

Installation of Closed Circuit Television to Produce a Quality Assessment Process in Vocational Learning

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Abstract - Efforts to improve the quality of education can be done through a quality assessment system and supervision. During this time, the assessment system on the practice in Vocational High School workshops (VHS) still use the conventional method of observation and direct supervision. This can reduce the objectivity of the competency assessment of learners in one class. One of the innovation of technology utilization to improve the quality of objective assessment and supervision is through the use of Closed Circuit Television (CCTV) media. Closed Circuit Television is a device used to monitor and transmit video signals in a space to be forwarded to the monitor screen. CCTV functions as a picture, sound, and video recorder can be stored on a hard drive via Digital Video Recorder (DVR). CCTV can be used as a tool to improve the objectivity of the assessment system and supervision in the workshop. Some things to note in the use of this medium include: location or position, number of installation, work area, and cost. The devices used include: camera, DVR, cable, adapter, hard drive, VGA converter, and monitor.

Index Terms – *Circuit, television, vocation learning*

I. INTRODUCTION

Professional education in the 21st century demands on a learning system based on an information technology approach. The role and progress of science and technology encourages various sectors of education to implement technology as a means of communication and information support. According to the National Education Standards [2], one of the most prominent features in the 21st century is the increasingly interconnected world of science resulting in synergies that impact on increasing the effectiveness of distance and time. In accordance with the Mission Education Development Plan Long Term in 2025 by the Education Ministry in 2003 explained that the need to use the optimal means of radio, television, computers and devices ICT (Information and Communication Technology) as "Building up a knowledge-based Indonesian Telematics Society in the year 2020". Therefore, the momentum of this millennium should be used by developers in the world of education to optimize the use of ICT as a means of support to enhance the quality of education.

The definition of education according to the legislation Sisdiknas is a conscious and planned effort to create an atmosphere of learning and learning process so that learners actively develop their potential to have spiritual strength, self-control, personality, intelligence, noble character, as well as skills needed him, society, nation and country. The development of self-potential learners will grow rapidly if the individual is getting the optimal education. The two main things that determine the quality of education are the quality of the learn-

ing and assessment process. The synergy of optimizing the use of ICT in the learning and assessment process can ensure the improvement of the overall quality of education.

Utilization of ICT in the learning system is quite common. Various education sectors have been touched by ICT. The varied utilization is used by all campus users to access practical and effective information. This is different from the use of ICT in the scoring system. The system of supervision and appraisal especially in the practice workshop has been using conventional methods of using direct observation. The human ability to save impressions or limited information [3]. This is a human weakness so that an appraisal and measuring tool is needed to address it. Assessment directly has a weakness that requires a relatively long time and observation can not observe in depth. In addition, the level of maturity of learners based on formal education levels have different maturity. For example, supervision and control to handle elementary school students will be different ways when handling VHS students. The teacher's intensive guidance toward elementary students tends to be higher than for vocational students. The belief that teachers impart to learners in learning in vocational education to build a strong culture and independent character. However, the problems that are often encountered in the field shows that the confidence that teachers give to learners especially related to learning practicum used by learners for other activities. This shows that the task of teachers as supervision of learning in a holistic experience weaknesses especially in the field of supervision services practice learning.

The Regulation of the Head of Disdikpora DIY concerning the National Examination Examination Guidelines Year 2014/2015 on the supervisor states that the space supervisor is a teacher / educator who has the attitude and behavior of discipline, honest, responsible, conscientious, and uphold secrecy. This shows that a strong character for educators can be a benchmark in determining the quality of the supervisory system used. During this time, the supervisory system in the practice exam only relies on direct observation. Supervisors should be readily accessible to their students, and regular monitoring and feedback should be ensured [4]. This means that learners should know the development of their competencies by referring to regular monitoring. Periodic monitoring in question is to know every detail of the process, especially the practicum as a whole. Direct observation without ICT assistance can only be observed in a single monitoring process so it is not possible to review the results of the process. Learners should be observed since the process of establishing competence lev-

el, but the observation of the competency level of students is only seen in the final test which tends to be subjective than objective. Therefore, the utilization of ICT in the form of Closed Circuit Television media usage as a means to optimize the function of supervision and assessment can answer the problem. CCTV utilization can record an activity so that it can be used to supervise the practice in the workshop.

Assessment using CCTV is expected to improve the quality of supervision and assessment of observation [5]. This is due to the students to do a job without being supervised directly so will the learners do the job naturally. This indicates an increase in the objectivity of the assessment and the impression of engineering action of the learners can be minimized. In addition, the use of CCTV may reduce the assessment judge's subjectivity because the process during the assessment can be played back through video recordings.

The assessment system in vocational education emphasizes three aspects of assessment, including: affective, cognitive, and psychomotor assessment. Workshops come into direct contact with practicum dominated in affective and psychomotor aspects. The ability of teachers to provide equal distribution of supervision and objective assessment to each learner either affectively or psychomotoric certainly experienced many problems. These constraints will be easily felt for the teacher when the assessment is done on the students together at the same time. This makes it difficult for teachers to assess and monitor every detail of what each student does. Therefore, the use of technology in the form of CCTV to improve the supervision system and assessment of the activities of learners become very important to be developed.

