Developing vocational synthetic video motion learning using motor slider

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Abstract. We describe a method for improving the function of the manual slider to be an electrical slider with a technique to enhance the quality, making the effect and removing the undesired camera shakes. The moving of the camera ball head used belt strapped to a motor with a simple electronic circuit using IC regulator LM 317 that can set the speed of moving to the right or left. This study has the objective to help the making of the video e-learning so that the results can be optimized, can reduce the video image shake due to hand power limited, so the video like as professional video. This research using Research and Development Method (R&D). There are 10 steps according to the development of this model, namely the potential and problems, data collection, product design, design validation, design revisions, product testing, product revision, utility testing, product revision, and mass production. However, this study is limited to the following five steps to the first product revision. The conclusion that motor slider is overall valuable and well accepted educational tools to create video motion and the video results can be as video training.

1. Introduction

A video is a form of multimedia that conveys information through two simultaneous sensory channels: aural and visual. It often uses multiple presentation modes, such as verbal and pictorial representations in the case of on-screen print and closed-captioning [5,8]. Using audio-video materials in the classroom is nothing new since filmstrips were first studied during World War II as a training tool for soldiers [4] educators have recognized the power of audio-video materials to capture the attention of learners, increase their motivation and enhance their learning experience. Both the content and technology have developed considerably since that time, increasing the availability and the value of audio-video materials in the classroom. Media development mapped out by Barrett in as the table 1 below.
Table 1. Portfolio construction tool compared [3].

| Portfolio Construction Tool | Structure & Links | Player Available | Advantages | Disadvantages | Ease of Use* | Technology Required | Cost Path Description |
|-----------------------------|-------------------|-----------------|------------|---------------|--------------|-------------------|----------------------|
| Redacted Databases | Nicki.co | Yes | Portable, requires no additional software platform. | No tech skills required. | Low risk, potential for high returns. | Easy to set up. | No additional software required. |
| Hypertext Digital Media | Hypertext Digital Media | Yes | Hypertext is accessible to all users. | No tech skills required. | No additional software required. | Easy to set up. | No additional software required. |
| Multimedia Authoring | Multimedia Authoring | Yes | Full control over media creation. | No tech skills required. | No additional software required. | Easy to set up. | No additional software required. |
| Voice Recorder | Voice Recorder | Yes | Voice is accessible to all users. | No tech skills required. | No additional software required. | Easy to set up. | No additional software required. |
| Adobe Flash | Adobe Flash | Yes | Flash is accessible to all users. | No tech skills required. | No additional software required. | Easy to set up. | No additional software required. |
| Skyscraper Knowledge | Skyscraper Knowledge | Yes | Knowledge is accessible to all users. | No tech skills required. | No additional software required. | Easy to set up. | No additional software required. |

2. Literature review

An electronic circuit that is used to regulate the voltage of the motor shown in figure 1:

![Figure 1. Electronic circuit using IC LM317.](image)

Internal Short-Circuit Current Limiting Constant with Temperature, Output Transistor Safe-Area Compensation, Floating Operation for High Voltage Applications, Eliminates Stocking many Fixed Voltages, Available in Surface Mount D PAK-3, and Standard 3-Lead Transistor Package. NCV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable. These are Pb-Free Devices. An electronic circuit using IC LM317 is an adjustable 3-terminal positive voltage regulator capable of supplying in excess of 1.5 A over an output voltage range of 1.2 V to 37 V. This voltage regulator is exceptionally easy to use and requires only two external resistors to set the output voltage. Further, it employs internal current limiting, thermal shutdown, and safe area compensation, making it essentially blowout proof. The LM317 serves a wide variety of applications including local, on card regulation. This device can also be used to make a programmable output regulator, or by connecting a fixed resistor between the adjustment and output, the LM317 can be used as a precision current regulator [1].
The research conducted in developing online test application using CodeIgniter framework in Vocational High School (SMK). From the validator, it can be obtained from the media expert value of 81.25% which means the application is very valid and can be used. From the validation expert about the aspect of Validation, Content gets a valid value which means can be used, while the aspect of Language and Writing Problem gets a very understandable value which means can be used in testing. According to research by User Acceptance Testing (UAT), applications can be received very well by the students and can be used to do the final semester or midterm’s exam [10].

An instructional media is needed to help students achieve the best learning outcome. The method used was Research and Development (R&D) using post-test-only in controlled quasi-experimental group design [8,11].

The terms Electronic Portfolio and Digital Portfolio are used interchangeably; however, there is a distinction. An Electronic Portfolio contains artifacts that may be in analog forms, such as a video tape, or may be in the computer-readable form: in a Digital Portfolio, all artifacts have been transformed into computer-readable form. An electronic portfolio is not a haphazard collection of artifacts (i.e., a digital scrapbook or a multimedia presentation) rather a reflective tool that demonstrates growth over time [3].

The use of video learning already explores [9]. Their research explores the uses of camera features on the cell phone to capture subjects in the creation of Javanese traditional wedding makeup using the traditional costumes of each area in Indonesia. The technique of taking a picture using mini glide cam which implemented to stabilize the video to eliminate shaking when still recording.

3. Method
The method of this research using the model of Research and Development (R & D) as figure 2. There are 10 steps according to the development of this model, (1) namely the potential and problems, (2) data collection, (3) product design, (4) design validation, (5) design revisions, (6) product testing, (7) product revision, (8) utility testing, (9) product revision, and (10) mass production. It takes an initial data collection to determine the potential and problem that could be developed and modify in the use of a manual slider to be an electric slider. Whether using the motor slider, can reduce the vibration video and the need for electronic circuits, as well as other supporting equipment. Then the design of electrical slider validated with the objective of motor slider design as the expectations. The next stage is the first test to determine the voltage requirement, if necessary, it needs to modification electronic circuits base on the basic circuit. This method is limited to utility testing.

