

A Measurement of Vocational Education's Student Satisfaction in Learning Electronic Appliance Repair and Maintenance Course with CCTV Trainer Kit

Lusia Rakhmawati, Fariz Irwansyah Febriyanto*

Department of Electrical Engineering, Universitas Negeri Surabaya, Indonesia

*frizz.irwansyah@yahoo.com

Abstract. This study aimed to investigate satisfaction levels, among of the eleventh-grade students majoring in audio-video technique, towards the instructional media CCTV trainer kit: The CCTV Prototype and job sheet on to and analyzed perspectives of the practical approach to learning using CCTV prototype to improve installation skills in the electronic appliance repair and maintenance class. Survey questionnaires and instructional media were applied to data collection. The students' satisfaction towards the instructional media in teaching and learning process was presented in positive responses, 91.94 % satisfied. The finding reveals that the instructional media using trainer could better to overcome the need a practical approach to learning. Furthermore, using trainer kit media creates an environment where students can support each other and receive feedback from their peers. They performed practice activities that help them apply the new information from the steps on the job sheet.

1. Introduction

Today, the development of technology in the field of electronics is rapid growth. Creative and innovative technologies are starting to emerge with the aim of introducing the latest technology. One example of the development of electronic technology today is CCTV-based technology (Closed Circuit Television). CCTV is a surveillance camera that can record images and sound with the help of another device called DVR which inside there is a hard drive which can then be processed into a recording file so it can play back what has been recorded by the CCTV [2,3]. This technology is indispensable in both the business world or industry and the private home environment for security surveillance, for an anticipation of crime action, theft of robberies, and many other things related to crime and undesirable activities [8].

With the increasing number of CCTV usage, the vocational high school students, especially in the field of audio-video engineering, must have the expertise to install, maintain and repair audio video equipment of CCTV. The learning of repair and maintenance of audio video electronics equipment will become an interesting and easy to understand learning material presented with a practical and flexible media so that students can recognize components with many variations according to practical material that can be fulfilled one of them through media trainer supported a job sheet. Learning media in the form of objects support the principle of learning by doing while the worksheet practice supports



individualized learning principles, where the worksheet as a learning resource that allows students to learn independently on the implementation of the lab.

Trainer (prototype) is a miniature, replica or imagery conceptual work of a tool that was created for the purpose of being studied. With this media trainer students [10] are expected to learn and know about the process and the working concept of a tool [9]. This media is well used to support student learning especially vocational students who are required to apply theories in the field or the world of work later, by using this media trainer students are expected to know the process and mastery of learning materials because students can see the practice, research and apply theories which is a miniature of an object that may have a large and complicated shape, students can minimize work accidents and make learning time efficient.

In this paper, we want to investigate student' response [7] in the learning experience of a vocational student in the case study of the eleventh- grade students majoring in audio-video technique with CCTV trainer kit in SMKN 3 Surabaya. This paper is organized as follows. In Section II, we introduce related works regarding fundamental digital electronics course and mobile learning projects, while the methodology is presented in Section III. Section IV is dedicated to the presentation of the results and discussion about developed mobile learning. Finally, in Section V, conclusions are presented.

2. Trainer Kit Description

This prototype is designed on a simple miniature home shaped board with an area of 70 cm x 50cm with an actual scale of 1: 20 meter as shown in Figure 1.

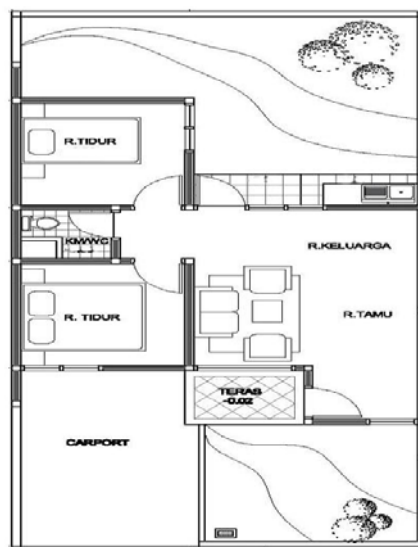


Figure 1. The prototype house for CCTV placement

Learning activities used for the job sheet are: 1) Installing CCTV, installation of software /hardware at home, including wiring on CCTV systems, from 0 to complete; 2) Programming Servo CCTV in turn, at this stage student will do the programming of the servo so that the camera can move alternately; adjust the angle of the wall and the point that has been determined; 3) Displays video from CCTV moving simultaneously, displays video footage of all three CCTVs moving together along the specified point.