II. QUALIFIED PROCESS ASSESSMENT

Assessment is the driver of learning [6]. The quality of the assessment affects the quality of learning. Implementation of education should pay attention to the quality of assessment and learning so as to produce qualified and relevant graduates. Efforts to improve the quality of education can be pursued through improving the quality of learning and improving the quality of the assessment system [7]. This shows that the quality of the assessment has a very important role for education sustainability. Therefore, improving the quality of education only occurs when the assessment is done have a quality that meets the criteria of quality assessment to measure the competence of learners.

Assessment of quality must meet the criteria that serve as the basic principles of development and implementation of the assessment. According to [8], assessment aims to: (1) stimulate the activities of learners, (2) find the cause of progress or failure of learners, teachers, as well as the learning process itself, (3) provide appropriate guidance to each learner, (4) to report on progress / progress of learners to parents and related educational institutions, and (5) as a feed back program or educational curriculum that is in effect. The preparation of assessment tools should be based on its basic principles. The assessment must meet the criteria of reliability, validity, objectivity, practicality, discrimination, norm-referenced test, criteria referenced test [9]. The seven principle

points can be used as a reference for the development and implementation of the assessment so as to produce quality assessment products. Of the seven criteria, then re-deepened in the Curriculum 2013 which produces ten basic principles of assessment as follows:

- 1) The assessment must be valid, meaning that the assessment is based on data that reflects the ability to be measured.
- 2) Objective assessment is an assessment based on clear procedures and criteria and should not be influenced by the subjectivity of the appraiser.
- 3) Fair assessment means a disadvantage or disadvantage to learners only because they (may be) have special needs and have different religious, ethnic, cultural, cultural, socioeconomic, and gender backgrounds.
- 4) Integrated, assessment is said to fulfill an integrated principle if the appraiser which is one component is inseparable from the learning activities.
- 5) The assessment must satisfy the principle of openness in which the assessment criteria, and the basis of the decision-making used can be known by all interested parties.
- 6) Comprehensive and sustainable, the assessment shall be conducted thoroughly and continuously by the assessor and shall cover all aspects of competence using appropriate assessment techniques. Thus will be able to monitor the development of the ability of learners.
- 7) Systematic, the assessment undertaken by the assessor shall be planned and undertaken in stages by following the standard steps.
- 8) Referring to the criteria, the assessment is said to be a criterion if the assessment is based on a measure of the attainment of a defined competency.
- 9) Accountable, accountable assessments of which processes and results may be accounted for, either in terms of techniques, procedures, or outcomes.
- 10) Educative, assessment is called to fulfill the educative principle if the assessment is done for the importance and progress of education peseta learners.

III. RESEARCH METHODE

This study uses research and development that refers to the development of Borg & Gall. In this research method only limited to preliminary study (concept) covering three initial step, that is: (a) data collection and preliminary information, (b) planning, and (c) initial product development. Target of research is workshop of vocational school production with research subject is student and productive teacher.

IV. DISCUSSION

Closed Circuit Television (CCTV) is classified into two types, namely CCTV Analog and CCTV Digital. How Analog CCTV works is a camera that transmits continuous video streaming through coaxial cable, while CCTV Digital works through discrete video streaming via UTP Cable. Digital CCTV cameras are generally equipped with IP Address so often known as IP (Network) Camera

The main design in the CCTV system consists of two kinds, namely using cables and signals. The use of cable can be coaxial cables and twisted-pair cable transmission, while the use of signal in the form of control signal circuits and electrical power construction requirement [10]. The workings produced by CCTV resemble the television system. In television, data recording can be captured using camera / recorder then transmitted to the transmitter to be broadcasted directly / indirectly. Similarly in CCTV systems, the recorded signal will be channeled through coaxial cables or remote controlled remote control signals to be broadcast into the monitor monitor. Cameras used in CCTV are diverse, from large to small shapes (spy cam). Determination of CCTV cameras can be determined based on the needs and interests of use. The following is an example of a CCTV circuit using a coaxial cable.

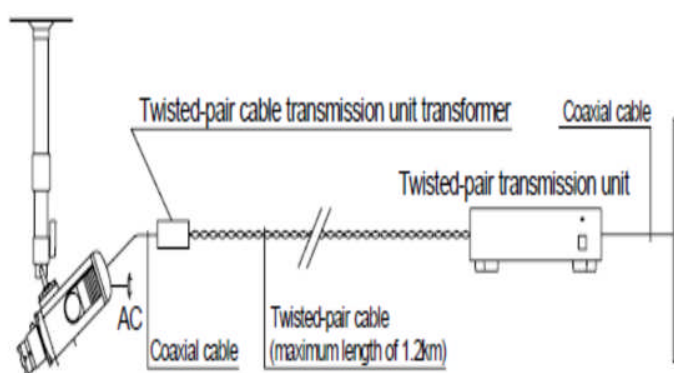


Figure 1. CCTV circuit scheme with coaxial cable (TOA Cooperation, 2005)

The main components used in CCTV devices include: camera, Digital Video Recorder (DVR), cable, adapter, hard disk, VGA converter, and monitor. The camera functions as both visual and video object capture. Digital Video Recorder (DVR) functions as a storage of CCTV recordings and converts from analog data to digital data. Cable serves as a link between CCTV and DVR. Adapter is a device that serves to raise and lower the voltage so that it corresponds to the working voltage of the equipment used. Hardisk is useful as a storage of recordings in the form of files. Video Graphic Array (VGA) is to convert or translate digital signals from computer to monitor to display graphics. The function of components as described is still standard components applied in CCTV especially using coaxial cable system.

