

Power INFLUENCES Approach Of Web Centric Course For Chemistry Learning In Non Formal Education

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Abstract: In the 4.0 revolution era technology was very important in determining the outcome of the learning process. In non-formal education which is usually done with teacher centered experience development with the existence of learning methods using web centric courses, especially in chemical materials. The research method is done by quantitative analysis with experimental design. The control class was given the pre test and post test instruments. Hypothesis testing of data uses t-tests involving tests of normality and homogeneity. The results of the study provide information that the use of web centric courses can improve chemistry learning achievement for students in non-formal education.

Index Terms: chemistry learning, non formal education, web centric course.

1 INTRODUCTION

Chemistry is one of the subjects included in the non-formal education curriculum. Many students find learning chemistry difficult, so there is a need for innovative learning methods so students can understand chemistry well, are interested in learning chemistry and ultimately improve their learning achievement. Good learning outcomes are certainly the hope to be achieved by all educational institutions. Learning outcomes are an indicator of the successful application of learning methods [1]. Learning outcomes are determinants of student success in participating in learning ([2]. Learning outcomes are also influenced by several factors, one of which is the use of less innovative learning methods [3]. The development of learning models using information technology is a more innovative alternative and one of them is e-learning. E-learning as a form of information technology that is applied in education in the form of cyberspace [4]. E-learning is defined as learning using media in the form of application forms, programs, web sites. Through e-learning learning the learning process is not just teacher learning, listening to tutors, but students can observe, and are enthusiastic in learning. Chemistry learning material that is considered difficult by non-formal education students can be visualized in a variety of more dynamic formats and forms so students are motivated to learn. One e-learning that is used is a website. According to Aqib Aqib [5] there are aspects in the development of e-learning learning using web sites including: web courses, web centric courses. In this study e-learning is used with a web centric course model. Web centric courses aim to use the web by combining distance learning and face-to-face. Web centric courses have advantages because of several documents such as: learning instruments, instruments of discussion, discussions, consultations, assignments and exercises carried out via the online web, while for examinations and some learning material is done face to face. Media in the form of a laptop or computer connected to the internet has changed conventional learning methods to virtual learning.

The learning process using a web centric course can be a solution to the problems of non-formal education from the problem of time, place and learning resources. Tutors can provide material by simply uploading it to the web, then students can access it easily so students are ready with the material and learning can take place more optimally [6]. The development of internet-based e-learning with the web centric course model is the use of the internet combining distance learning and face-to-face. Some of the material is delivered via the web and some through face-to-face. In this model the tutor can give direction to students to learn the subject matter through the website. Students are also given direction to look for other sources from relevant websites. At the face-to-face meeting, students and tutors discussed more about the contents of the material that had been learned through the internet. Unlike the case with web courses, according to Davidson-Shivers, et al. [7] web courses are the use of the web for learning purposes, where students and tutors are completely separate and there is no need for face-to-face contact. All teaching materials, discussions, consultations, assignments, exercises, exams and other learning activities are fully delivered via the web, this model uses a remote system. Web centric course is the use of the internet that combines distance learning and face-to-face (conventional). Some material is delivered via the internet, and some through face-to-face. In this model the teacher can provide material and assignments to students to learn online. Students are also given direction to look for other sources from relevant websites. Various research results support the use of web centric course learning models to improve learning achievement. According to [8] that the web centric course learning model is significantly more successful than if learning is only traditional or only uses online-based learning. Alfred and Hopem (2004) combine traditional learning with online learning [9]. Livingstone and Condie [10] conducted a study by applying learning based on e-learning individually, traditional learning individually and learning by combining e-learning and traditional. The results show that, learning guides through information and communication technology with traditional methods have a positive impact on learning outcomes. Web centric course combining online learning with face-to-face can improve individual learning and provide feedback. Information development technology in revolution 4.0 is growing very fast. The education area gets attention and significant impact with development technology. This causes the growth of e-learning

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based learning especially web centric courses [11]. Web centric courses are expected to improve student learning outcomes. Nowadays there are many formal schoolstake advantage of the presence of this technology, namely learning using a web centric course based e-learning center, where students have 2 learning session, face to face session on outdoor classes and online sessions school hours (learning web access) [12]. Non-formal education is expected to follow technological developments by applying a web centric course. Web-centric e-learning based courses have a number advantages where students can learn by accessing the learning web anytime with updated material various types of learning media that can makes it easy to learn abstract concepts, one of them is matter in chemistry. However, e-learning based on web centric course has some disadvantages, others not can touch the affective part like traditional teacher in the class, and Low motivated students will experience difficulty to learn independently by using the web outside this school [13]. Associated with the study of literature has been done, the writer tried provide solutions to overcome weaknesses found in implementation web-centric e-learning based courses by developing new e-learning model created computer technology and the internet as learning media assisted by teacher's existence as mentor while studying in class.

