The Development of Interactive Learning Media with Mind Map Concept in Video Processing Subject

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Abstract:

This research aims to create an interactive learning media with mind map concept in Video Processing subject. Method used in this research was research and development with 5 steps, (1) problem and potency analysis, (2) data collection, (3) product design, (4) design validation, and (5) design improvement. This learning media is flash based and developed by using Adobe Flash application. Flash-based media has small size, easy to use and compatible to various devices. Media's advisability, which had developed, in percentage are 89% from the media expert, 92% from material expert, 85% of users (limited) and 87% from users (expanded). It can be concluded that the design of learning media is "very appropriate".The benefits of the learning media are: (1) interactive and fun, (2) equipped with videos tutorial, (3) equipped with exercises which able to scored and able to see the correct answers.

Keywords: development, learning media, mind map, video processing subject, vocational school.

1   Introduction

Curriculum 2013 is developed from the previous curriculum, named KTSP. Curriculum 2013 is not only about knowledge but also about character. The curriculum expects students to comprehend the lesson, have skills, and have good characters both social and spiritual. Moreover, students are expected to be independent, who be the center (students centered method). The teacher should build a condition where students could learn with their own ability in every subject and they involve actively in every learning activity. For build that condition, the teacher may use varieties methods and learning media, and use many facilities and learning resource (Mulyasa, 2014). Therefore, it can be said that learning resource is one of the factors which determine the success of teaching and learning activities.

Video processing is one of multimedia major subject in vocational school. Teaching and learning activity is conducted for 2 hours in a week. The common applications which are used **on** this subject, including SMK Negeri 3 Surakarta, are Adobe After Effect and Adobe Premiere. These applications have different functions but related one each other.

Based on observations in teaching and learning activities of video processing subject, in SMK Negeri 3 Surakarta, teacher's difficulty is there is much material that must be given, while the time provided for one subject is limited. In addition, video processing needs a lot of time to practice. If teachers rely solely on meeting with students in subjects, then the material provided is limited and not optimal.

Another difficulty is related to learning resources. Students tend to rely on teacher explanations when teaching and learning activities take place due to unavailability of appropriate learning resources. Another difficulty is related to learning resources.Students tend to rely on teacher explanations when teaching and learning activities take place due to unavailability of appropriate learning resources. Whereas, to understand teacher's explanation, each student takes a different time, some are easy, some need more time, or need repetition. Teachers have difficulty if they have to guide each student personally.

Some reasons above are potencies to develop a learning media in video processing subject. The developed learning media helps students to learn independently and the teacher plays a facilitator role. The learning media also help students understand the material and also provide tutorial videos which the material fit on the syllabus. This learning media is flash based and developed by using Adobe Flash application. Flash-based media has small size, easy to use and compatible to various devices. Then, the purpose of using mind map is to present the material in this media as an effort that can help students to understand the use and relationship between the parts of menus, panels, properties and other sub-sections of the application. According to Azman, et al (2014), Some of the advantages of mind map are: summarizing information, presenting information in a format that shows the overall, studying, retaining and recall information, and promotes meaningful learning instead of memorization. The use of mind map more effective than concept map. Even it will be more useful if the mind map user has been introduced to special software to create a mind map that will save time and the presentation of the mind map can be more alive. (Liu, Y., et al, 2014).

A study with equivalent lesson has been conducted. Mannens, et al (2014) conducted a design of intelligent multimedia mind maps intended for the pre-production media industry. The use of mind map helps users convey their thoughts, so it can be understood by the next party who read their mind map. That media made it possible to create a mind map by including image, text, audio, and video data, as well as searching for explanations from the mind map.

The purpose of this research is knowing the way to develop an interactive learning media with the concept of mind map and knowing the advisability of the media. This research's benefits are as a reference for others research in education field and produce learning media that can be used.

2   Research Method

This research and development uses 5 steps, there are: (1) problem and potency analysis, (2) data collection, (3) product design, (4) design validation, and (5) design improvement.

2.1   Problem and Potency Analysis

Problem and potency are found by observing teaching and learning activities and interviewing the teacher and some student representatives.

