Development of Interactive Learning Media Based on Video Tutorials using *the Lectora Inspire* and *Macromedia Flash Applications* in Stone and Concrete Engineering Courses

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ABSTRACT

This research aims to create learning media in the Stone and Concrete Engineering course with the help of the Lectora Inspire and Macromedia Flash applications. The approach carried out in this study uses the R&D method using a 4D development model which includes the defining stage (define), design stage (design), development stage (develop) and trial stage (disseminate). The subjects of the study were civil engineering students enrolled in the Stone and Concrete Engineering course as many as 16 people. Assessment of the feasibility of learning media is carried out by providing validity and practicality questionnaires to media experts, material experts. Data from the questionnaire is then processed to determine the level of validity and practicality of the learning media. The effectiveness of learning media is measured from student learning outcomes using developed learning media. The assessment results from media and material experts for learning media made get an average score of 0.86 in the very valid category. The results of the assessment of the practicality of the learning media made get an average score of 86% in the very practical category. Based on the implementation of the pretest, the average score was 58.25 and the implementation of the posttest or final test obtained the average value was 80.12. There is an increase in student learning outcomes after being given video tutorial-based learning media so that it can be concluded that the level of effectiveness of using this media is very effective. Referring to the assessment of material experts, media experts, tests to students can be declared learning media that are developed suitable for use as learning media.

INTRODUCTION

Learning media is one of the important factors in the learning process because it can be an intermediary and introduction for teachers during the teaching and learning process. In the learning process, in addition to teachers and students, two very important elements are learning methods and learning media. To be able to improve the knowledge and skills of students, it is important to consider the methods and media used in the learning process. Stone and Concrete Engineering is one of the practical courses that demands knowledge and skills.

The implementation of lectures in the Concrete Stone Engineering course requires students to understand and have *skills* in the field of civil engineering such as planning and implementing simple buildings. This course is guided by SNI 1726:2012 rules regarding simple houses. Stone and Concrete Engineering is a practical course that demands motor skills. Practical learning is learning to train students with the aim of improving the ability of students to apply

the knowledge and skills that have been learned.

Based on the results of the analysis of student needs for media in this course, it can be concluded that the availability of learning media is still minimal or little to be used in learning in workshops and independent learning. During the lecture, students only listen to explanations from lecturers without looking at the order of work in the Stone and Concrete Engineering course. So that both lecturers and students really need an interactive learning media that can explain the concept and sequence of these jobs. The lack of use of learning media makes learning less varied and boring, so it is necessary to use new learning media that are interesting, interactive and easy to understand.

The use of video-based learning media tutoial provides knowledge of the material, as well as the steps and ways of the practice process in accordance with the right steps. Stone and Concrete Engineering is a course consisting of theory and practice, therefore the need for learning media is very *urgent*. Learning media must be equipped with video tutorials so that students can understand well and see firsthand how the practical work process will be carried out.

Lecturers and students need innovative, new learning media and can reach the depth of the material. *Software* that supports the creation of interactive multimedia one of them is *Lectora Inspire* and *Macromedia Flash*. *Lectora Inspire* is an authoring tool that can be used in creating interactive multimedia based on audio-visual, development software used for electronic-based learning (e-learning). While *Macromedia Flash* serves to create animations so that the media display becomes more attractive. With an attractive and easy-to-understand appearance, it is expected to improve students' knowledge and skills towards Concrete Stone Engineering work.

The advancement of educational media can encourage, increase and stimulate student interest in what they learn in class so that the purpose of this research can be achieved, namely to develop valid, practical and effective video tutorial-based learning media in Stone and Concrete Engineering courses. Learning media contains lecture objectives, tools and materials, the process of working and analyzing calculations. Through video tutorials, students can learn independently either theory or practice when carrying out Stone and Concrete Engineering practices and improve the quality of learning

METHOD

This type of research is included in the development or Research and Development (R&D) with a development model. Development research can produce media or products that can solve problems and improve the learning and teaching environment consisting of 4 stages, namely the defining stage (*define*), the design stage (*design*), the development stage (*develop*) and the dissemination stage (*disseminate*).

