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**Development of Digital System Learning Media Using Digital Learning System**

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**Keywords:** Digital Learning System (DLS), Indonesian National Qualifications Framework, Digital System.

**Abstract:** In this research learning media developed are digital system learning media. Digital system learning in UNHASY, especially in Informatics Study Program Faculty of Information Technology still uses conventional systems with oral-based teaching systems so that the digital system learning process is less optimal because basic competencies cannot be taught in full. Therefore, digital system learning media based on Digital Learning System (DLS) was developed based on standard the Indonesian National Qualification Framework with the application of a website in which there are several teaching materials consisting of learning modules, learning job sheets, video tutorials, problem training, experimental simulation, and consultation by online so that it makes it easier for students to learn. Not only that, teachers can also be better prepared in teaching and can make the teaching and learning process more effective and interesting. The results of the research indicate the feasibility of a website with an average rating of 87% (including very good category) and modules with an average rating of 85% (including very good categories) while based on student responses we obtain a value of 3 (including good categories) with 80% rating (including interesting). From the results above, it can be concluded that the media website and modules developed are very feasible to use in improving student knowledge and digital learning systems that are independent and can be applied in daily life.

**1 INTRODUCTION**

Education is an effort to develop the potential of students who have spiritual strength, self-control, personality, intelligence, morals, nobility, and skills with conscious and planned efforts through learning and active learning so that they can produce generations that are useful for themselves and society. The learning process can be done with several learning models including conventional and modern learning models. The conventional learning model is a traditional learning model that is an oral communication tool that has always been used but the conventional learning model is considered ineffective at this time considering the progress of technological development.

Along with the development of computer technology, information technology, and communication, a model is developed modern learning. This modern learning model uses a Digital Learning System (DLS) to facilitate students in the

learning process. Digital Learning System (DLS) is a modern digital learning by utilizing both software and hardware technology that is applied in the teaching and learning process in an interesting and interactive manner. The current Hasyim Asyari Tebuireng Jombang refers to the Indonesian National Qualifications Framework in Indonesia called is KKNI standard. So that the material in the Digital Learning System (DLS) method in the form of text, modules, job sheets that are packaged in the form of software, mobile learning, images, videos and animations is also adapted to the KKNI standard which can be accessed anywhere and anytime online.

In this study the learning media developed is a digital learning system. Digital system learning at Hasyim Asy'ari Tebuireng Jombang University still uses a conventional system with a system that supports oral use. In this conventional learning, using the teaching and learning process so this concept discusses about discussing the place,

location and time of implementation by facilitating the activities of students and teachers (Muntu, 2017). Learning the digital system learning process is not optimal because basic competencies cannot be fully supported.

Therefore, digital system learning media were developed which implemented a Digital Learning System (DLS) by making several teaching materials consisting of learning modules, video tutorials, problem training, experimental simulations, and online consultations so as to facilitate students in learning. Not only that, the instructor can also make the teaching and learning process more effective and interesting. By utilizing the Digital Learning System (DLS) it is hoped that it can increase the enthusiasm and motivation of learning for special students at Hasyim Asy'ari Tebuireng Jombang University in increasing knowledge and independent digital learning systems that can apply digital systems in everyday life.

## 2 METHOD

The type of research used is research and development (Research and Development) Borg and Gall (2007) explains that development research is a development of research used to design new products and procedures, then systematically tested, evaluated and improved to meet effectiveness, quality, or the same standard of the specified criteria. Based on the above opinion, it was concluded that the research on the development of digital system learning media with the application of DLS is a systematic process of designing and testing products (modules and websites) to meet the criteria of validity, practicality and effectiveness.

### 2.1 Research Sites

Research on the development of learning media (websites and modules) with the application of DLS in the digital system subject of FTI Informatics Engineering students will be conducted at Hasyim Asy'ari University, Tebuireng Jombang.

