

Enhancing of Student Competency in Psychrometric Subjects Using the Edutainment Method

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Abstract—This research background by issues imbalance mastery of concept, practice, and student's activity in psychometric subject. Therefore, teacher sought using edutainment methods to occurred learning atmosphere interesting and fun. The aims of this research is knowing both the increasing of learning outcomes and students activity after using edutainment methods in psychometric learning. The method in this research is classroom action research that consisting of three cycles (action, observation, and reflection). The data collected by using pretest, posttest, and observation. The results show an increasing of students learning outcomes that shown by an average value in first cycle till third cycle, with increased of N-Gain from first cycle till third cycle. Implementation of edutainment method in learning activity, also increase of students activity in each cycles. In conclusion, by using edutainment method in learning activity, it is can increase the learning outcome and students activity in system and installation of air conditioning subject at psychrometric learning.

Keywords—*edutainment; learning outcome; N-Gain; psychometric; vocational*

I. INTRODUCTION

The issue of vocational education in the world is a discussion and urgency to be given a solution. The amount of vocational training has been increased at the general courses, and its students will be more qualified for further studies at the university level. It has been argued that this change of policy can be seen as not any longer giving social classes equal access to equivalent education [1]. However, to support the development of students' employability, the industries and labor representatives have been given more education and examination of students. Furthermore, to stress the required connection to work life, a pathway to apprenticeship, with at least 50% of the time spent in working life, there are 15 weeks of students' placements in working life during the three-year period. vocational program. Vocational High Schools (SMK) in Indonesia are educational units specifically prepared to produce graduates who are able to work effectively and efficiently and develop their skills. Therefore, the 2013 Curriculum System and Installation of Air Conditioning subjects are embedded in the Mechanical Engineering expertise program [2]. Air Conditioning Systems and Installations are subjects who learn about the technique of cooling a room or

object. Air conditioning techniques are not only used for complementary accessories such as air conditioners, but are also used for commercial activities such as food preservation, temperature regulation in warehouses, homes, buildings, and others. Where more specifically, psychrometry material is the study of the properties of a mixture of air and water vapor which has a very important role in air conditioning or air freshening because the atmosphere consists of a mixture of air and water vapor. Psychrometry principles will be applied to load calculations, air conditioning systems, humidity reduction, cooling towers and evaporating condensers.

In vocational education, learning is an activity carried out to add insight, knowledge, skills, and the power of thinking, by strengthening the intensity of time in the learning process to improve students' abilities so as to form abilities from a habit. By studying a child who cannot do something, is able to do something, or a child who is not skilled in being skilled [3,4]. Learning outcomes can be known through tests carried out, one of which is a daily test. The case study in this paper, the results of daily learning in psychometric learning on the System and Installation of air conditioning subjects in TPTU A class XI of SMK in Cimahi in the academic year 2018/2019 in the school year is still relatively low, namely the percentage of students who have not reached KKM (74.41 %) greater than the percentage of students who reach KKM. In addition, there is some information about psychrometry learning that is related to factors that influence learning outcomes, including: the learning process using expository learning strategies; facilities and infrastructure available in full schools; the school environment is comfortable to use for the learning process; spiritual factors are fulfilled by holding religious activities every day; and passive students in the learning process and are not motivated in seeking their own information (exploration).

It is assumed that the factors that lead to low student learning outcomes are incompatibility of learning strategies or models used in the learning process with the characteristics of the System and Installation of Air System subjects (problem solving properties). So as to result in passive students in the learning process and are not motivated in seeking their own information (exploration). The expository learning strategy is a form of teacher-oriented learning approach. Performed by conveying material that has become oral with a one-way

communication style [5]. So that the knowledge possessed by students is limited to what is given by the teacher and it is difficult to develop students' abilities in terms of socialization skills, interpersonal relationships, and critical thinking [2]. Expository learning strategies can be used in teaching a variety of subject matter, except those which are problems [4,6]. This allegation is quite rational because the subjects of the Air System and Installation generally contain material that solves problems, including in psychrometry learning. Students will have difficulty understanding the subject matter if they only listen to the teacher's explanation, students must be able to find additional information, either from books, the internet, or through group discussions. In addition, students will have difficulty increasing the ability to solve problems if they only solve the questions given by the teacher, students must be able to make their own questions and solve them as a form of training, both individually and in groups. Coupled with a very long learning duration for one of these subjects from 10:00 - 17:00 WIB. This of course can make the learning atmosphere become bored and bored, if not wrapped in creative and diverse methods in the implementation of the process.