2.2   Data Collection

After analyzing the problem and potency, the following step was collecting the information. At this stage, collecting relevant research, books, syllabus and video processing material were conducted. Development of learning media program according to Musfiqon (2012: 164) through the following steps: (1) Analyzing the requirements and students characteristic, (2) Analyzing the instructional purpose, (3) Formulating item items in detail that support the achievement of goals, (4) Making instrument to assess, (5) Writing a media script, (6) Conducting tests and improvement. Moreover, the development of an interactive learning multimedia, according to Darmawan (2011: 41), analyzing the requirements in first point is to know the function needed of the media. The analysis of non-functional needs was aimed to determine the needs of hardware and software used in research and development.

2.3   Product Design

A learning media was designed based on the results of potential and problem analysis and data collection. This stage are divided into several steps according to the procedure of development of interactive multimedia learning program by Darmawan (2011: 34-45), which is: which is: designing the flowchart, arranging material (storyboard), designing the interface (collecting materials in the form of text, images, animations, video, audio), graphic design implementation (including coding, organizing all materials, and finishing).

2.3.1   Designing the Flowchart

Flowchart described thoroughly the flow of media would be used as a guidance in making media (Darmawan, 2011: 42). Flowcharts were made according to functional requirements analysis.

2.3.2   Arrange Lessons and Evaluations

After flowchart had designed, next step was prepared the material and evaluation. The presentation of materials and evaluation was based on the basic competencies written in the syllabus according to Poerwati and Amri (2013). There are 4 main competencies in every subject, the first is spiritual attitudes, second is social attitudes, third is knowledge, and fourth is skills. Each main competency is divided into several basic competencies (KD).

Video processing subjects are expected to achieve 12 basic competencies at third and fourth basic competency in one academic year. However, this learning media includes 5 basic competencies that are expected becoming material in the odd semester. The five basic competencies can be seen in Table 1.

Tabel 1. Basic Competence of Video Processing Subject

KI	KD	Basic Competencies
1	1.1	Understanding spiritual value by realizing the relationship of order and the complexity of nature and the universe toward the greatness of God who created it
	1.2	Describing the greatness of God that creates various sources of energy in nature.
	1.3	Implementing the values of faith in accordance with the teachings of religion in everyday life
2	2.1	Showing scientific behavior (curiosity, objective, honest, meticulous, careful, cautious, responsible, open, critical, creative, innovative and caring environment) in daily activities as a form of implementation of attitude in experimenting and discussing
	2.2	Appreciate the work of individuals and groups in daily activities as a form of implementation to carry out experiments and report on experimental results
3	3.1	Understanding the various video formats
	3.2	Understanding the using of video processing software
	3.3	Understanding video manipulation using effect in video processing software
	3.4	Understanding the audio processing to be integrated with video
	3.5	Understand text processing to integrate with video
4	4.1	Presenting a variety of video formats
	4.2	Processing various video formats with the help of video processing software
	4.3	Presenting the results of video manipulation using effects feature in video processing software

| 4.4 | Processing audio to be combined with video |
| 4.5 | Processing text to integrate with video |

In each meeting, teacher should make lesson plan. Each lesson plan should involve a point from each of the basic competencies in first and second basic competencies. While at the third and fourth basic competencies, selected numbered equal points.

In this learning media consists of materials and evaluations. Material presentation and evaluation are grouped based on points on KD 3 and 4. Presentation of the material begins by explaining the basic competencies to be achieved. The next page, the material is presented with the concept of mind map. The steps of design a mind map are: (1) Writing the main ideas in the middle of the paper, (2) Adding a branch of the main idea with varying number of branches, and different colors for each branch, (3) Writing the keyword or phrase on each branch to convey the core of an idea and to trigger your memory, (4) Adding symbols and illustrations to make it easier to remember.

The mind map presentation comes with a link on the branch that leads to the video tutorial page or brings up the explanatory text. There are 14 tutorial videos in this learning media. Steps to create a video tutorial are: (1) Planning the content of the video and specifying time allocation, (2) Recording each movement of video processing practices using special applications; (3) Recording audio separately if audio quality is still poor, then combine audio with video during editing, (5) Adding text to required sections, (6) Rendering the video.