The research begins by analyzing the Semester Learning Plan (RPS), analyzing student needs and the needs of lecturers and students for learning media. The design is based on learning objectives in the Stone and Concrete Engineering course which is adjusted to the planning of learning media. This stage starts from designing learning media testing media in the form of material and media validation, application to find out the practicality of learning media and effectiveness testing to find out the difference in learning outcomes before and after media application.

The research was carried out in the even semester of July-December 2020 in the Stone and

Concrete Engineering course at the Civil Engineering Department. The subjects for testing video tutorial-based learning media in this study were 16 students of the Department of Civil Engineering, Faculty of Engineering, Padang State University who took the Stone and Concrete Engineering course in the even semester of July-December 2020. The learning media developed are tested for validity, practicality by providing questionnaires to expert lecturers and the effectiveness of the media is assessed from the results of *the pretest* and *posttest*.

Analysis of validity data was carried out using quantitative descriptive analysis techniques, namely analyzing quantitative data obtained from learning media validation questionnaires given to media experts and material experts. The formula used to calculate validity uses Aiken's calculations. The result of Aiken's calculation ranges from 0 to 1 and the number 0.6 can be interpreted to have a high enough coefficient then the value of V 0.67 and above is expressed in the valid category.

Practicality test data is obtained from data provided by lecturers and students. To analyze user response sheets on learning media, descriptive analysis is used. To determine the level of practicality of learning learning media with the criteria in Table 2.

Table 2 : Categories Practicality Learning media

No.	Achievement Rate (%)	Category
1	81-100	Very Practical
2	61-80	Practical
3	41-60	Quite Practical
4	21-40	Less Practical
5	0-21	Impractical

Analyze effectiveness data to obtain data on the feasibility of the developed product. The data collection technique used to analyze effectiveness data is through tests, because the ability of objects measured in this study is a learning outcome. The design of student learning ability tests can be seen in the following table:

Table 3: *One Group Pretest-Posttes Design*

Pretesst	Treatment	Posttest
T1	X	T2

The effectiveness of using learning media is determined by looking at the achievement of completeness of student learning outcomes by using video tutorials used during research and compared to before using media. If 80% of student learning outcomes achieve a score of at least 70-74, then this learning media is said to be effective. The level of success of student learning outcomes can be seen in table 2.3 below:

Table 4: Learning Success Level Criteria

No	Achievement Rate (%)	Interpretation
1	81 % - 100 %	Very Good
2	61 % - 80 %	Good
3	41% - 60 %	Enough
4	20 % - 40 %	Less
5	< 20 %	Very Lacking

RESULTS AND DISCUSSION

This research develops interactive learning media based on video tutorials using the *lectora inspire* application and *macromedia flash* in stone and concrete engineering courses. This media development has 4 stages: *define*, *design*, *develop*, and *disseminate*.

1. Defining Stage (Define)

    The first thing to do in the defining stage is a needs analysis. This analysis aims to determine the needs, advantages, and disadvantages of learning media in the learning process. The analysis carried out can be seen in the following explanation:

    a. Curriculum Analysis

    Designing the development of learning media in the Tutorial-based Stone and Concrete Engineering course by analyzing the needs of learning materials tailored to practicum activities. The video tutorial that will be developed is based on the indicator standards in SAP (Learning Event Unit).

    b. Student Analysis

    The next stage is to analyze students about the material, consider concepts, material formulations, and learning objectives are needed to carry out this stage to achieve the goals. The media to be developed must be aligned with SAP. The results of the analysis found that students still did not understand the implementation of practicum during the work process. It is hoped that the development of learning media for Stone and Concrete Engineering courses based on video tutorials can help students in implementing practicum activities independently.

