Effectiveness of E-Learning Approach to Contextual Teaching and Learning in Improving Students' Ability

Zulfi Azhar¹, Suparno², Kasman Rukun³ Jalius Jama⁴, Hansi Effendi⁵, Mukhlidi Muskhir⁶

¹Faculty of Computer Science, Universitas Negeri Padang, Padang, Indonesia
²Sekolah Tinggi Manajemen Informatika dan Komputer Royal, Indonesia
³Faculty of Computer Science, Universitas Negeri Padang, Padang, Indonesia
⁴Faculty of Computer Science, Universitas Negeri Padang, Padang, Indonesia
⁵Faculty of Computer Science, Universitas Negeri Padang, Padang, Indonesia
⁶Faculty of Computer Science, Universitas Negeri Padang, Padang, Indonesia

*zulfi_azhar@yahoo.co.id

Abstract. In this study using a contextual teaching and learning approach to STMIK Royal Kisaran students. Class sampling consisted of class SI-5C using the CTL approach and class SI-5F using CTL and e-learning as an experimental group, while the class SI-5D used a conventional approach as a control group. Using the pretest and posttest in the form of multiple choice as instruments in artificial intelligence lectures. From the results of the tests carried out there are significant differences in students who are taught using the CTL and E-learning approaches and conventional approaches. Taking approaches of CTL and CTL & E-Learning to students is more effective than conventional ones. However, CTL is better than using the approach of CTL & E-Learning.

1, Introduction

In the learning process in the classroom, there is something that must always be considered about the lack of focus of some students in listening and paying attention to the lecturers' delivery in front of the class. In the learning model that is carried out directly, it is often applied in the classroom, namely a student-centered approach that does not involve student activeness in active and interactive participation during learning activities which will cause boredom and boredom. Meanwhile, student-centered learning approaches reduce inquiry and discovery learning strategies as well as inductive learning. The learning process in the classroom must always be considered about the majority of students listening and paying attention to the lecturers' delivery in front of the class. Learning models that are carried out directly are often applied in the classroom, namely a student-centered approach[1].

Monotonous learning makes students feel bored so that it can affect students' ability to understand the material and lectures well. This will result in the ability and student learning outcomes that are less satisfying. The value of the results they get will be very far from what is
expected by a lecturer. And if there is further lecture material which has a direct relationship with the material taught is not understood by students, it will result in further lecture material making students confused, especially in understanding in theory and practice if any[2]. By using CTL, students can collaborate together on ideas and opinions to conduct discussions to complete learning materials and assignments[3].

The Contextual Teaching and Learning approach helps students connect subject matter with real life which will make students get the meaning of what they are learning so that they are able to develop thinking skills that can develop student character[4]. Contextual learning, gives students the opportunity to build relationships that are more relevant and meaningful to them and effective in increasing the potential of students so that they are more interested in science learning[5]. CTL is a learning process in making it easy for students to understand the meaning in the fields they are studying, making relationships from subjects at school with real contexts in everyday life[6]. Learning can use e-learning at any time, anywhere and anytime, enriched with material from various learning sources, can be updated quickly[7].

The results of observations show that E-learning based learning with Edmodo can solve problems that occur in grade 11 following industrial practice activities[8]. Edmodo platform, as an online social media with web services, has a shape similar to Facebook which makes students feel comfortable and feel close to communicating and learning[9]. With edmodo, in the experimental group students were superior to the control group in terms of their learning outcomes, showing higher and positive learning motivation. Technology as a means of supporting learning and assistance for students in producing better learning conditions[10].

This study aims to determine which e-learning and CTL approaches are effective in learning artificial intelligence lectures for 5th semester students at STMIK Royal Kisaran. Artificial intelligence lecture material is a very important subject, because this lecture material is closely related to the understanding of lecture material in theory and practice and will subsequently be sustainable, especially in the application of information systems programs. In the implementation of advanced lecture materials, many students do not understand application programs such as database system application programs, visual programming, analysis and design of information systems, database system management, artificial intelligence and web programming. All of which application programs are interrelated and support in further lecture material so that students must really be able to attend lectures well and successfully and can complete lectures with a satisfactory graduation. By not understanding the application of the program students will be confused, especially with the application program in the information system they are learning in the classroom.

2. Methodology

The population in this study were 75 students from 3 classes namely SI-5C, SI-5D and SI-5F at STMIK Royal Kisaran. This study took data from the pretest scores and also the final results from the posttest as in table 1 below. Of the 3 classes are divided into two groups, namely the experimental group (class SI-5C and class SI-5F), for one more group namely the control class (class SI-5D).

Table 1. Sample of the Research

| Classes | Groups    | Treatments       |
|---------|-----------|------------------|
| SI-5C   | Experiment| CTL              |
| SI-5F   | Experiment| CTL and E-Learning|
| SI-5D   | Control   | Conventional     |
Using a multiple choice test on the pretest and posttest as research data, which aim to measure the ability of students' knowledge in answering the questions given. Research Procedure There are several stages in the research procedure, the first stage is site preparation, determining the population and sample by the researcher as well as creating learning plans and preparing pretest and posttest. Performing a pretest at the beginning before starting learning, implementing learning with a conventional approach (SI-5D) and CTL E-learning in class (SI-5C and SI-5F).

