Learning Modules with LMS-Based ICARE Learning Flow

Assessment Aspects	Average Score	Category
Material Aspects	4.20	Good
Learning Aspects	4.50	Very good
Linguistic Aspect	4.40	Very good
Average Overall Score	4.36	Very good

Based on the data in Table 6, it is known that the average score for the overall assessment of learning material aspects reached 4.36. According to the quantitative data conversion table to qualitative data scale 5, this figure is classified in the "Very Good" category, which means that the learning material

developed is suitable for application in learning. The revision suggestions from learning material experts are: add advanced material that can be obtained from learning resources by utilization, the material presented should be able to direct students to think critically and creatively.

**Table 7.** Media Expert Validation Results of Online Learning Modules with LMS-Based ICARE Learning Flow

Assessment Aspects	Average Score	Category
Opener	4.71	Very good
Source of learning	4.83	Very good
Interaction and communication	4.67	Very good
Student/learner support	5.00	Very good
Technology design	4.87	Very good
Closing	5.00	Very good
Evaluation	5.00	Very good
Learning cycle	4.67	Very good
Average Overall Score	4.84	Very good

Based on the data in Table 7, it is known that the average score for the overall assessment of the learning media aspect reached 4.84. This figure, according to the quantitative data conversion table to qualitative data on a scale of 5, is classified in the "Very Good" category, which means the learning media developed is suitable for application in learning. The suggestions for revision from learning media experts are: the variety of learning resources needs to be increased to accommodate various student learning modalities,

study instructions need to be added to each module to help students carry out independent learning, added discussion forums to train students in critical, creative thinking, and developing communication skills. Furthermore, the results of the assessment of the trial activities carried out on 28 students are presented in Table 8.

**Table 8.** Student Assessment in Online Learning Module Trial with LMS-Based ICARE Learning Flow

Assessment Aspects	Average Score	Category
Material Aspects	4.63	Very good
Learning Aspects	4.64	Very good
Linguistic Aspect	4.59	Very good
Opener	4.80	Very good
Learning resources	4.64	Very good
Interaction and communication	4.68	Very good
Student	4.59	Very good
Technology design	4.61	Very good
Closing	4.63	Very good
Evaluation	4.76	Very good
Learning cycle	4.64	Very good
Average Overall Score	4.65	Very good

Based on the data in Table 8, it is known that the average score for the overall assessment of aspects of the online learning module in the learning media course reached 4.65. This figure is according to the quantitative data conversion table to qualitative data on scale 5. Classified in the "Very Good" category, which means the product developed is suitable for application in learning. In general, the comments from students in testing this product are: learning becomes more flexible, because online modules can be accessed anytime, anywhere, systematic learning steps are very helpful in speeding up understanding of the module content, 3) the presence of enrichment materials provides broader insight than what has been included in the main material, 4) you can find out learning progress from feedback and grades given immediately by the lecturer, 5) online learning modules are easier to use, have high accessibility so learning becomes more efficient.

The process of developing online learning modules with the ICARE learning flow based on the LMS U-Learning Class in this learning media course has been carried out through five stages, namely analysis, design, development, implementation and evaluation steps. This process can run smoothly, quickly and in a more organized manner because it is based on pre-made plans and the readiness of the required materials based on the results of the analysis that has been carried out. Paying attention to the assessment results from material experts in the very good category, the results of the media expert's assessment in the very good category, and the results of trials with students in the very good category, it can be concluded that the online learning module with the LMS-based ICARE learning flow has met the eligibility criteria for used in learning. Several reasons why this product is suitable for use in learning are as follows. Online learning modules with ICARE learning flows based on LMS U-Learning Class, the resulting learning media courses have combined various delivery methods, teaching models and learning styles,

introducing various choices of learning media or learning resources and various interaction formats between lecturers and students. with students by utilizing various mobile application features (Moodle LMS). Choosing the Moodle LMS application in a u-learning setting can provide several benefits, namely: being able to choose various available learning activity formats, for example weekly formats, or you can also use topic formats and social formats, being flexible in determining activities for learning for example: communities, journals, quizzes, choice questions, surveys, assignments, chats, all class members in forums, journals, quizzes and assignments can be viewed on one page (and can be downloaded as a spreadsheet file), 4 is able to display various user activities (Suartama et al., 2019).