2 METHODS

The object of this research was 20 students of An Nafii's PKBM Paket C. The research and development model used in this study is a modification of two models, namely: (1) the Sugiyono development model and (2) the Dick & Carey development model. The research method used is quantitative analysis with experimental design in the form of pre-test and post-test instruments. Data collection was carried out with a questionnaire that aims to determine student interest in using the web centric course learning method for chemistry lessons under the website name ruangkimia.com. Improved student achievement results were also analyzed using the normality test, homogeneity test as well as the percentage of successful use of the web centric course learning model. Design research can be seen in table 1.

Table 1. Design Research

Sample	Pre test	Treatment	Post Test
Experiment Class	T _{1x} , C _{1x}	X	T _{2x} , C _{2x}
Control class	T _{1o} , C _{1o}	O	T _{2o} , C _{2o}

Information :

T: test chemistry lesson (1: start, 2: end)

C: Character of student (1: beginning, 2: end)

X: use of the web centric course learning model

O: use of the conventional learning model

Research Instrument . The instruments used in this study were learning outcomes tests and observation sheets. The instrument used in this study is a learning outcome test with 15 items in multiple choice forms with 5 options from 30 validated questions. Observation sheet. Observation is intended for observe the character of students during implementation of learning. Assessment student character is done by giving a check mark (√) to the column available according to the facts observed Data

collection technique. Data collection is done by conducting a preliminary test to determine students' ability to redox material. After the redox material is given to students, a post test is carried out to find out the student learning outcomes. During the teaching and learning process takes place, students are observed characters formed at each meeting by observers and tutors. The characters observed include discipline, honesty, self-confidence, hard work, responsibility, love of science, curiosity, and independence. Data analysis technique. Test the validity of the research instruments include: test the validity of the items, reliability of the questions, the level of difficulty and power difference. Analysis prerequisite tests include: normality test using SPSS version 21, homogeneity test using SPSS 21 and balance test using SPSS 21 independent sample t-test. Hypothesis testing is done by testing the similarity of the average posttest (t-one party test). This t-one party test is used to determine the effect of a treatment, namely the web centric course learning model on student learning outcomes.

3 RESULT AND DISCUSSION

Web centric course learning model can make students learn chemistry independence and more time efficient. This can be seen when students need remedial or enrichment of students just open the material on the web page, so students are more independent. Time efficient in this case it means that when students need remedial or enrichment, students do not depends on the time the teacher has. In line with this Arifin and Herman [14] states web-based learning is able to foster the independence of students to construct own knowledge, indicated by an increase in mastery of concepts and students give a good response. Web centric course learning model can make students more motivated to do independent learning. This is in line with Gorgone and Kanabar [15] states that web centric course learning model can improve student performance. The role of elearning learning in fostering learning independence comes from the learning design factors that are can foster motivation for learning as a basic component in independent learning. This motivation for learning grows because learning through online learning portals is felt a lot of fun. Motivation also grows because of the guidance and encouragement from the teacher to use the direct discussion feature (chat). The effectiveness of web centric course learning model design in this study of the independence of learning chemistry, students viewed from students exploring material from various sources (example accessing material through the internet, both web pages that have been prepared by the teacher through a link (link) to e-learning portal address and do your own searching and solving issues through online discussions on chat facilities that we can see in table 2.

Table 2. Aspect of Web Centric Course

Component	Mean	Deviation Standard	Level
Support	4.22	0.851	High
Participatory	4.13	0.768	High
Achievement Oriented	4.23	0.880	High
Task	4.11	0.712	High
Effectiveness of Supervision	4.18	0.784	High

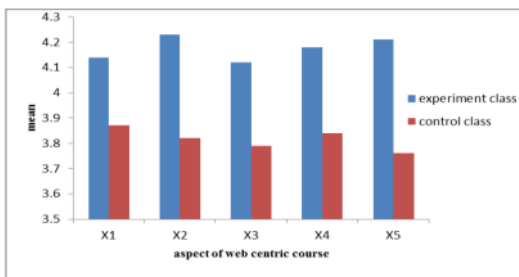


Figure 1. Result from experiment class and control class

With this web centric course understanding the concept of chemistry by students becomes better, this seen from understanding chemical concepts in the experimental class better than at understanding the concept of control class, this is because the information that students get is far more much of the information provided by teachers in learning using conventional learning. In learning by using a web centric course, students in solving problems can relearn material on web pages, study groups and ask the teacher. Such interactions do not occur in learning using conventional classroom media delivered face to face. The learning activities are dominated by teachers. Learning like this causes students to not be able to freely learn in their own way because they must follow the stages of learning directed by the teacher.