Doing a posttest at the end to get the effectiveness of student abilities in carrying out learning with conventional approaches and CTL E-learning in the. The instrument was made according to researchers there are two ways, namely making multiple choice questions, where students by answering directly to the class SI-5D and Class SI-5C. As for the SI-5F Class with multiple choice questions using edmodo e-learning as a supporting medium. For student accounts on e-learning Edmodo has been prepared in advance by researchers with a username and password.

3. Result And Discussion

By using statistics, the figures for the pretest and posttest are obtained below

| Table 2. The Score of The Pre and Posttest Assessments |
|-------------|-----------|-----------|-----------|-----------|
|            | N | Minim | Maxim | Mean | Std. Deviation |
| **Pretest** |   |       |       |      |               |
| SI-5C       | 25 | 40    | 70    | 54,96 | 11,635        |
| SI-5F       | 25 | 40    | 70    | 54,80 | 11,460        |
| SI-5D       | 25 | 40    | 70    | 53,20 | 10,384        |
| **Postest** |   |       |       |      |               |
| SI-5C       | 25 | 80    | 95    | 88,24 | 4,245         |
| SI-5F       | 25 | 80    | 95    | 86,76 | 5,060         |
| SI-5D       | 25 | 65    | 81    | 73,48 | 5,606         |

There is a difference in the results of the assessment, the average score in the SI-5C class is the highest compared to other classes. Perform normal distribution test to get normally distributed data.

| Table 3. Normality of Distribution |
|-------------|-----------|-----------|
| KS          | Sig.      | Result    |
| **Pretest** |           |           |
| CTL         | 0,124     | p>0,05    |
| Conv        | 0,169     | p>0,05    |
| CTL-EI      | 0,116     | p>0,05    |
| **Postest** |           |           |
| CTL         | 0,200*    | p>0,05    |
| Conv        | 0,176     | p>0,05    |
| CTL-EI      | 0,200*    | p>0,05    |

Next test the homogeneity variance to determine whether the group has a homogeneity variant or not. From the results of Table 5, it turns out that the value of sig. is bigger than sig. Level 0,05, p>0,05 = normal.
Table 4 Variance Homogeneity Test

|             | df1 | df2 | Sig. |
|-------------|-----|-----|------|
| CTL Based on (BO) Mean | 6,19 | 1 | 48 | 0,435 |
| BO Media | 6,10 | 1 | 48 | 0,439 |
| BO Median and with adjusted of BO trimmed mean | 5,93 | 1 | 48 | 0,445 |
| Posttest | | | | 0,435 |

Sig. > 0,05 = homogeneous

In this test, it fulfills the existence of normally distributed and homogeneous data. There is a difference in the ability of students to use conventional approaches and CTL E-Learning. in table 5.

Table 5. The Result of ANCOVA

| Source | Squares | F  | Sig. | Partial Eka Squared | Result |
|--------|---------|----|------|---------------------|--------|
| Kelas  | 3276,007| 130,772 | 0,000 | 0,642 | Sig. < 0,05 = significant diference |

There was a mean difference in grupps I and J, where in the CTL and CTL E-Learning approaches there was no significant difference.

Table 6. Post Hoc Test Result

| Grups (I) | Grups (J) | Difference Mean (IJ) | Std Error | Sig. |
|-----------|-----------|----------------------|-----------|------|
| CTL       | CTL-El    | -1,48000             | 1,41475   | 0,550 |
|           | Conv      | 13,28000*            | 1,41475   | 0,000 |
| CTL-El    | CTL       | 1,48000              | 1,41475   | 0,550 |
|           | Conv      | 14,76000*            | 1,41475   | 0,000 |
| Conv      | CTL       | -13,28000*           | 1,41475   | 0,000 |
|           | CTL-El    | 14,76000*            | 1,41475   | 0,000 |

Taking the CTL approach is better and very effective when done with the approach of CTL & E-Learning, where in table 6 it states that there is a significant difference in increasing student ability scores using conventional approaches and CTL & E-Learning with an average difference of 14.76. In table 3, it is found that more than 75% of students for the experimental group achieved a minimum criterion score of 75. And half of the students from the control group got a minimum criterion score of 73.48 so the conventional approach was less effective. There are significant differences using conventional, scientific and CTL approaches in teaching writing[11]. E-learning has a positive and significant effect on learning quality[12]. The implementation of CTL learning is better and very effective when it is carried out with a conventional control class approach[13]. The use of edmodo is complementary in increasing student satisfaction in student
learning in class[14]. There are differences in learning outcomes using CTL and Edmodo e-learning with conventional learning[15]. Maintain face-to-face interaction while completing online assignments using edmodo[9]. Using edmodo in online assignment discussions can increase students' interest and motivation in writing skills[16].

4. Conclusion

This research conducted states that the student's ability to significantly increase in artificial intelligence lectures by using the CTL & E-learning approach. With an approach using CTL and E-learning to increase the effectiveness of student abilities in artificial intelligence lectures. The use of e-learning as a complement is very useful in improving classroom learning, especially to overcome limitations that occur in face-to-face interactions.

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