Development of Learning Multimedia on Thread Turning Material

Rusiyanto Rusiyanto[1], Sudiyono Sudiyono[2], Wirawan Sumbodo[3], Dhidik Prastiyanto[4], Sri Handayani[5], Johan Andric Aprilian[6]

[123] Mechanical Engineering Education Study Program, Faculty of Engineering, Universitas Negeri Semarang, Indonesia

[4] Electrical Engineering Study Program, Faculty of Engineering, Universitas Negeri Semarang, Indonesia

[5] Civil Engineering Education Study Program, Faculty of Engineering, Universitas Negeri Semarang, Indonesia

[6] Vocational Education Study Program, Postgraduate School, Universitas Negeri Semarang, Indonesia

me_rusiyanto@mail.unnes.ac.id

Abstract

This research aims to develop learning multimedia on triangular thread-turning competencies that is feasible and practical for use in learning. The multimedia content developed is in the form of animations and learning videos. The research method used is *research and development (RnD).* The development method used is ADDIE (Analysis*, Design, Development, Implementation, and Evaluation)*. The data collection method used is documentation to obtain initial learning data on thread-turning understanding material, interviews with teachers and students, and a multimedia feasibility questionnaire by experts. material and media experts. Apart from that, questionnaires were also given to teachers and students to assess the practicality of multimedia. The results of the research show that multimedia is suitable for use in learning thread-turning material with a material expert suitability score of 93.1% or in the very suitable category. The results of the media feasibility assessment by media experts obtained a score of 91.74% or the very feasible category. Meanwhile, the practicality assessment by the teacher obtained a percentage of 85.7%, and the practicality assessment by students was 87.5%. These two practicality assessments show that this multimedia is very practical to use in learning thread-turning material.

Keywords: development, multimedia, thread turning

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1. INTRODUCTION

According to Law No. 20 of 2003 concerning national education, Vocational High School (SMK) is a formal educational institution where graduates are prepared to enter the world of work and have abilities that are in line with industrial capabilities. Vocational school graduates are prepared to work in industry. One of the industrial fields is the machining or manufacturing industry. The increasing development of industry in Indonesia, including the field of machining, will play a very important role. So, the need for skilled and competent workers who have expertise in the field of machining will increase.

One of the subjects that can improve students' skills is practical subjects. Practical subjects are a group of training subjects whose function is to equip students to have work competencies following the Indonesian National Work Competency Standards (SKKNI) or competency standards agreed by institutions representing the business or industrial world. Practical lessons are taught specifically according to the needs of each skills program. Productive (practical) lessons have a large number of hours compared to the number of normative or adaptive (theory) lesson hours (GBPP, 2004: 8). According to [1] 70% of learning in vocational schools is filled with practice and only 30% theory, because vocational school graduates are required to have certain skills.

One of the factors that influence the quality of education is student competency [2]. Meanwhile, student competence is influenced by various factors within the student, such as intelligence, interest, motivation, and environmental factors such as teachers, curriculum, facilities, etc. One of the factors that greatly influences the process and quality of teaching is factors within the students themselves, namely student learning motivation, therefore teachers must be able to create situations that can support student learning development, including fostering student learning motivation so that they can improve results. Study.

SMK N 1 Blora is a vocational high school that has a machining engineering skills program in which one of the lessons is doing thread-turning work with a lathe. It is hoped that in the future the resulting graduates will be able to do jobs in terms of thread turning with quality according to standards set by the industry.

In general, the students' practice results are still not as expected because there are still some students who have scores less than the KKM. KKM is a reference criterion for achieving basic competencies that must be achieved by students in each subject and students who have not achieved KKM are said to be incomplete [3]. The KKM applied at SMK N 1 Blora for practical subjects is 75. However, based on the results of observations of students' practice scores in class XI TPM 1 and XI TPM 2, each with 35 students, showed that 51 students (72.86%) still got scores below the KKM in the thread turning material. This condition illustrates that this is not very encouraging for all parties because it will affect the achievement of graduation.

Based on these scores, it appears that it is not enough for students to enter the industrial world directly because competition for the industrial world among vocational school students requires students to obtain scores that not only meet the KKM but also good graduation standards to meet the correct criteria. Industry requires competency, knowledge, ability, behavior, and experience.

According to [4], improving learning practices is one way that can be used to improve the quality of education. Apart from that, students must have the ability to use various learning resources, and teachers must also have the ability to use these learning resources [5]. Therefore, according to [6], an educator must have pedagogical competence and methodological abilities to plan and implement learning. Additionally, they must have the ability to use learning tools.

The description of students at SMK N 1 Blora while doing work with a lathe when the author made observations was firstly a lack of understanding of students in understanding the subject matter presented in learning activities in class, especially regarding thread-turning competence. This is because the delivery of material about lathes still uses the lecture method which is carried out at the beginning of the meeting. So the thread material has not been delivered but it has been practiced and the learning media used is still not interesting, because it is not equipped with animation, audio, or video about threads. This causes students to have no idea of understanding the material about screw lathes that will be practiced by students.