3. Methodology

This type of research uses Research and Development (R & D). The development procedure follows Borg and Gall procedure [1] that can be done more simply by involving four main steps, they are 1).conducting an analysis of products to be developed; 2. developing the initial product; 3. expert validation and revision; 4. test the small-scale field and Product revisions. With this research, the models are tested systematically, evaluated, improved to obtain specific criteria of the same effectiveness, quality, or standard. This study is the process of implementation of learning steps that are applied in the classroom and the level of creativity to make mobile media applications and student learning achievement as a result of the use CCTV trainer.

Media trainer and job sheet are done according to the research stage design. Creation of trainers and job sheet of CCTV Prototype is done based on the potential and problems contained in SMKN 3 Surabaya, especially in the department of Audio Video Technique. Researchers see the potential of the lessons as a new lesson in SMKN 3 Surabaya. So it needed the development of a learning media to generate attraction, interest, and motivation for students in an effort to improve student achievement.

In the next stage is to examine the concepts or theories related to learning media products that will be made. In this case, the data collected are the materials about CCTV, so that researchers are able to determine the appropriate application of the material in the manufacture of learning media trainer and job sheet. Continue to make the product, which has the specification of the trainer: 1 piece of the worksheet, 1 miniature house, 3 webcam camera equipped with servo, and 1 prototype. The prototype has 1 Arduino NANO and 3 USB to connect to PC / Laptop. The products that have been created is shown in Figure 2.

After the validation and revision of trainer and job sheet design is declared eligible to be tested. The next stage is the product trial, at this stage, the media learning trainers and job sheet tested as a medium of learning in practical activities at SMKN 3 Surabaya in the Audio Video Technique Expertise. Product testing aims to determine the results of student responses to media trainer and CCTV prototype's job sheet.

From the product test results, obtained the results of student responses to media trainer and CCTV prototype job sheet. Based on these trials, the analysis and reporting to determine the performance of trainers and job sheet on students and responses or results of student responses to trainers and job sheet prototype CCTV.

4. Results and Discussions

a. Miniature house

In this miniature house has an area of 70 cm x 70 cm with the actual scale ratio of 1: 20 meter, in which have a specification of the terrace, 1 garage, living room, living room, bedroom, bathroom, and a kitchen. Previous products and designs have differences because in the previous house design is not possible to put 3 CCTV caused many partitions of the room so researchers took the initiative to change the previous design into a minimalist image.

The miniature of this house has certain points that must be monitored by CCTV, at the green point of monitoring must move to follow that point, for the redpoint of monitoring at that point.



Figure 2. CCTV Prototype

b. Prototype CCTV

CCTV Prototype has 3 ports for camera 1 + servo, camera2 + servo, camera 3 + servo, 3 USB cables to connect to laptop / PC, power on / off button, 12V 2A DC voltage source. Prototype serves to move CCTV that has been in the program and connect CCTV with laptop / PC to be able to see the catch of images from CCTV, for software researchers using webcam7, CCTV itself results from modifying webcam that given servo in order to move as desired.

c.

Data on student response to media trainer and CCTV prototype worksheet were obtained using student response questionnaire as shown at Table 1, wherein this research instrument response questionnaire for trainer and job sheet filled by students of class XI TAV 2 SMKN 3 Surabaya.

Table 1. The results of student response questionnaire

	Aspects	Yes	No
Interest in Media in terms of Design	Is the design trainer interesting?	30	0
	Are the schematic of the trainer circuit and the layout of the circuit layout clearly visible?	27	3
	Can it foster interest in learning?	25	5
	Does the use of media like this make me understand the learning materials?	29	1
Ease of Use in the job sheet	Are the material and work steps clear enough to understand?	28	2
	Is writing and language usage easy to understand?	28	2
	Is the schematic drawing of the practicum series easy to understand?	28	2
Ease of Use In Trainer	Is the CCTV Prototype trainer easy to use?	25	5
	Is the placement of ports and cabling arranged neatly and easily?	28	2
	Is using media like this will cultivate a critical attitude, scientific thinking, and cooperation?	26	4
	Is connecting the connector to the trainer easy?	30	0
	Are the components used easily to obtain?	27	3

As shown in Table 1, the result of student response describes that the students gave a positive response to the trainer and the CCTV prototype job sheet. It can be seen from the filling out the student response questionnaire. The percentage results of aspects ease in the use of trainers is 91.94% categorized very well. So that students responses are categorized very well towards the manufacture of media trainer and CCTV prototype job sheet in class XI TAV 2 SMKN 3 Surabaya.

5. Conclusions and Future Work

Based on the data of research and discussion, it can be concluded as follows: Student response to instructional media prototype and CCTV job sheet on Repair and Maintenance of Audio Video Equipment Electronics subject get the positive response from students. With media percentage value with 3 aspects: media interest in terms of design, aspects of ease in the use of job sheet, and aspects of ease in the use of trainers can know the percentage results of 91.94% categorized very well.

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