### 2.2 Development Research Model

The development model is the basis of developing websites and modules. The development model in this study refers to the steps described by Borg and Gall (in Sugiyono, 2008). The steps of the Borg and

Gall development model can be seen in the following figure:

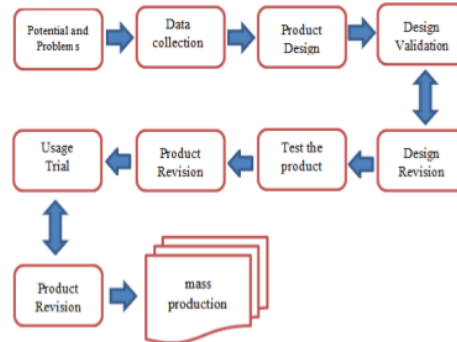


Figure 1. Stages of Research Model Development

## 2.3 Development Research Procedure

### 2.3.1 Potential and Problems

The research was conducted at the Informatics Engineering Study Program at Hasyim Asy'ari University. Observations were made on semester 1 Informatics Engineering students. From the results of the Final Semester Exam data in the digital system course the 2017/2018 academic year showed that the absorptive capacity of students towards digital system courses was still lacking.

One possible causative factor is the use of digital system textbooks that are packaged less attractively and the content of material that uses the language is difficult for students to understand. In addition, conventional delivery used emphasizes more on drill and practice which makes concepts that are difficult for students to absorb. From some of the descriptions above, it is necessary to make improvements to learning, namely in teaching materials (modules) and website use (online) in which there are modules, job sheets, and tutorial videos so that learning is more optimal.

### 2.3.2 Data Collection

At this stage the researcher seeks information that is used as the basis for developing modules and websites. Data collection carried out on this study included observation of the learning process, analysis of the character of students, and RPS Based on KKNi and analysis of the learning environment.

### 2.3.3 Product Design

Website content includes Home, E-Module, Jobsheet and learning videos in each chapter according to module material, RPS, and a gallery containing photos of students during lectures in the computer lab. The module content includes the home page, introduction, content and index sections. On the front page (cover) will contain the module title, the name of the course and the constituent identity. For the introduction contains module identity, preface, table of contents. While the core section contains material, examples of questions and exercises questions. And finally, for indexes and bibliography.

### 2.3.4 Design Validation

Validation activities are needed in development research to be able to see whether the module and website are suitable for use in learning activities or not. This validation stage is carried out by material experts, module development experts and media experts. Expert validation is carried out by digital system experts so that the content / material of the module is in accordance with the learning material.

Expert validation is carried out by digital system lecturers. While expert development validation is carried out by lecturers who are experts in the field of developing materials and teaching tools with a minimum qualification of S2. Validation Website media experts are conducted by Web Programming lecturers. Validation Expert media websites aim to find out that online learning can be applied.

### 2.3.5 Product Trial

Product testing was carried out in small groups of 10 random students from the Unhasy Informatics Engineering class in class A. The product trial was conducted to find out how students responded to the implementation of DLS whether it could facilitate learning digital systems.

### 2.3.6 Product Revision

From the results of student responses about modules and websites, student suggestions and comments were analyzed from expert validation data obtained from validation sheets and student response data obtained from student response questionnaires. Then repaired by paying attention to the analysis data from the response.

## 3 TESTING AND ANALYSIS

In this research the author focused on developing digital system learning media using the Digital Learning System (DLS) applied to students of the Information Technology Faculty of Information Technology Study Program, Hasyim Asy'ari Tebuireng Jombang University aimed at knowing how students respond and can be used as a measure of completeness learning.

Studying learning media is expected that students can maximize learning digital systems. This media consists of: The website developed by the author for learning refers to the KKNi competency standard as a learning aid, especially in the Informatics Engineering Department which is made communicative and easily accessible for students, so that students can study not only at lecture time but also elsewhere and can apply in everyday life. The website developed can be seen in Figure 2 below:

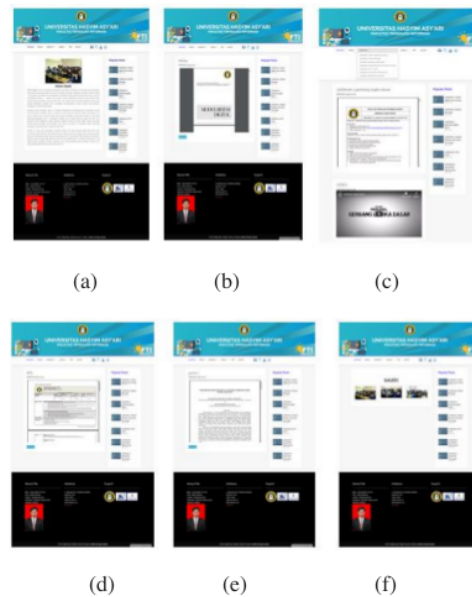


Figure 2. Website of Digital System Learning Media

The information in figure 2 is as follows: (a) Display of the Home and profile of the researcher; (b) The Digital System Module can be downloaded; (c) Job sheets and tutorial videos according to the material; (d) Journal Views can be downloaded; (e) Display of semester learning plan; (f) Gallery (Documentation of KBM activities);

The learning tool developed by the author is using a website and in it there is a learning module that refers to the semester learning plan with the KKNI standard, step by step on each material. The learning modules developed can be seen in the following figure.