The observation results also show that several shortcomings are still encountered, including the delivery of material still using the lecture method, which causes students to have no idea of understand the material; lack of understanding of students in understanding the subject matter presented in classroom learning activities, this is due to the lack of interest in learning media such as animation, audio media, video media; lack of learning resource facilities and teaching materials that support students to learn at home; learning has not developed students' abilities as a whole including the affective, cognitive and psychomotor domains; as well as learning activities that should still be teacher-centered. Teacher-centered learning will cause students to become passive, making the teacher the only source of learning, and not having the opportunity to develop critical thinking skills and solve problems in learning [7] [8] [9].

Considering this reality, the main aim of this research is to develop learning multimedia that is feasible and practical for students to use in thread-turning material. Apart from that, it is also hoped that with this multimedia, students can learn independently after receiving the material in class. The multimedia developed is multimedia based on the PowerPoint application which is equipped with images, audio, video, and animation. It is hoped that this multimedia development can increase student activity in learning, be flexible to use for learning anywhere, and increase student motivation in learning [10].

2. METHODS

2.1 Types of research

The research carried out is research and development *(Research and Development)*. Development research is a research method used to develop new products or improve existing products and can be accounted for. This research is focused on developing learning multimedia based on the PowerPoint application for thread-turning material.

2.2 Research procedure

The development model used in this research is the ADDIE development model. [11] explains that research into the development of the ADDIE model is one of the development models that can be used to produce effective learning plans. The ADDIE development model has five development steps, namely *analysis*, *design*, development, *implementation*, and *evaluation*.

2.3 Analysis

In the analysis stage, researchers analyzed the machining engineering skills program curriculum at SMK Negeri 1 Blora on the topic of working with a lathe. Curriculum analysis includes basic competencies, core competencies, learning objectives, learning materials provided, and learning materials that students must master. The purpose of this analysis is to determine which competencies require the development of learning materials.

2.4 Design

Planning is carried out based on the results of the analysis. The planning stage includes creating an outline of multimedia learning content, designing multimedia content, creating multimedia research/assessment tools, planning multimedia content scripts, creating animations, and creating learning videos.

2.5 Development

Multimedia creation activities are included in the development stage. This stage consists of three stages of development: writing a multimedia draft, storyboard, sequence of material, placement of animation and video, editing, and then continued with validation and assessment by material experts and media experts.

2.6 Implementation

Practicality testing of the machining engineering skills program was carried out by teachers and students of SMK N 1 Blora after the multimedia product was developed and well received by media and materials experts. This activity was carried

out to determine the reactions of teachers and students after using the results of multimedia development.

2.7 Evaluation

Evaluation is the final stage of the development process. At this stage, the electronic teaching materials developed are evaluated, which includes evaluating multimedia learning through assessment sheets created by material experts and media experts, and practicality questionnaires are given to students and teachers for use.

2.8 Data collection technique

This research uses observation, interviews, and questionnaires to collect data. One method of collecting data is a questionnaire, which is done by giving respondents several written statements or questions to answer [12]. Multimedia feasibility data is collected through expert validation sheets. Next, it was analyzed using a Likert scale questionnaire with 4 alternative answers to determine the level of feasibility. This is done using the analysis techniques mentioned below [12]:

Information:

P = Percentage of multimedia feasibility
Σn = Total score of research aspects by experts
ΣN = Maximum total assessment score (maximum value for each item x number of question items x number of respondents)

Once the analysis and assessment percentages are collected, they can be converted into qualitative sentences. If the results of the feasibility test data analysis by an expert show a minimum result of 51% or more, the learning media for thread turning can be considered feasible. This applies according to the following guidelines:

Table 1. Percentage Rating Scale

Valuation Percentage	Interpretation
76 % - 100 %	Very feasible
51 % - 75 %	feasible
26 % - 50 %	Less feasible
0 % - 25 %	Not feasible

(Source: [12])

In this research, data on the practicality of multimedia learning to thread turning was obtained from two research subjects, namely teachers and students. The average data from both will be calculated and then converted according to the practicality

level criteria. Analysis of the level of multimedia practicality can be calculated using the following formula:

(Source: [13])

Information :
Vp = Practical Validity
TSEp = Total Empirical Practicality Score
S-max = Maximum expected score

After knowing the practicality value, the following criteria can be used to explain the practicality results obtained:

Table 2. Criteria for Practicality of Interactive Multimedia

Criteria	Category	Information
75.01% - 100%	Very Practical	Can be used without revision
50.01% - 75.00%	Practical	Can be used with small revisions
25.01% - 50.00%	Less Practical	It is recommended not to use
00.00% - 25.00%	Impractical	Can not be used

(Source: [13])

3. RESULTS AND DISCUSSION

Analysis Stage

The earliest stage in developing this learning multimedia was analyzing by conducting field observations and reviewing existing literature. Literature analysis and interviews with teachers and students practicing lathe machining are the first steps in developing this learning multimedia. The purpose of these observations and interviews is to collect data about multimedia that has been used by teachers in learning.