A variety of methods and teaching approaches continue to be carried out in all vocational education institutions to be able to improve student learning outcomes. One method that has effectiveness in improving learning outcomes is the edutainment method. The edutainment method is a well-packaged learning method that is able to overcome students' boredom in the learning process. Edutainment is a method process that is designed in such a way that educational and entertainment content can be combined harmoniously so that learning feels good [7]. In Classroom assessment Techniques use the edutainment method approach, teacher performance in planning learning carried out in three cycles has increased in each cycle. Activities and student learning outcomes in each cycle also increase [4]. Furthermore, in the Mathematic and Multimedia learning field student learning outcomes using the edutainment teaching method experienced a significant increase from students who were not given a fun teaching method [8,9]. The actualization of the use of the edutainment method is included in the high category, namely 69 percent and there are differences in learning outcomes before and after using the edutainment learning method in the Basic Cooking Technique Materials at Godean 2 Vocational School [4,10]. In this case, fun learning is done with humor, puzzle games, simulations with creative animation procedures and demonstrations. So that it is expected that the Edutainment learning model can improve student learning outcomes [7,8,10]. Efforts to overcome the cases raised in this paper are carried out by selecting learning models that are suitable for learning / education purposes, the role of teachers and students, characteristics of subjects / fields of study, and learning environment. The learning model that fits this consideration is the Edutainment Learning Model (entertaining education). This model facilitates the learning process in such a way that educational and entertainment content can be combined harmoniously to create enjoyable learning.

II. METHOD

The design of this research is Classroom Action Research (CAR). CAR is a research conducted to solve the classroom problems faced by teachers and students through cyclical steps. It is usually carried out either individually or collaboratively. This research uses a Collaborative CAR in which the researcher collaborates with the teacher as an observer during the implementation of the animation clips. A collaborative CAR may include as few as two teachers or a group of several teachers and others interested in addressing a classroom or department issue. This issue may involve one classroom or a common problem shared by many classrooms [11]. The issue concerned in the study is how to improve the learning outcomes of XI TPTU A of SMK in Cimahi. Beside that, this research improves the quality of the learning process, improve learning outcomes, and find innovative learning models to solve problems experienced by educators and students. The CAR design used in this study is Lewin's model consisting of action planning, implementation of actions and observation, and reflection. The research carried out consisted of three cycles.

This study involved 35 participants consisting of research subjects, observers of learning implementation, and instrument validators. Subjects in this study were students of class XI TPTU A of SMK in Cimahi consisting of 31 students (5 male and 26 female). The basis of the selection consideration is that class XI TPTU A is a class that has the lowest value compared to other classes. Observers of learning implementation consist of 3 observers, namely lecturers, teachers and students. The basic consideration of the selection is that the observer knows the learning process using the Edutainment learning model. The instrument validator consists of 3 validators, namely 1 lecturer and 2 teachers. The basic consideration of the selection is because it is considered to have expertise that has to do with research instruments. The researcher chose the class as the subject of the study because the class has the lowest scores in in system and installation of air conditioning subject at psychrometric learning. The researcher had also consulted the teacher who taught in the school.

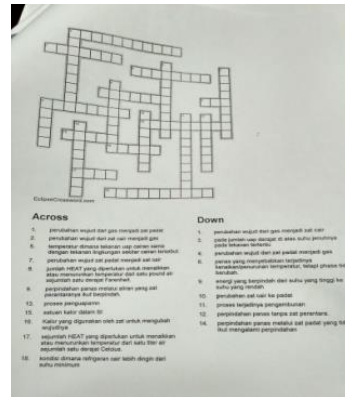
The first thing that researcher needs to do before planning an action is conducting a preliminary study. Preliminary study is used to know the problem in the particular place. This is needed to do to know the students real ability. By knowing the students real condition, the researcher will be able to make some adaptation to the edutainment method and media like psychrometric chart & puzzle that will be used in the research in that class. On the preliminary study done by the researcher, the researcher had interviewed the teacher and the students of XI TPTU A of SMK in Cimahi and also the researcher gave questionnaire to clarify the problems that occurred in the class. The researcher used observation sheets, pre-test, post test and questionnaires to collect the data. In the observation, the researcher collaborated with the class teacher to observe and record the implementation of the media by using the chart and puzzle games. Field notes were also used to make a complete record of the teaching and learning activities carried out using the edutainment method. Students' test scores (pre-test and post test) were used as data in this study, collected using the written tests. The results of the students' learning scores

indicated whether or not the students made improvement. This provided a basis for further revisions and planning for the next

cycle.



