E-Monitoring in The Vocational Process-Based Assessment

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Abstract

Assessment is an important part of vocational learning evaluations to be done carefully, thoroughly and profoundly to obtain objective assessment criteria. If the assessment of professional practice is not done objectively, it can provide students' bias and sense of injustice. This study provides an e-monitoring offer and compares e-monitoring with personal computers and Android mobile in process-based assessment. The study used ten vocational instructors with 31 subjects tested. Assessment criteria refer to the ten assessment standards are valid, objective, fair, integrated, open, systematic, relating to the requirements, accountable, and educative. The results showed that active e-monitoring was applied after post-condition on the first, second and third day

Keywords: e-monitoring, vocational learning practice, process-based assessment

1. Introduction

In the broad scope, monitoring and evaluation is a package that can not be separated from a program. Monitoring is a step for collecting data for sustainable development indicated by progress and achievement of goals, while evaluation tends to provide credible and useful information as a material in decision making [1]. In fact, the knowledge gained in monitoring can be a stakeholder's information to check whether the program is going according to its original purpose [2].

In smaller scopes, touching the realm of education, the monitoring function is often associated with improved learning achievement of learners. When described more simply, monitoring in learning has a meaning of teacher control controls to make instructional decisions that have an impact on improving student learning and motivation [3], [4]. By knowing the learning difficulties faced by students, it can be determined the design of learning by the characteristics of the subjects and the needs of learners [5]. When shown the difficulty and compared the two figures of general and vocational school teachers, professional teachers are more likely to monitor learners' learning than the general teacher.

Like a bottleneck, many vocational teachers face the problems of their students in the laboratory [6]. Both of the difficulties at the time of preparation of learning materials [7], classroom settings, supervision, and practical assessment are common to them [8]. This poses challenges for vocational or instructor teachers to intensify periodic monitoring for students' progress, conducive learning environments, and workplace safety.

In vocational education known as three comprehensive assessment, namely: work readiness assessment, process assessment, and product assessment . Evaluation of work readiness is essential before the students see the practice to prepare the knowledge, skills, and work attitude required during the lab [9], [10]. A second assessment is an assessment of the process by which the estimate is a long section to be assessed and impacts on the quality of the practice product. Process assessment can provide principled process information on the domain by providing strategic knowledge objectives and steps used to select the steps in a procedure [11]. The next assessment is a product assessment in which this assessment is a sequence of procedures performed by students when practicable. In the scope of vocational education, the evaluation of the most complained process is challenging to implement comprehensively according to scoring criteria.

It is a challenge for the instructor to observe every detail of the learning process of the vocational practice of each student [12], [13]. This will undoubtedly impact on teachers 'difficulties in implementing observations of students' practical processes comprehensively [14]. Also, the ability of an instructor to observe and record information obtained by his students is insufficient which results in a weakness in remembering the results of his class observations [15]. In fact, assessment of learning is important in improving their pedagogic quality [16] and ranking students' learning achievements [17].

Because assessment is the driver of learning [18], then to maintain the quality should pay attention to the quality of the evaluation and knowledge to produce quality product work. Quality assessment meets specific criteria that serve as a fundamental principle of assessment development and implementation. According to Arikunto, assessment aims to stimulate the activities of learners, find the cause of progress or failure of learners, teachers, as well as the learning process itself, provide appropriate guidance to each learner, give reports about students progress to parents and related educational institutions, and as a feedback program or curriculum of education is in force a [19].

The digital information era has been running since the early 21st century, but until now there are still many instructors using direct monitoring of learning. Complaints felt by the instructors are how to conduct a process assessment which can be a material for supervision and evaluate the learning process of vocational practice. Various charges submitted learners because the instructor's assessment is not objective because many students are cheating, not appropriate procedures, and steal the

practice work of friends. This indicates the absence of technological intervention supervision practicum that provides conclusions of quality education and efficient. The student can learning by self [20] using the technology.

Supervision with the approach of information technology began to be prepared infrastructure to build a fair, transparent, and comprehensive, and objective culture. The term e-supervision becomes the supervisory bridge if the supervisor can not reach the object either because of time, energy, budget, and geographical conditions [21]. Similarly, an assessment, a reasonable evaluation is that assessments can provide sustainability, reliability, and measurability in the measurement [22], [23].