Evaluation is done after students studied the material. Evaluations in this media have two forms of evaluations, which are multiple choices applied to the first, second, and fourth basic competencies and project assignments applied to the third and fifth basic competencies. The multiple choice aims to assess students' level of understanding. After the answer is entered, the user gets feedback in the form of a value and can see the right answer. While in project assignments, students are assigned to make video such as video samples which are available or as the terms are displayed.

2.3.3   Design Interface

After had compiled the materials and evaluations, then created the interface design which steps are designing the page layout, collecting or designing text, image, animation, video, audio, and button.

2.3.4   Graphic Design Implementation

The results obtained from both collecting and designing were arranged by page layout design and drafting of materials and evaluation. All arranged in Adobe Flash applications including writing program code, for the learning media to run in accordance with the expected function.
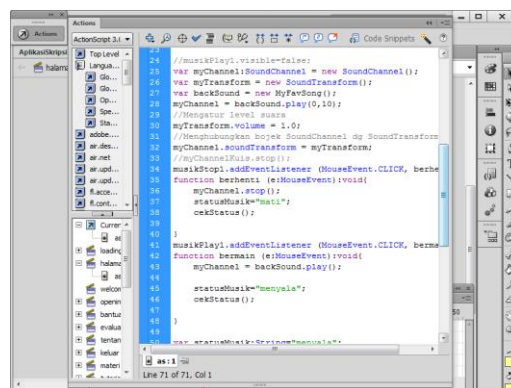

Figure 1. Writing Programming Code

Development of learning media used a 64 bit PC unit with 4GB RAM with 10 GB hard disk space and recording device. Software used in this research were: Windows 7 operating system, Adobe Flash Professional CS6 developer application, Adobe After Effect CS6 video tutorial application, Camtasia 8, Adobe Audition 1.5, Format Factory, and image processing Corel Draw X4.

2.4   Design Validation

Validation was conducted after the learning media design had made. Validation is a stage of assessing media design by involving experts or experienced experts to assess the product. Validation was using questionnaires as an instrument with the scale of 1-5 to get quantitative data, and paper sheet to give critic and suggestion to get qualitative data. Prior to validation, the instrument should be validated by media and material experts.

Media expert assessed the developed media. The assessment is divided into aspect of visual communication (display quality of text, image, sound, navigation) and aspect of software engineering (usage instructions and the ease of using the media)

Material experts assessed the video processing's material. The assessment is divided into aspect of material substance (material content) and aspect of learning (material and evaluation presentation and the use of language and illustration)

The users assessed learning media from the media and material aspects. For the users, validation had done twice, limited validation by involving teachers and some students as representatives, and the expanded validation by involving teachers and all students in one class.

2.5   Design Improvement

Improvements were done after media had been validated. Things that need to be improved on the design of media are known from the assessment results during design validation. The first improvement was made after validation by media experts and material experts. Then, the second improvement was done after limited validation. If after expanded validation, there were things that need to be fixed, learning media still need to be improved.

3   Results and Discussion

The result of this research and development are a learning media design that has been assessed by experts and users and has improved. The results of each stage are described in detail as follows.

3.1   Problem and Potency Analysis

The result of observation in teaching and learning activity of video processing subject were: (1) for a year, students learn very wide material, (2) the method of delivering the material are by talk and practice, (3) Appropriate learning resource not available, (4) At the time of practice, students often ask the same relative question as lagging. Then the results of interviews the teachers and students are: (1) Teacher use video tutorials obtained from the internet as learning resources with the weakness of video content is less in line with the syllabus, (2) the students found it difficult because they didn't have learning resources such as books, or e-book, which contains material descriptions.

3.2   Data Collection

The results of collecting information supported the development of learning media which is containing mind map concept and accompanied by video tutorial and evaluation. Then the needs of learning media were: (1) equipped with material according to basic competence (KD) of curriculum 2013 video processing subjects, (2) presentation of material helping students understand the material, (3) equipped with video tutorial, (4) completed with quizzes or practice with feedback in the form of values, (5) interesting and fun.