(a) Psychrometric Chart



(b) Puzzle games

Fig. 1. Application of edutainment methods in psychrometric subject.

Figure 1 describe an application of edutainment methods in psychrometric subject. The instrument in this study is the observation sheet implementing learning to obtain planning data and teacher performance in the learning process, and a multiple-choice form test sheet to determine student learning outcomes. Testing the validity of the observation sheet on the implementation of learning and test sheets was done through expert judgment, as well as reliability, differentiation, and difficulty levels for the test sheets. Test sheets are given at the pretest and posttest of each cycle. Assessment of the implementation of learning is given by the observer along with the learning process. The results of data collection will be compared to each cycle, so that it can be seen increasing. Learning outcomes are known through scoring the results of the pretest and posttest of each cycle which is then normalized by N-Gain. The criteria for success of the study are if the student learning outcomes are classically a minimum of 75% of the number of students who achieve the specified KKM (70).

III. RESULTS AND DISCUSSION

The ability of students to master psychrometric and psychrometric chart concepts can be seen from the results of the initial tests carried out before being given treatment using edutainment learning methods. The average score obtained by students is still below the KKM. The first cycle obtained an average value of 34.853, the second cycle was obtained by an average value of 46.667, and the third cycle obtained an average value of 44.118.

The initial tests that have been carried out are known that the average student score is below the KKM in each cycle, even though in terms of value there is an increase. However, the increase still cannot reach the KKM. The most influencing factor is because students are still less actively involved and have not been able to enjoy the learning process. Another factor is the method used by the teacher in delivering the material still using a teacher-centered learning approach. This affects the saturation of students in following the learning process. Another impact is that students are less able to master

learning material. So that the learning outcomes are not satisfactory.

The ability to master the psychrometric and psychrometric chart concepts can be seen from the results of the final tests carried out after being treated by using the edutainment learning method in the learning process. The average score obtained by students is still below the KKM and some are above the KKM. The first cycle obtained an average value of 74.412, the second cycle obtained an average value of 81.061, and the third cycle obtained an average value of 85,000.

TABLE I. AVERAGE SCORES OF PRETEST AND POSTTEST STUDENTS

Cycle	Average Scores of Students Pre-Test	Average Scores of Students Post-Test	Increase in Average Student Scores
I	34,853	74,412	39,559
II	46,667	81,061	34,394
III	44,118	85,000	40,882

Tabel 1 describe average scores of pre-test and post-test students. The treatment in the learning process carried out by the teacher turned out to have a pretty good impact. Test results show that students experience increased learning outcomes. Although in terms of student learning outcomes there is an increase, but the average increase is not so large from each cycle. The first cycle of students experienced an average increase in value of 39,559. The second cycle of students only experienced an increase in the average value of 34,394. The third cycle of students experienced an increase in the average value of 40,882. Based on the analysis, it turns out that the increase in value is still in the medium category. Researchers hope that using edutainment learning methods can improve high learning outcomes. Some of the causes that researchers can convey include students still not able to enjoy the learning process well, teachers still do not master the class, and teachers are still not optimal in using edutainment learning methods.

The initial condition of this student learning activity researchers get from observations with instruments that include

aspects of reading, recording, asking, answering, presentation, listening, participation, and enthusiasm. Observations made to see this initial condition are carried out when the learning process takes place in the classroom. Then, researchers write the problems that arise in learning activities.

This initial observation resulted in several problems that arise in student learning activities, including students who are still not well conditioned, students are still not actively involved in the learning process, and the learning methods used by teachers tend to be monotonous. So, student learning activities are still not optimal. Initial results before using the edutainment method, the percentage of student learning activities is 36.25%. Based on the criteria of learning activities, this percentage is in the medium category. This result according to the researcher cannot be separated from the factors of problems that arise when the learning process takes place.