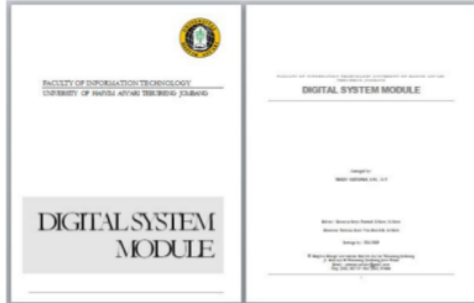


Figure 3. Display of Learning Modules.

### 3.1. Data Retrieval Results

Data collection carried out by researchers in conducting research reviews can be systematically. The results of this research measure are obtained through website validation and learning modules by 2 expert validators, including those listed in table 1.:

Table 1. Validator website and learning module.

No.	NIY	Validator	Work
1.	UHA. 01.0788	Aries Dwi Indriyanti, S.kom.,M.Kom	Lecture
2.	UHA. 01.0358	Ir. Ach.Imam Agung, M.Pd	Lecture

The value of website effectiveness can be known using the validation sheet with the help of the validator in granting values and input and suggestions for improvement. The results of the assessment results can be seen as follows.

Table 2. Table of results of website validation

No.	Validator	Rating in Average		
		A	B	C
1.	Aries Dwi Indriyanti, S.kom.,M.Kom	4,9	4,82	4,8
2.	Ir. Ach.Imam Agung, M.Pd	4,1	4,55	4,8
Average validation results		4,5	4,68	4,8
Overall results		4,67 good category (B)		

The results of the validator's assessment can be shown in table 2 above for websites that are developed with an average is good (4.67). With some revisions obtained, further improvements are made according to the revised validator. Described in table 3 below.

Table 3. Website revision results table.

Format	Expert Advice	After revision
Website	learning videos made by themselves.	own learning videos have been made
	own learning videos have been made	web address made easy.

In the validation sheet assessment stages are prepared to find out the truth in developing learning that is more effective, interactive, and interesting for students. The complete results of the validator's assessment of the learning modules and devices are as shown in table 4 below:

Table 4. Table of results of the learning module validation.

No.	Validator	Rating in Average		
		A	B	C
1.	Aries Dwi Indriyanti, S.kom.,M.Kom	5	4,9	4,7
2.	Ir. Ach.Imam Agung, M.Pd	4,5	4,1	4,6
Average validation results		4,75	4,5	4,7
Overall results		4,64 good category (B)		

The results of the assessment of the learning modules developed can be seen in table 4 above. The results of the module assessment by the validator on the average are good (4.64). Of course, with some revisions obtained, then the module is repaired. So, it can be explained in table 5 below.

Table 5. Learning module validation revision table.

Format	expert advice	After revision
Module	Learning objectives are explained in detail in each material	Learning objectives have been explained in detail
	References possible in the latest year	already added with the latest year

Taking student response data, opinions, and suggestions regarding learning media developed using student response questionnaire sheets. The

complete results of student response data are as shown in table 6.

Table 6. Results of student responses.

Student Name	Response Questionnaire									
	1	2	3	4	5	6	7	8	9	10
Amalia Ridhani	4	2	2	4	4	2	2	4	2	4
Aqilla Fadia Haya	4	2	2	4	4	2	4	2	4	5
Bella Fadia Al - Farida	4	2	2	4	4	2	1	4	2	4
Desy Nur Masita	4	2	2	4	4	2	2	4	2	4
Ikhwan Fitra	4	2	2	4	4	2	2	4	4	5
M Zidan Jayidan	4	2	2	4	4	2	2	4	2	2
Nika Vian Vida A	4	2	2	4	4	2	2	4	2	4
Rocky Ardiansyah Yudistira P	4	2	1	4	4	2	1	4	2	4
Umi Shofiatul Ummah	4	2	2	4	4	4	2	4	2	4
Unzila Savika Putri	4	2	2	4	4	1	1	4	1	4
Student response average	4	2	1,9	4	4	2,1	1,9	3,8	2,3	4
Overall average	3									

Observations were made in learning by writing down student activities by digital system lecturers. The following are observations of student activities during learning in table 7.