    c. Learning Media Analysis

    Analysis of learning media begins by looking at the learning media used in Stone and Concrete Engineering eyes. Then the development analysis is carried out by developing learning media in the form of video tutorials. The video tutorial that will be presented contains the purpose of testing, tools and materials, work steps and analysis of material needs calculations. The learning videos developed have been adjusted to the discussion groups in SAP Stone and Concrete Engineering. The scope of learning materials in the Concrete Stone Engineering course is:

    1) Measurements consisting of floor plan measurement, bowplank installation and soil excavation
    2) Foundation work consisting of aanstampang work and river stone foundation work.
    3) Ironing or repeating work consisting of making sloof and column ironing, sloof and column formwork work and sloof and column casting.
    4) Wall work consisting of masonry, stucco, screwing and ceramics.
    5)

2. Design Stage

    The next step is the preparation of drafts of materials and working drawings. Since the material to be made is in the form of video tutorials and animations, the right step to be carried out first is to make working drawings using the Autocad application (building drawings in 2 dimensions). The material made using the application is such as bowplank planning, river stone foundation shape and repetition on sloof and columns as shown below.

Figure 1: Bowplank Design and Foundation Plan

Figure 2: Foundation Plan and Details

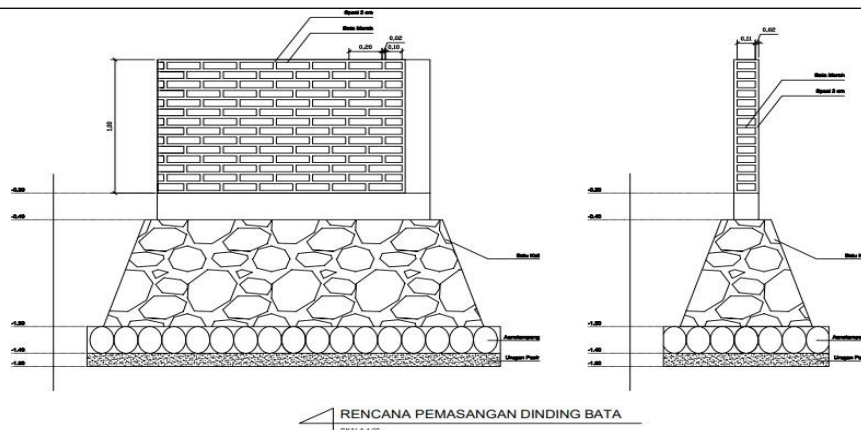Figure 3: Sloof and Column Recurrence Details

Figure 4: Brick Wall Installation

3. Development Stage

At this stage, development is carried out on the design that has been adjusted to SAP. The development phase begins with the shooting of video tutorials in construction workshops. This stage starts from the initial work in the Stone and Concrete Engineering course. The video shooting process starts from bowplank work, stone foundation work, repetition work and wall work. Next is the merging of video tutorials with video editing applications, namely macromedia flash and lectora inspire. By using the application, the video merging process becomes easier, adjusting the material with edited video tutorials so that students are easier to understand the material presented. The next step is to test the media that has been developed. The testing carried out is a stage of improving the learning video that has been made.

The next stage of the process of making this media is development. This stage aims to get learning media based on video tutorials for Stone and Concrete Engineering courses that are valid, practical and effective. The development carried out at this stage consists of three stages, namely:

a. **Validation Stage of Video-Based Learning Media Tutorial**

At the validation stage of this video tutorial-based learning media is carried out into 2 parts, namely video tutorials and material on video tutorials. This stage is still in the process of revision, so what will be conveyed is only an overview of the implementation.

1) **Video Tutorial Validation**

The aspects assessed consist of aspects of content feasibility, aspects of contextual approach and feasibility of presentation. The validation sheet contains didactic requirements, construction requirements and technical requirements. This validation was carried out by 2 lecturers majoring in Civil Engineering FT UNP. Media validators are experts in the field of media and materials in the Stone and Concrete Engineering course.