3.3   Product Design

The design of media had developed based on the results of potential and problem analysis and the results of data collection. The results of each step in designing media are described as follows.
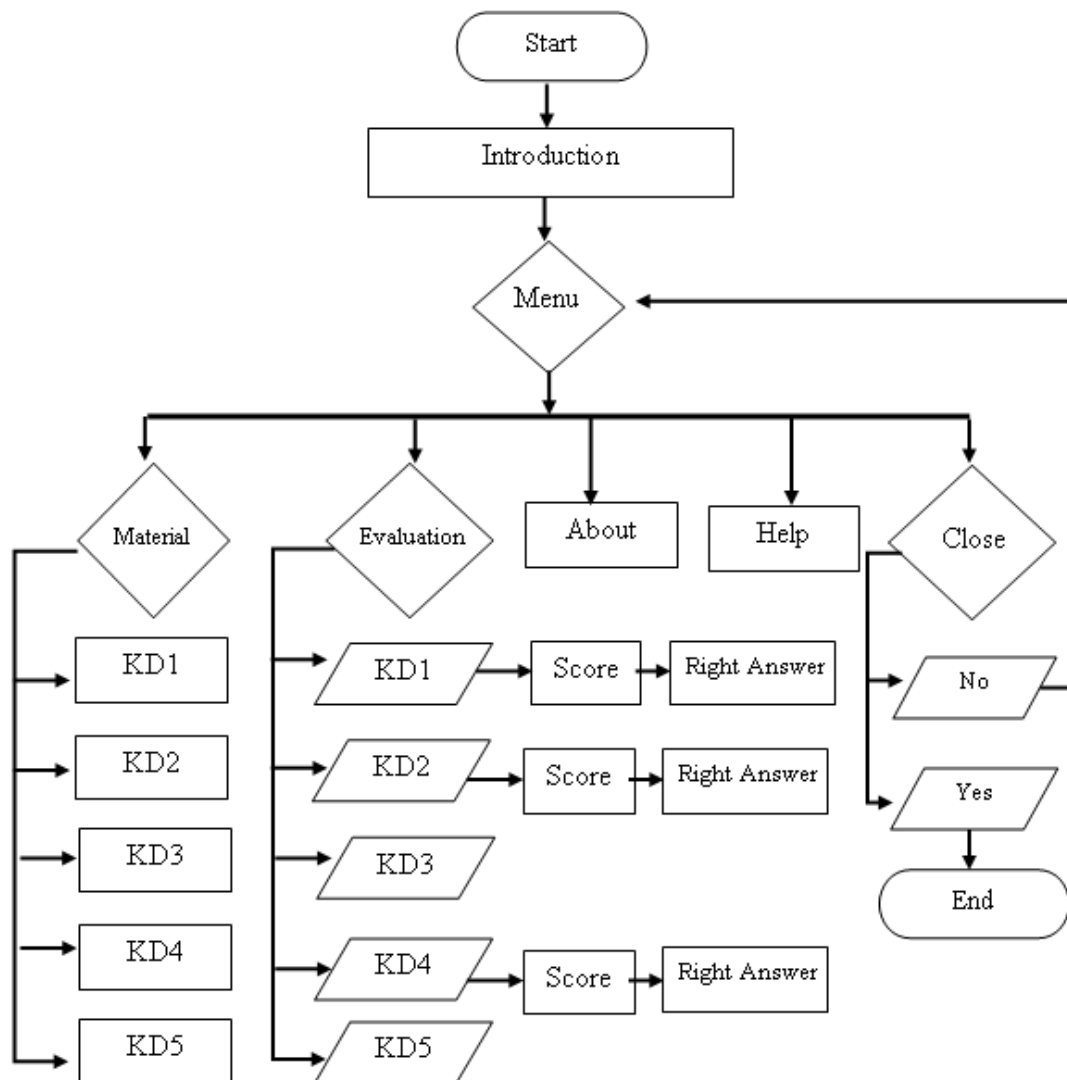
Figure 2. Flowchart of Learning Media

The first step in product design was designing a flowchart. The results of the design can be seen in Figure 1. Then, arranging the lessons and evaluations. The material on learning media was divided into 5 KD and presented with mind map. This learning media also fully equipped with 14 videos for practice and questions as evaluation.