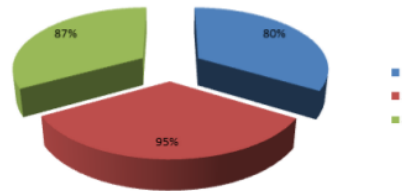
Table 7. Observations of student activities.

Observed categories	Student Activity Presentation (%)		
	Meeting 1	Meeting 2	Average
Pay attention to the lecturer who explained.	30 %	21 %	39%
Reading module	19 %	11 %	21 %
Work with digital system websites	21 %	28 %	16 %
Write relevant to KBM.	11 %	20 %	4%
Discuss or question and answer.	15 %	15 %	14 %

Behavior that is not relevant to KBM.	6 %	5 %	6 %
Total	100 %	100%	100%

### 3.2 The Results of The Learning Website

The Results of The Learning Website.



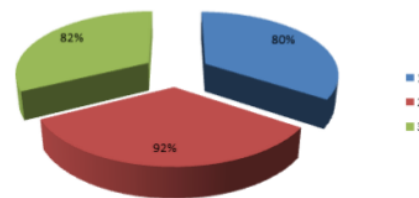
Graph 1. Website validation results.

The results of the website validation analysis shown in graph 1 obtained an overall average of website validation obtained from 2 validators of 4.5 (included in the good category). With details: (A) Aspect 1 (Usability) has a rating of 80%; (B) Aspect 2 (Functionality) obtained a rating of 95%; (C) Aspect 3 (visual communication) has a rating of 87%.

From the description of the website validation rating, it is found that the website developed has an overall average rating of 87% which is included in the excellent category and is very feasible to be applied/used in the UNHAS Y Informatics Engineering digital system application course.

### 3.3 The Results of The Learning Module Assessment

The Results of The Learning Module Assessment



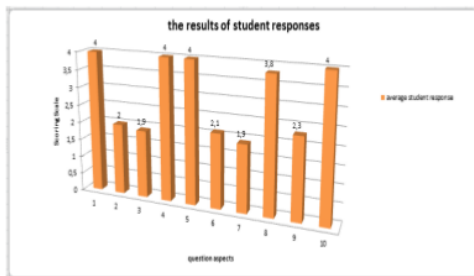
Graph 2. Results of the learning module validation

From the data analysis of the items in the assessment of the learning module in Graph 2. the overall average about the validation of the learning module obtained from 2 validators is 4.2 (included in the

good category). With details: (A) Aspect 1 (Module size) obtained a rating of 80%; (B) Aspect 2 (Module Cover Design (cover) obtained a rating of 92%; (C) Aspect 3 (Module Content Design) obtained a rating of 82 %.

From the description of the learning module validation rating results that the developed learning module gets an overall average rating value of 85% is included in the good category and is very feasible to be applied / used in the application of digital system courses in the Department of Informatics FTI Hasyim Asy'ari University Tebuireng Jombang .

### 3.4 Student Response Results



Graph 3. Results of average student responses.

Based on the student response questionnaire developed digital learning media using Digital Learning System (DLS) with media websites with results 3 (included in the good category), with an 80% rating (attractive category). Informatics Study Program students respond positively to expect better results in the KKNI competency standard learning process using digital systems using Digital Learning Systems (DLS) with one proof of questionnaire data for written student responses and comments "By learning to use DLS can improve and simplify in learning ", from the statistic it can be concluded that students really respond well.

## 4 CONCLUSIONS

Digital system learning media that implements the Digital Learning System (DLS) by creating a website containing several teaching materials consisting of learning modules, job sheet learning, video tutorials, problem training, experimental simulations, and online consultations with the KKNI standard can improve student learning.

In accordance with the results of module validation with an average rating of 85% (good

category) and a website with an average rating of 87% (very good category) so that it is feasible to use. While the response data of students with a weight of 3 with an 80% rating are categorized as attractive. Students also will not miss the material taught because it can be accessed anywhere and anytime online and can motivate learning for students, especially at FTI UNHAS, in increasing the knowledge and expertise of digital systems independently so that they can apply digital systems to everyday life.

## ACKNOWLEDGMENTS

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