Table 5. Validation of Video Tutorials as Learning Media Based on Filling Questionnaires by Validators

No Aspects	Assessment Items	V value	Information
Didactic Terms			
1.	Media developed in accordance with the educational curriculum	0,80	Valid
2.	Videos developed can support learning	1.00	Valid

3.	Media developed can improve the quality of an effective learning process	1,00	Valid
4	The media developed is made according to the character of students as users	0,75	Valid
5	The media developed can guide students in learning	1,00	Valid
6	The developed media can stimulate student interest and attention	0,80	Valid
Construction Requirements			
1	Media developed to support learning objectives	1,00	Valid
2	Media video tutorials contain subject matter and details	0,75	Valid
3	The use of media is clear, and easy for students to understand	1,00	Valid
4	Media can be used for independent student learning	0,75	Valid
5	Learning to use video tutorials as a learning medium becomes more interesting	0,80	Valid
6	The use of media as a medium can increase student learning activities	1,00	Valid
Average		**0,88**	**Valid**
Technical Requirements			
1.	The media display is quite attractive	0,75	Valid
2.	The color combination used is appropriate and interesting	0,83	Valid
3.	The components on the media are clear and understandable	0,81	Valid
4.	The quality of the media supports the material delivered	0,85	Valid
Average		**0,81**	**Valid**
Average totals		**0,86**	**Valid**

From the results of the analysis of the validity of video tutorials used as learning media in the Stone and Concrete Engineering course, it can be concluded that from each aspect of the indicators provided by validators, the average of the overall media validation can be taken is 0.86 so that it can be concluded that the tools developed are included in the "very valid" category.

2) **Practicality**

Practicality test data was obtained from filling out questionnaires on the practicality of using tools as learning media by lecturers and students.

a) Lecturer Practicality

Practicality data was taken through questionnaires filled out by lecturers who presented Stone and Concrete Engineering courses. The results of filling out the practicality questionnaire by lecturers can be seen in the following.

Table 6: Results of Practicality by Lecturers

No	Statement	D1	D2	∫	%	Category
1	The media is easy to use according to the user's wishes	5	4	9	90	Very Practical
2	The use of media raises students' interest in learning	5	9	9	90	Very Practical
3	Learning to use media makes students understand the material faster	4	4	8	80	Practical
4	The use of this media can make learning more interesting	4	5	9	90	Very Practical
5	The developed media can be implemented by lecturers	5	5	10	100	Very Practical
6	Media is designed according to learning materials	4	5	9	90	Very Practical
7	The use of video tutorials as a medium saves time in presenting material	4	5	9	90	Very Practical
8	Video tutorials can be used as an independent learning medium	4	5	9	90	Very Practical
9	Video tutorials help lecturers provide learning experiences for students	5	4	9	90	Very Practical
10	Media can help lecturers to construct student knowledge	5	5	10	100	Very Practical
11	The learning process using student-centered media	5	4	9	90	Very Practical
12	The existence of video tutorials can reduce material misconceptions	4	4	8	80	Practical
Average				**108**	**90**	**Very Practical**

Based on the table of lecturers' responses about the practicality of the media used, it can be seen that the average score is 90% with the Very Practical category. Thus, based on the lecturer's response, the product developed is of very practical value.

b) Student Practicality
The practicality of using shaking table tools as learning media is also obtained from student responses about the practicality of using tools which can be seen in the following table.

Table 7: Practical Results Based on Student Responses

No	Assessment Indicators	%	Category
1	With this video tutorial I can find out the learning objectives of the Stone and Concrete Engineering course	90	Very Practical
2	I can follow the learning steps in the Stone and Concrete Engineering video tutorial	91	Very Practical
3	Languages used in the video The tutorial is easy to understand.	80	Practical
4	I can easily use learning media	85	Very Practical
5	This video tutorial helped me to understand Stone and Concrete Engineering material.	87	Very Practical
6	This video tutorial interests me to learn Stone and Concrete Engineering material	85	Practical
7	This learning medium helps me be more active in learning	89	Very Practical
8	With this learning media, it helps me to understand the material about Stone and Concrete Engineering	80	Practical
9	This learning media can facilitate me to learn independently	88	Very Practical
10	This learning media helps me be more active in carrying out practicum in accordance with the right work steps.	85	Practical
Total		**860**	
Average		**86**	**Very Practical**

Based on Table 3.3 student responses about the practicality of using shaking table tools as learning media, it can be seen that the average score is 86% so it can be concluded that the media developed is practical.