The online learning module with the ICARE learning flow based on LMS U-Learning Class in learning media courses emphasizes maximum student activity to search and find material (placing students as learning subjects). In the learning process, students do not only act as passive recipients, they will construct their knowledge in their own way. In the online learning module with the ICARE learning flow based on LMS U-Learning Class, this learning media course presents various learning methods such as individual study, group work, field assignments, and project-based learning. Likewise, the learning media or learning resources provided vary (documents, presentations, animation and multimedia) which are adjusted to students' learning preferences. This will be able to provide creativity modeling to students, encourage students to be more active and be able to find ways of learning that are suitable for themselves (IK Suartama, Setyosari, et al., 2020). By using methods that suit the material and student characteristics, you will be able to create a conducive learning atmosphere and improve student learning achievement (Munawaroh, 2017).

The online learning module with the ICARE learning flow based on LMS U-Learning Class, this

learning media course, has another advantage, namely the direct feedback given by the lecturer on the assignments carried out by students. This feedback is in the form of positive reinforcement or negative reinforcement from the lecturer. Apart from that, the existence of various assessment methods and the right of students' access to their grades will encourage students to continue studying hard in order to excel in class. Based on the responses given by students to the online learning module with the LMS-based ICARE learning flow for the learning media courses developed, this product has the advantage of having a good level of interactivity which is able to make students interested and active in the learning process. Student interest in online learning modules with LMS-based ICARE learning flows for learning media courses is an indicator of student motivation to learn and is a very good symptom towards improving learning processes and outcomes (Demir & Akpınar, 2018).

Display elements that can be considered attractive in online learning module products with ICARE learning flows based on LMS U-Learning Class for this learning media course include the home page, ease of navigation, and a very harmonious combination of text and background colors. Apart from an attractive appearance, on each subject, this media is equipped with examples of images, animations, videos and multimedia so that students or users can understand it better. Regarding the ease of use of online learning modules with the ICARE learning flow based on LMS U-Learning Class, this learning media course is also recognized by students. Just by typing the url: <http://u-learningclass.site/> In the browser, students can use online learning modules with the ICARE learning flow based on the U-Learning Class LMS for this learning media course.

Using the Moodle mobile application also makes it easier for students to use it and access to online modules is faster. Through online learning modules with ICARE learning flows based on LMS U-Learning Class, learning media courses, learning materials can be accessed more quickly, at any time and from anywhere, besides that the materials can be enriched with various learning sources including multimedia, which can be quickly updated. by the lecturer. Students also carry out monitoring, communication and collaboration. On the other hand, students can of course download learning materials, complete assignments and quizzes, and participate in chats and discussion forums.

## Conclusion

Online learning modules are teaching materials that are arranged systematically, measurably, interestingly and easily understood by users which have the characteristics of being able to be accessed and used without barriers of space and time as long as they are connected to the internet network and accessed using gadgets such as cellphones, tablets and PCs/laptops. The development of online learning modules with ICARE learning flows based on the U-Learning Class LMS for this learning media course has been carried out through needs analysis, developing activity designs, learning resources, and determining learning evaluation and validation from experts. Assessment of several aspects of online learning modules with ICARE learning flows based on LMS U-Learning Class for learning media courses such as aspects of instructional design, course opening, assessment of learning, interaction and community, instructional resources for teaching and learning, learner support, technology design, course closing, and instructional design cycle shows results in the "very good" category, which means this learning product is suitable for application in learning. Efforts need to be made to develop online learning modules with ICARE learning flows based on LMS U-Learning Class for learning media courses by optimizing more varied presentation methods. It is necessary to pursue further research activities to determine the level of effectiveness of using online learning module products with the ICARE learning flow based on the LMS U-Learning Class for this learning media course, both using classroom action research methods and experimental research with a wider target group.

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## Author Contribution

Conceptualization, K., E. D. P., P. H. P., E. T.; methodology, K.; software, E. D. P.; validation, P. H. P.; formal analysis, E. T.; investigation, K.; resources, E. D. P.; data curation, P. H. P.; writing-original draft preparation, E. T.; writing-review and editing, B. S. and K. All authors have read and agreed to the published version of the manuscript.

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## Conflicts of Interest

The authors declare no conflict of interest.

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