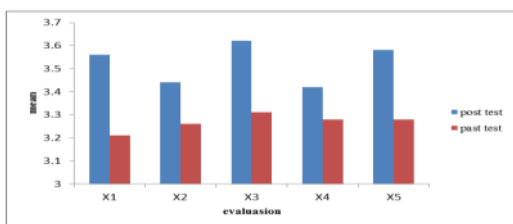


Figure 2. Result of evaluation from post test and pre test with web centric course learning model

In the pre-test, the average value of understanding students' chemistry concepts the experimental class was 31.52 while in the control class 31.22. Difference between the two classes is 0.30. In order to obtain the achievement of the experimental class is 78.8% or 0.7% more higher than the average achievement of pre-test scores in understanding the chemistry concepts of control class students which is only 78.1%. Both classes have the ability to understand early chemistry concepts which is relatively the same because of the difference in achievement between the experimental class and the control class relatively low. This is different from the level of achievement on the average post-test comprehension score student chemistry concepts. The average score of the post-test scores understanding students' chemistry concepts in the experimental class was 34.97 while in the control class 32.38. Difference between the two class is 2.59. In order to obtain the achievement of the experimental class is 87.4% or 6.5% higher than the average achievement of post-test scores in understanding students' chemistry concepts in class the controls were only 81.0%. Based on the above data, understanding conclusions can be drawn chemical concepts of students who obtain e-learning learning web centric course

models better than students whose learning uses conventional learning model. In addition to understanding the concepts, an analysis of the results of the pre-test and post-test was carried out to see the independence of learning average of the pre-test scores of students' chemistry learning independence on the experimental class has an average value of 87.03 while the control class is 80.21. Difference in average the pre-test between the two classes is 6.83. So that the two classes have a different initial attitude but relatively the same. The average post-test score of chemistry learning independence of experimental class students is 99.59 which is higher than the control class which only has an average of 89.00. difference in post-test average scores both classes are 10.59. Based on the data above, the conclusion is attitudes independence of learning chemistry experimental class students better than the control class. Analysis Requirements Test Results Internal analysis requirements test this research is; (1) Test Normality, (2) Homogeneity Test

a. Normality test

Based on the results of test calculations normality for all groups obtained a significance value of <0.005 on significant level $\alpha = 0.05$. This matter show that both groups of data in this study came from the population normal distribution. Results the calculation of the Liliefors test can be seen in the following table 4.

Table 4. Summary of Test Calculation normality result of Research Data

Value Group	Sig.	Note
Pretest Control	0.413	Normal
Pretest Experiment	0.314	Normal
Posttest Control	0.168	Normal
Posttest Experiment	0.372	Normal

Student centered learning will make students have more mastery of concepts well. One effort that can be done to make the lesson is student centered is learning through a web centric course. Web centric courses cause students to get depth material that students want, students can stop and or continue in accordance with the level of mastery of students towards a concept. Through the web centric course students get more information from the internet and learning becomes more practical and efficient because of this students can ask the teacher online when students in the class are less able understand learning material. Learning using a web centric course can encourage students to learn more actively (student-centered) and the teacher functions more as a facilitator to create an atmosphere of learning which is fun. The teacher gives material planted on Moodle software and students required to study, answer questions or solve problems that have been provided. Assignments assigned to students must be completed before the deadline

b. Homogeneity Test

This test is to find out whether a sample of a variant population homogeneous or not. Testing the homogeneity of the data the pretest uses SPSS version 21 Levene-Statistic, with confidence level $\alpha = 5\%$. Results calculations can be seen in the table 5.

Table 5. Summary of Test Calculation Results of Homogeneity

Value	Sig.	Note
Pretest Control and Pretest Experiments	0.662	Homogeneous
Posttest control and Posttest Experiment	0.841	Homogeneous

4 CONCLUSION

In general it can be said that based on the learning that has been done, The application of web centric course learning can make (1) students have more opportunities in utilizing chemistry knowledge and skills that have been possessed, (2) students actively participate in learning and actively express their ideas, (3) students can respond to problems in their own way, (4) students are motivated to give evidence or explanation of the strategy chosen in solving the problem, (5) more student experience in answering problems so they can improve understanding of the concept. These results support an increase in understanding of the chemistry concept. New technology, especially in the field of informatics, has an increasingly important role important in learning. Many people believe that multimedia will work leads us to a learning situation where "learning with effort" can be replaced with "learning with .fun". Especially in adult learning, learning with effort becomes quite difficult to implement due to various factors constraints such as age, ability to grasp, willpower, etc. So the process learning that is fun, creative, not boring is the choice of the teacher. If a learning situation like this is not created, at least multimedia can make learning more effective in the opinion of some teachers. Combine face-to-face meetings with learning electronics can increase the contribution and interactivity between students. Through face to face learners can get to know fellow students and their accompanying teachers. This intimacy really supports their collaboration work virtually. Preparation mature before implementing a multimedia-based learning holds an important role for the smooth learning process. All preparations like scheduling up to the technical determination of communication during the learning process is an important stage in implementing web-based learning.

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