- KD I : Understanding the various video formats and presenting a variety of video formats

- KD II: Understanding the using of video processing software and processing various video formats with the help of video processing software

- KD III: Understanding and presenting the results of video manipulation using effect in video processing software

- KD IV: Understanding audio processing and processing the audio to be integrated with video

- KD V: Understand text processing and processing the text to be integrated with video

3.3.1 Design Interface

The result of designing the interface, writing the programming code and media end view can be seen in Figure 3-9.

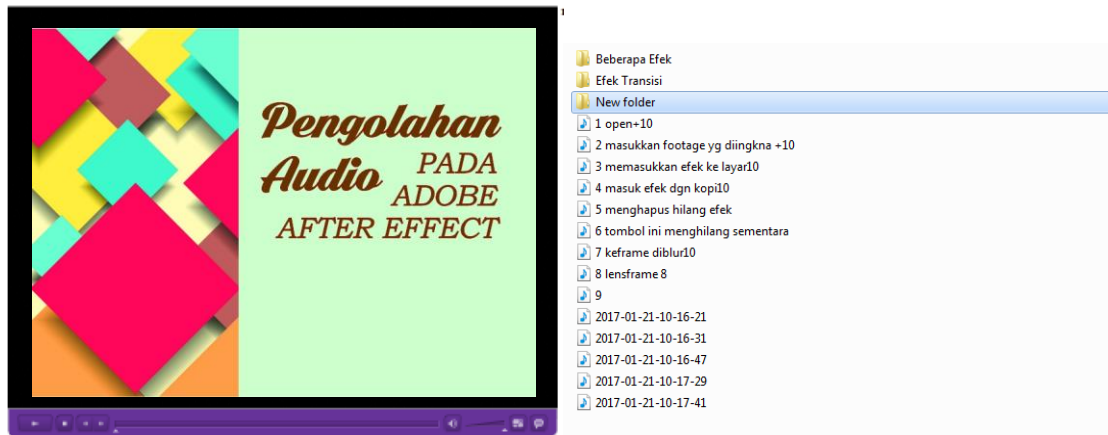Figure 3. Examples of Text, Image, and Animation Collection

Figure 4. Examples of Video and Audio Collection
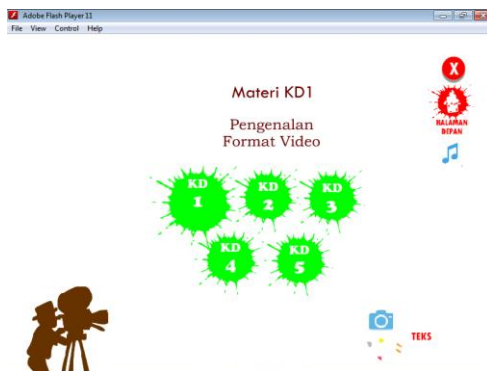
Figure 5. Front View of Learning Media
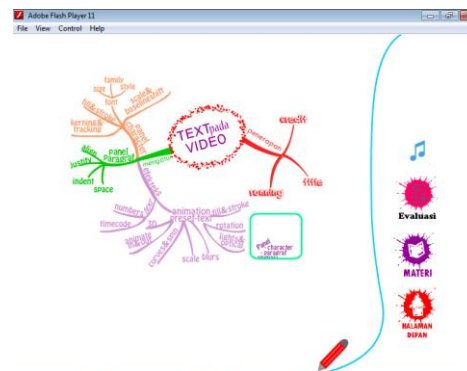
Figure 6. Content Menu Display

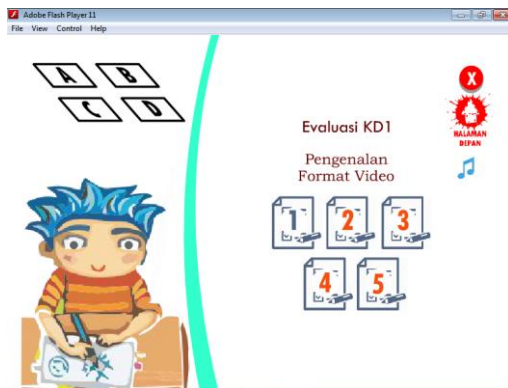Figure 7. Display of Material Presentation with Mind Map