Based on the above explanations, it is necessary to research how to develop e-monitoring tools of vocational practice learning that can assist the instructor in conducting an objective assessment [24]. Also, e-monitoring can be used to find out how far the quality of learning from the teacher, observe the comprehensive practice process in one time or another, provide transparent assessment information, and produce an objective process assessment. This study also offers comparative precondition and post-condition in the application of e-monitoring as measured by the effectiveness of the instructor in providing accurate estimates [25].

2. Methods

This study aims to develop e-monitoring tools for vocational learning practice and test the effectiveness of means to determine the quality of process-based assessment. The development of e-monitoring apparatus is demonstrated by making monitoring tools accessible over long distances. The device can record practicum activities so that the instructor can assess thoroughly and profoundly.

This research method used experiment with quantitative approach. The experimental design used was pre-test post-test group design. The pretest is given on precondition or before using e-monitoring media treatment, and post-test is given post-condition or after obtaining media e-monitoring. The research population is the instructor of the practice course with the total of the whole class that used is 31 subjects. The sample was 28 subjects with sampling technique using simple random sampling. Data collection techniques using questionnaires. The preparation of assessment tools should be based on its fundamental principles. Johnson & Johnson [26] states that the assessment must meet the criteria of reliability, validity, objectivity, practicality, discrimination, norm-referenced test, standards referenced test. The seven principle points can be used as a reference for the development and implementation of the assessment 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:

a. Sahih, the judgment must be valid, meaning that the evaluation is based on data that reflects the ability to be measured.
b. Objective, objective judgments are judgments based on transparent procedures and criteria and should not be influenced by the subjectivity of the appraiser.
c. Fair, fair judgment means a disadvantage or disadvantage to learners only because they (maybe) have special needs and have different religious, ethnic, cultural, cultural, socioeconomic, and gender backgrounds.
d. Integrated, assessment is said to fulfill an integrated principle if the assessor who is one component is inseparable from the learning activities.
e. Open, assessments must satisfy the principle of openness in which the assessment criteria and the basis for the decision-making used can be recognized by all interested parties.
f. Comprehensive and sustainable, the assessment should be thorough and continuous by the assessor and should cover all aspects of competence by using appropriate assessment techniques. Thus will be able to monitor the development of the ability of learners.
g. Systematic, assessments made by assessors should be planned and undertaken in stages by following the standard steps.
h. Refer to the criteria; the assessment is said to be a criterion if the evaluation is based on the measure of the attainment of a defined competency.
i. Accountable, accountable judgments are assessments of which processes and outcomes can be accounted for, both regarding techniques, procedures, and results.
j. Educative, judgments are called to comply with educational principles when the assessment is made for the interests and educational progress of learners.

The instrument indicators used are referring to the assessment criteria in the Curriculum 2013, namely valid, objective, fair, integrated, open, comprehensive and sustainable, systematic, standards, accountable, and educative. The use of quality assessment criteria is due to aspects that will be measured for students has covered the objective and comprehensive approaches. The number of questions in the quality assessment instrument is 30 items with four alternative answers that are Always / Very Easy to Do; Frequent / Easy to Do; Rarely / Simply Easy to Do, and Never / Difficult to Do. Validation of the instrument consists of 3 steps: (1) Expert validation (expert) using two assessment experts (lecturer); (2) limited instrument trial 30 practical subjects; and (3) testing instrument validity utilizing the moment product correlation.

Validity test results indicate that there are four items of the deciduous instrument, so the valid grains used are 26 items. The next test is the instrument reliability. Reliability test results show that the instrument used reliably with reliability value is 0.907. This means that the created tool meets the valid and reliable criteria.

Data analysis technique in this research uses descriptive and inferential statistic. Descriptive statistics are used to describe the initial and final quality of the assessment before and after the monitoring of e-monitoring. Inferential statistics were used to test the hypothesis "there is an effect of using e-monitoring on the quality of instructor appraisal." Examining these statistics using Wilcoxon Signed-Test with the help of SPSS 18.0.