![Figure 2. Complete step using R&D method [11]](image)

4. Results and discussion
This experiment using a design study with the Research and Development (R & D) [11] in 10 step, but this research is limited as: from the flowchart above can be explained namely: (1) Potential and
problems; the potential and problem that could be developed and modify in the use of a manual slider to be an electric slider.

Starting from a video produced some movement seen online courses can be unsightly and so we need a method or product that could dampen or reduce unwanted motion. The movement is commonly shaking when video camera recorder exposed for scratching or using the hand as a buffer that holds the camera well. Whereas the movement of the camera must be stable so that the resulting video does not disturb focus of learning and well received by learners, This study has the objective to help the making of the video e-learning so that the video results can be optimized, can reduce the video image shake due to hand power limited then the video like as professional.

Whether using the motor slider, can reduce the vibration video and the need for electronic circuits, as well as other supporting equipment. In this study, carried out a search on the website http://vi-learn.unesa.ac.id , there is kind of video learning with unstable motion, unfocused video subject, (2) the Data Collection ; Once the potential and problems can be shown in a factual and up to date, we then need to collect a variety of data that can be used as material for planning a video e-materials are expected to be used as a solution and produce a video e-material stable in this research, data collecting: a) collect material that is suitable and can be used as a video, b) make concept story board video e-materials, c) collecting pictures, music, and materials used in the development of video material, d) e-journal relevant research, (3) Product design ; the product design stage, which is produced a prototype, making video e-materials. This stage starts with making a slider, installing the motor, installing a circuit of the simple electronic motor drive as figure 3.

Design Validation; validation is the process of product design activities to assess the product. Validation is done for research instruments such as the observation sheets filled by three expert lecturers, namely, materials experts, media experts, and linguists. In this case, the product is partially multimedia video material subjects. Validation is done by seven lecturers are experts, subject matter experts, media experts, and linguists. Rate on video covers three aspects are considered, namely: a) format media assessed to see the opening menu of applications, the harmony of colour display background with the text, the clarity of the instructions for use and the buttons function properly, b) the video format assessed the suitability of video material that haircut (Graduation), video quality, image clarity, clarity of narration or audio, the suitability of music illustrations to support the display and buttons function properly, c) the format of the material assessed the suitability of the material with the theory, text settings, selecting the model and size of the text, an explanation letter, and buttons function properly, (5) Product Revision ; this step is to revise form as assessment, update question
form, (6) Product Validation; validation is the process of product design activities to assess the product. Validation is done for research instruments such as the observation sheets filled by three expert lecturers, namely, materials experts, media experts, and linguists. In this case, the product is partially multimedia video material subjects. Validation using UAT [2,10] is done by 7 lecturers are experts, subject matter experts, media experts, and linguists. Rate on video covers three aspects are considered, namely: a) format media assessed to see the opening menu of applications, the harmony of colour display background with the text, the clarity of the instructions for use and the buttons function properly b) the video format assessed the suitability of video material that barbershop base women (Graduation), video quality, image clarity, clarity of narration or audio, the suitability of music illustrations to support the display and buttons function properly c) the format of the material assessed the suitability of the material with the theory, text settings, selecting the model and size of the text, an explanation letter, and buttons function properly, (7) Product Testing 1; this step is testing the slider to generate video with certain conditions such as the length of the slider x cm takes a few seconds, with a certain voltage, (8) Utility Testing; furthermore, It is known that the IC need protection using a diode. By using the formula

\[ V_{\text{out}} = 1.25V \left( 1 + \frac{R_2}{R_1} \right) + I_{\text{Adj}} R_2 \]  

(1)

When external capacitors are used with any IC regulator it is sometimes necessary to add protection diodes to prevent the capacitors from discharging through low current points into the regulator figure 4 shows the LM317 with the recommended protection diodes for output voltages in excess of 25 V or high capacitance values (C₀ > 25 F, C > 10 F). Diode D₁ prevents C₀ Adj from discharging through the IC during an input short circuit. Diode D₂ protects against capacitor C discharging through the IC during an output short circuit. The combination of diodes D₁ and D₂ prevents C from discharging through the IC during an input short circuit. The modification circuit as figure 5. The formula

![Figure 5. The basic circuit with diode modified](image)

| Table 2. Simulation results using slider motor |
|-----------------------------------------------|
| Distance (cm) | 120 | 120 | 120 | 120 |
| Voltage       | 3.4 | 8.3 | 11.7| 16.5|
| Speed         | 25°97'' | 20°11'' | 10°3'' | 6°51''|
| Time          | 25'97'' | 20'11'' | 10'3'' | 6'51''|
If the voltage applied to the motor is getting low, will produce motor movement slowly so that cameras are used to move slowly and the video motion effect will be produced, but if the voltage applied to the motor is high (in this case a maximum of 24 Volts) the motor movement into normal even faster, and motion video effect will not be generated. Symbol m meaning minutes, the symbol s means seconds.

5. Conclusion
It is important to modify the basic circuit using a diode to protect IC to be long life the motor and ensure the battery full charge and also to prevent the capacitors from discharging through low current points into the regulator IC. The research by User Acceptance Testing (UAT), applications can be received very well by the validator, and also suggests that slider motor can be supported to make synthetic video motion. This may be more suited to make video e-learning. The motor slider is overall valuable and well accepted educational tools to create slow motion video and the video results can be video training.

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