Figure 8. Evaluation Menu View

Figure 9. Multiple Choice in Evaluation Display

3.4 Validation and Improvement

After media design, then validation stage by media experts, material experts and users were conducted. The instruments were questionnaire and paper sheet to give critic and suggestion

3.4.1 Validation by Media Expert

The goal of media validation is assessing the feasibility of learning media. The results of the assessment of media experts, learning media received the percentage of 100% on the aspect of software engineering and the percentage of 80% on the aspect of visual communication with the lowest assessment lies in sub-aspects of graphics and sub-aspects of the text. Inputs given by the media experts were: (1) Adding the display loading bar, (2) Using a movie clip that fits the theme of video processing to make it more interesting, (3) Adding information to the buttons in the Menu page Material and Evaluation Menu

3.4.2 Validation by Material Expert

The result of the assessment from the material expert is learning media received the percentage of 95% on the learning aspect and the percentage of 90% on the material substance aspect with the lowest rating on the sub-aspect of material quality. Inputs from the material aspect were: (1) Presenting the mind map of the material with animation, (2) Adding the explanatory text to the video tutorial, (3) Adding the description on the About Page about the application discussed is Adobe After Effect CS6 Application, and (4) Adding a discussion page to the evaluation. The results of validation with the experts to be material improvement in the design improvement.

3.4.3 Validations by Users

Limited users had assessed and the results were 89% on the software aspect, 83% percentage on the material substance aspect and 83% on the communication aspect. The lowest percentage is on material

substance aspect in sub-aspect of audio quality and evaluation (cover). While the lowest percentage on the aspect of visual communication is on the sub-aspect of sound quality. Criticism and suggestions received were: (1) Placement of text annotation need to replace, (2) The presentation of evaluation is less interesting, (3) Mind map is confusing, (4) Audio button still error.

A development of mind map based learning media has been conducted in the subject of transistor at SMK Negeri 1 Magelang. In presenting the material, Nurkholis (2015) initially presents the main competencies and basic competencies that must be achieved, followed by the presentation of mind map, then into the material. Features presented are material menus, exercise questions, and references. Media got the percentage of eligibility 88.13% from material experts, 85% of media experts, and 81.85% from the student.

Another development of mind map based learning media also conducted in the subjects of General Ecology in the Biology Education Major of Jambi University by Ningsih (2015). Mind maps are used to view the general overview of the material as a whole, and are used as a review. Media experts and materials experts scored 87.5% and 95%. In small group trial the score was 85.65%, and in the large group trial 88.95%. Applications are considered very good and can help in understanding the material Ecology.

After learning media had been improved, then expanded users assessed the learning media. Validation got 90% percentage of software aspect, 85% from material substance aspect and 86% from visual communication. Criticisms and suggestions received: (1) color combinations are less appropriate, (2) some mind maps are confusing, (3) clarify the resolution of fonts and images, (4) fix some navigation buttons that have not functioned yet. (5) improve the calculation of the evaluation value of KD 3.2 and 4.2 because it is not accurate.

4   Conclusions and Recommendation

The results of the assessment on developed media were 89% by media experts, 92% by material experts, 85% by limited users and 87% by users expanded. It can be concluded that interactive learning media that have been developed is "very appropriate".

The development of learning media gives the following implications. (1) Being a learning resource to help students, (2) Helping teachers when giving material in learning activities of video processing subject, (3) Motivating students to apply mind mapping as one of effective way of learning, (4) And the more effective and efficient power and resources.

Suggestions for the next development are: (1) Presenting material with mind map concept or other concepts better and easier to understand, (2) Making tutorial videos with better picture and audio quality, (3) Conducting observation to assess user responds naturally when using media with instruments. In developing the learning media, pay attention to the ability of hardware and software owned so the development can run optimally.

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