The results of interviews and observations show that so far, the implementation of lathe machining practices has not used adequate learning media. So far, teachers only use media in the form of presentations, so the content is very limited. Students also have not mastered the basics of machining practices. This causes students' understanding of machining material, especially lathe machining, to be very limited.

The literature study was conducted after the field study was completed. In this step, the activity is to analyze the Lathe Machining Practice Learning Implementation Plan. This is done to examine learning objectives, basic competencies, core competencies, and the material provided to students. The results of this analysis are also used as a basis for developing learning multimedia that will be developed.

Design Stage

Learning multimedia design is a task carried out at the design stage. Preparing an outline of multimedia content, selecting formats, drafting manuscripts, and editing are all the work carried out. In the lesson material, there is a foreword, table of contents, learning objectives, basic competencies, core competencies, and thread-turning material. The lesson material is also equipped with learning videos and animations. Writing is done in a consistent format and the material is arranged coherently so that it is easy for students to understand. Multimedia is created in Powerpoint presentation format which is equipped with animations and a complete learning video about thread turning.

Product Development and Validation Stage

The next step after design is multimedia development which is still in draft/plan form. This was done to obtain input from material experts and media experts regarding the depth of content, form, and format of the teaching materials being developed. The development activities carried out include adding up-to-date pictures of thread-turning machines and tools, animations of the thread-turning process, and videos of the process of initial setting of the workpiece and machine when doing thread-turning.

Assessment or validation by material experts and media experts is carried out after the multimedia has been prepared. Using previously prepared instruments, material expert validators and media experts were asked to assess the learning multimedia that had been prepared. Apart from assessing the validity of the multimedia created, validators are also asked to provide suggestions for the multimedia draft created, which is then used to improve or revise the multimedia draft that has been created. Table 3 shows the results of the expert validation.

Table 3. Material expert validation results

No	Assessment Aspects	Rating percentage (%)
1	Eligibility of content	95.5
2	Presentation equipment	88.3
3	Linguistic assessment	95.5
	Average	93.1

The results of material expert validation show an average assessment percentage of 93.1%. This percentage value is in the very feasible category. Likewise, the assessment from media experts showed that the average percentage of assessments obtained a score of 91.74% or was in the very feasible category.

Table 4. Media expert validation results

No	Assessment Aspects	Rating percentage (%)
1	Content Design	90
2	Display feasibility	86.6
3	Ease of use	91.1
4	Graphic feasibility	95.5
5	Eligibility Benefits	95.5
	Average	91.74

Implementation Stage

The implementation stage was carried out to measure the practicality of learning multimedia which had previously been declared valid by material experts and media experts. This practicality measurement involves teachers who teach practical lathe machining subjects and students who take these subjects. Students and teachers were asked to use the developed multimedia on a limited basis, and then given a questionnaire to measure its practicality.

The results of the multimedia practicality assessment by teachers as users show that the percentage of interactive multimedia practicality reached 85.7% with the criteria "Very Practical". Practicality assessment is carried out from several aspects including multimedia can be operated easily and smoothly, multimedia can be used repeatedly, multimedia can help students understand the material provided, multimedia can foster student creativity, multimedia can be studied independently by students, and material in multimedia is appropriate. with student progress, and up-to-date multimedia material.

Meanwhile, the practicality assessment by students obtained a percentage score of 87.5% or was in the very practical category. Aspects assessed by students include text readability, image clarity, animations can run well, videos can run well, multimedia material can be studied independently, multimedia material can improve students' understanding, multimedia can increase learning motivation, and after Using multimedia students become more enthusiastic about learning. The results of this assessment are in line with the results of research [14] which states that practical multimedia will help students and teachers in carrying out learning.

Evaluation Stage

The final product of this research is multimedia learning on thread-turning material. After receiving validation from experts, implementing it, and obtaining a practical assessment, then the multimedia is evaluated for further development. This development includes adding practice questions, adding links to learning videos from other sources, as well as adding material for making internal and external threads with various thread shapes. This needs to be done to produce complete multimedia for

studying all the material on turning various types of threads. Apart from that, it will increase students' understanding and make it easier for teachers to convey learning material, as argued by [15] which states that one of the main functions of multimedia is to make it easier for students to understand learning material.

4. CONCLUSIONS

The research results show that the multimedia learning developed has been declared valid by media experts and material experts so that it can be implemented in learning. Apart from that, the results of assessments by teachers and students also show that the multimedia developed is very practical for use in learning and can make learning easier for students.

The suggestion given is that the use of multimedia learning material for thread turning to produce optimal learning needs to be supported by the application of appropriate learning methods. Apart from that, future researchers can apply this multimedia to measure the effectiveness and learning outcomes after students use the developed learning media.

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