The results of the first cycle study show that student learning outcomes are still low. These results are influenced by several things; one of them is the process of student adaptation to the use of Edutainment learning models. In the learning process of cycle I it is seen that students are not familiar with learning conditions that use Edutainment learning models. When children learn in school, the teacher's factors and ways of teaching are important factors [4,12]. The attitude and personality of the teacher, the high and low knowledge possessed by the teacher, and how the teacher teaches the knowledge to his students also determines the learning outcomes to be achieved. Therefore, students must be able to adjust to various learning conditions so that students can get optimal results from the learning process. Adaptation is a process that can change human behavior.

In the first cycle learning process there are some students who do not carry learning modules, reference books or other teaching materials, it indicates that the student is not ready to learn. Learning readiness is very important in the learning process, because if students are ready to learn by preparing various things that are needed, the learning process will be more optimal and learning outcomes will be better. Readiness is the overall condition of a person who makes him ready to give a response / answer in a certain way to a situation.

Based on observations of the implementation of learning cycle I, the teacher does not allocate time on an ongoing basis for the implementation of one activity contained in the RPP, which provides motivation for each class meeting. This is one of the factors that causes low student learning outcomes in the first cycle, because the provision of learning motivation is an activity that is very influential on students' awareness, enthusiasm, and readiness to learn. The motive is a driver for an organism to do something. One will not want to try to learn something as well as possible if he does not know the importance and usefulness of the results that will be achieved from learning. Motives are driving forces that influence readiness to start doing a series of activities in a behavior. This is a particularly important point, for this TPTU A class XI which has a long learning duration from 10.00 - 17.00 WIB in every meet of the System and Installation of Air Conditioning. Where can be ascertained the class atmosphere will be easily

bored, saturated and not conducive because the energy is exhausted and not fresh at the end of time.

The final condition of students' learning activities after using the edutainment learning method experienced a significant increase. The results of the final condition of student learning activities are obtained from the results of observations made using the same instrument when making preliminary observations before using the edutainment learning method.

TABLE II. PERCENTAGE OF INCREASED STUDENT LEARNING ACTIVITIES

Cycle	Percentage		Category
	Initial conditions	Final conditions	
I	36,25 (medium)	39,80	Medium
II		65,15	High
III		84,19	Very High

The results show that the percentage of students' learning activities in the first cycle is 39.80%. This percentage has increased from before, but based on the criteria learning activities are still in the medium category. This means that the increase is still small compared to the previous one. The percentage of student learning activities in the second cycle is 65.15%. The percentage of learning activities in the second cycle experienced an increase again. Increased learning activities of students in the second cycle are in the high category. Then, the results of the third cycle observation showed the percentage of student learning activity was 84.19%. Learning activities in the third cycle experienced a significant increase. This percentage is in the very high category.

Edutainment can improve learning ability because with creativity and a variety of learning methods that combine education and entertainment, students can understand learning material not only by reading & hearing the information provided, but communicating orally and in writing through group discussion presentations, as well as psychomotor training through student aspects activity investigating and applying directly to observation labs [5,7]. So that, the variation in the learning process in edutainments method can make students comfortable and last a long time in the learning process, besides that it can cause students' memory to be much better. This shows that edutainment activities (entertaining education) can strengthen the ability and survival in student learning processes and can be one approach to anticipate changes in student behavior in an adaptive and generative manner [13]. Based on the explanation above, it can be concluded that edutainment learning methods are able to provide better changes to student learning outcomes and learning activities. The researcher realized that the changes had not been able to achieve the best, but at least this method was able to be an alternative solution in dealing with problems that occur when the learning process takes place.

IV. CONCLUSION

The results showed an increase in student learning outcomes in each cycle. The average N-Gain in the first cycle was 0.607 increasing to 0.638 in the second cycle, and to 0.695

in the third cycle. The percentage of students who reached the KKM in the first cycle was 39.8% increasing to 65.2% in the second cycle, and to 84.2% in the third cycle. So it can be concluded that the use of Edutainment learning models can improve student learning outcomes in psychometric subject in the System and Installation of Air Conditioning.

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