3) The Effectiveness of Learning Media

At this stage, students are asked to watch the tutorial video first. Video tutorials contain the stages of building construction work in the workshop. The building includes bowplank work, foundation body work, repetition work for beams and columns, and wall work. The sequence of video tutorials can be seen in the following image.

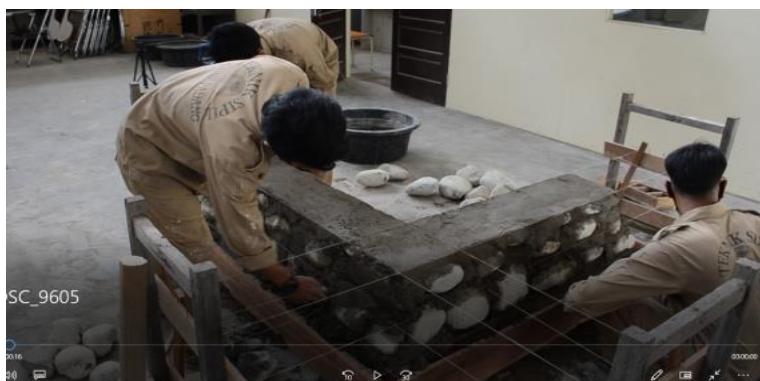Figure 5. The process of working on the bowplank

Figure 6: The process of making the river stone foundation

Figure 7 : Column Casting Process

The effectiveness of using video tutorials is done by conducting learning outcome tests that are carried out at the beginning and end of learning. These two test results are then compared to see the level of effectiveness of the use of learning media. The standard score in this study is the value of students with the lowest score in the range of 70-74. The results of learning mahasisa can be seen in the following table.

Table 8: Student Learning Outcomes

No Student	Pretest		Posttest	
	Value	Criterion	Value	Criterion
1	59	Not Graduated	85	Pass
2	56	Not Graduated	78	Pass
3	68	Not Graduated	83	Pass
4	53	Not Graduated	75	Pass
5	60	Not Graduated	81	Pass
6	59	Not Graduated	75	Pass
7	56	Not Graduated	82	Pass
8	56	Not Graduated	78	Pass
9	68	Not Graduated	88	Pass
10	56	Not Graduated	78	Pass

11	58	Not Graduated	81	Pass
12	57	Not Graduated	83	Pass
13	50	Not Graduated	75	Pass
14	60	Not Graduated	77	Pass
15	56	Not Graduated	78	Pass
16	60	Not Graduated	85	Pass
Average	**58,25**		**80,12**	

Based on the implementation of the pretest or initial test, the average score was 58.25 and the implementation of the posttest or final test obtained the average score was 80.12. From the table above, it can be seen that there is an increase in student learning outcomes after being given video tutorial-based learning media when compared to student grades before being given learning media. It can be concluded that the level of effectiveness of using this media is "very effective" according to the assessment category.

CONCLUSION

From the research that has been completed, it can be concluded that the learning media developed have been tested for validity, practicality and effectiveness. The results showed that the media met the principle of relevance in the qualification of learning media with a level to 0.86 validity which was in the valid category. The practicality of the media based on the lecturer's response is stated to be very practical with a value of 90% and 86% on the practical response of students. The percentage of student learning completeness after participating in learning using media is 80.12%. Based on these results, it can be seen that there is an increase in student learning outcomes after being given video tutorial-based learning media whose level of effectiveness of this learning medium is very effective and can be used in the learning process.

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