3. Results and Discussion

The interaction of advanced learning makes it possible to emphasize distance learning. Implementation strategy must be extra careful because it concerns the readiness of facilities, technical and knowledge of its users. This study provides an offer of the use of Closed Circuit Television (CCTV) and hidden cameras that are installed both in the corner of the room, in the workplace, and on the spot that can monitor the student practice work. The central design in the CCTV system consists of two kinds, namely using cables and signals. According to TOA Coorporation [27], the use of a cable can be coaxial cables and twisted-pair cable transmission, while the method of the message in the form of control signal circuits and electrical power construction requirement. 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 transmitted into the 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 users. The following is an example of a CCTV circuit using a coaxial cable.
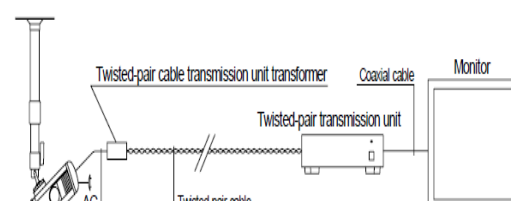
Figure 1. CCTV circuit scheme with coaxial cable (TOA Coorporation, 2005)

Further development leads to digital system-based monitoring. One recent study using E-monitoring as a hidden camera that adequately assesses the objectivity of lecturers' assessment. The tool is a micro CCTV innovation that operates using the help of the Android operating system. E-monitoring can be enabled to capture and record objects with excellent image capture. E-monitoring uses a comprehensive type of lens so that the catchment area is more extensive. The received result will be curved (globe), so it can sense up to a longer distance. Another case with CCTV, CCTV tend to reach the catching area is narrow. Therefore, in a larger room requires more than one CCTV.

The combination of CCTV and e-monitoring can be developed an e-monitoring model of active vocational learning. The intended effect is that it makes it easy for the instructor to perform objective assessments to the student when the practice. The design of e-monitoring model in vocational learning practice is as follows:
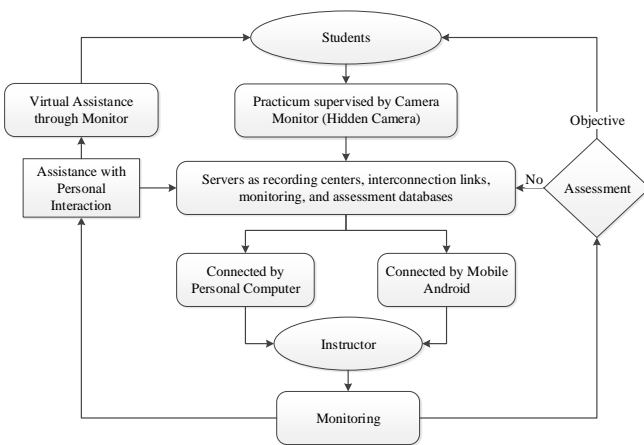

Figure 2. Design of e-monitoring of vocational process-based assessment

The initial condition is the first research activity which aims to know how far the traditional monitoring device gives influence to the objectivity of practice assessment. Assessment is carried out by an instructor of Mechanical Education Engineering Department of Teacher and Education of Science of the University of Sarjanawiyata Tamansiswa which done directly by observing student practicum process. The precondition in this research (*look at figure 4*) shows the result of the sufficiency of instructor appraisal process quality in traditional monitoring condition is 56%. For the eight most challenging assessment criteria done by the instructor is to conduct a holistic assessment. The low score on this aspect is because the lecturer practices difficulties in assessing a large number of students and at the same time (Setiadi et al., 2015). Instructors will have a problem in evaluating the criteria that have been made. This makes the overall process assessment quality less than optimal. Errors in measurement have an impact on the objectivity of the assessment.