The use of CCTV can be an effective supervision of activities. In addition to functioning as a monitoring tool, CCTV can be useful as a means of prevention, investigation, verification, and performance improvement. This is because CCTV has a component that works as an image data storage that is Digital Video Recorder (DVR). The use of CCTV in education is not the least applied in schools. Even in the UK, the use of CCTV in schools is frequent, and almost 85% of all British high schools now have CCTV systems in operation [11]. The use of CCTV is widely used by educational institutions as part of space security.

The use of Closed-Circuit Television can improve student performance rather than using face-to-face face-to-face inter-

action [12]. This happens because the student will work responsibly considering what he is doing is being monitored by his instructor indirectly. This is in line with what Douglas McGregor explains. The motivation and interaction ability of a person can be seen in two theories, namely the theory of X and Y [13]. X theory emphasizes more on the demands of work consistent, systematic, emphasis on guidance / guidance work, and the Y theory in McGregor explains "Theory Y will exercise self-direction and self-control in the service of objectives to which he [sic] is committed" [14]. This means that Y theory puts more emphasis on self-actualization than someone when working unattended.

The presence of CCTV can eradicate the confusion or deviation of students' attitudes in the classroom [11]. Although the seating layout of various forms [15]. The presence of CCTV can be evidence of teachers in measuring students' affective penilaian on a large scale. The observations by teachers widely can lead to difficulties in conducting quality assessments [1]. In line with that, [17] in his research showed that there is a positive, significant, and strong relationship between the influence of CCTV on the activities of learners on the subject of Civic Education. This means that the better knowledge of the use of CCTV is expected to minimize the negative learning activities of learners, especially on learning Citizenship Education. Therefore, the installation of CCTV should be properly considered so that the atmosphere in the classroom / workshop can be monitored in the monitor screen.

Installation in CCTV in the workshop needs to be done carefully. Some things to note in the installation process include: location or position, number, work area, installation, and cost. When referring to workshops, the majority of workshops in schools tend to be unfamiliar. Installation suitable to put CCTV in the workshop can use bullet camera model, while the use with dome camera model can be placed on the roof frames that are not too high. In determining the ideal visibility is affected by lens size and viewing angle. In the CCTV installation guide explains "The smaller the size of a lens, the angle of view will be widened but the visibility will decrease more toward the object, vice versa if the lens size is getting bigger, the viewing angle will be narrower but the visibility can be farther toward the object because more zoom ". Therefore, the ideal length range selection can refer to Table 1 below:

TABLE 1.
SELECTION OF CCTV CAMERAS

Lens Size	Viewpoint	Ideal Visibility
2,5 mm	110°	8 m
3,6 mm	100°	10 m
4 mm	90°	12 m
6 mm	65°	15 m
8 mm	55°	20 m

Installation of CCTV need to pay attention to workshop area workshop. According to Praken (1982) each student will be provided a small project work facility with a total distance of about 66 m³ and 300 m³ for large projects. The range as described in Praken does not necessarily represent the entire production workshop in SMK. The minimum distance of the

work area can be measured by spreading the hand with a distance of 50 cm to 150 cm. This means that the minimum coverage that CCTV has to take to supervise some students can be tailored to their needs and costs. The larger the size of the required lens can provide an expensive procurement cost. [10] added that laying CCTV cameras should consider the following aspects: position and orientation, environment, lighting / lighting, temperature and humidity, electromagnetic waves, radiation, corrosion, safe area from explosion, away from water or rain .

A good CCTV installation can assist teachers in conducting assessments and monitoring practices. Teachers can replay the recording of students' practice processes to find out the job steps based on the Standard Operating Procedures (SOP) that have been contracted. Improved in measurement techniques are more productive through CCTV as they can provide an advantage in ease of assessment without eliminating instructional effectiveness [1]. This means that the use of CCTV can be a tool of observation in the assessment and supervision of practice so as to improve the objectivity of the overall and comprehensive assessment.

V. CONCLUSION

Closed Circuit Television is a device used to monitor and transmit video signals in a space to be forwarded to the monitor screen. CCTV can be used as a tool to improve the objectivity of the assessment system and supervision in the workshop. Noteworthy in the use of this medium include: location / position, number, work area, installation, and cost. The devices used include: camera, DVR, cable, adapter, hard drive, VGA converter, and monitor.

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