The final condition is post-condition after treatment of e-monitoring is used as a process-based external monitoring and evaluation medium. The e-monitoring test was conducted by ten distributed practice instructors in 31 subjects. Effectivity of e-monitoring refers to the ten assessment criteria. Student practice monitoring is done in two ways, namely through a personal computer (PC) and mobile android (AM). Monitoring of learning results in the principle of practicality and comfort based on ten instructor's perception during three times using e-monitoring can be seen in the following diagram.

based assessment
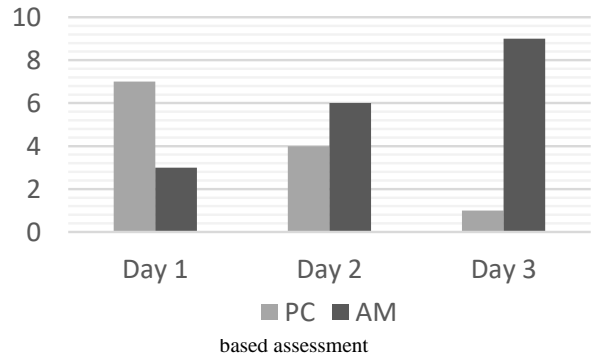
The e-monitoring test in the practice assessment was conducted by the research sample used. Postcondition resulting from the implementation of the 78 percent of instructors provide an excellent perception of the assessment process assisted by e-monitoring. Almost all the research indicators are in a good position, but there is the lowest indicator compared to the others that are the overall assessment. The reason for this low rating is because the quality of each AM is different in pixels, which causes some instructors difficulty in deepening the evaluation.

Instructor's perception with e-monitoring is well responded. Some instructors agree that e-monitoring makes it easier for them to conduct a comprehensive, objective, valid, and by the criteria achieved. The presence of electronic surveillance assistance can know which processes students are doing according to Standard Operational Procedure (SOP), avoid fraud, and save users, equipment, and machines from damage to work. Before performing hypothesis testing, it is necessary to present the pre and post-condition comparison graph of the application of e-monitoring in the learning of vocational practice as follows.
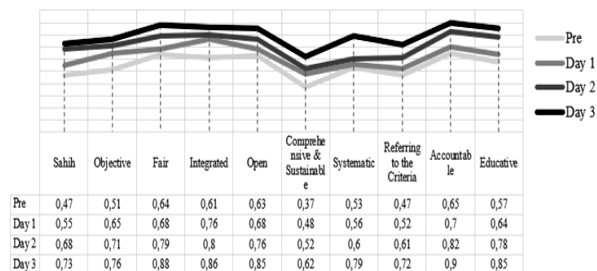

Figure 4. Pre & postcondition comparison graph of e-monitoring implementation in the process-based assessment

Hypothesis testing in this study is to prove whether there is the influence of the use of e-monitoring on the quality of lecturer practicum assessment. This test uses Wilcoxon Signed-Test because the data is ordinal. According to Sugiyono, ordinal data than in the completion of statistical calculations used are nonparametric. Nonparametric statistics do not need to be tested requirements analysis.

Test results using SPSS 18.0 software on nonparametric statistical analysis two related sample using Wilcoxon Signed Ranks test obtained before-after effects of Asymp. Sig. (2-tailed) is 0,000. This indicates that there is a significant effect of e-monitoring on the quality of the lecturer's appraisal process. Assessment of the process with direct observation gives the lecturer difficulty in conducting an objective and evenly assessed. The time spent will be exhausted due to the assessment process. If it refers to the results of Abel's research proving that the observations made by the assessor widely can cause difficulties in conducting a qualified assessment. This shows

that there are several considerations when using direct observation, namely: the number of lecturers, students, equipment and practical equipment, workshop/laboratory area, and assessment professionalism.

The use of e-monitoring will change the work motivation of students to work independently. In the world of work is known the term Theory of X and Y. According to Russ, X's theory emphasizes more consistent, systematic demands of work, emphasizes job direction and job supervision and tends to lead to authoritarianism, while 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 ". This means that Y theory puts more emphasis on self-actualization than someone when working unattended. If it is linked to the function of e-monitoring use, the student as a learner is included in the Y theory. That means the student will become an active, creative, and independent learner in completing the work in the lab.

4. Conclusion

Based on the result and discussion, it can be concluded that there is a significant influence on the use of e-monitoring on the quality of assessment of vocational instructor process. The technical equipment used in e-monitoring is accessible with a personal computer or android mobile. The findings show that the Android mobile gives practitioners practicality in doing the assessment.

Acknowledgment

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