



## The Effectiveness of Coopertative Learning (STAD and PBL type) on E-learning Sustainable Development in Higher Education

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### Abstract

Development and application of educational technology in higher education with innovative learning models based on Cooperative Learning Type Student Teams-Achievement Divisions (STAD) and Project Based Learning (PBL). The purpose of this study is to analyze the educational technology model and innovative learning based on cooperative learning type STAD and PBL sustainable learning model innovation based on e-learning. This study focuses on the learning outcomes of TOEFL students in the Department of English Education in English courses at Brawijaya University Malang. Research methods using pre-test and post-test designs. Data analysis One Way ANOVA test and SEM analysis using Partial Least Square (PLS) software. The results of this study showed that the treatment of TOEFL tests (pre-test, mid-test, and post-test) in the control and experimental class with cooperative learning model type STAD and PBL were different. The average pre-test TOEFL score in the experimental class was 344.71 with a range of starting score 300-397 with standard deviation was 29.386. The average result of mid-test TOEFL score in experimental class was 345.46 with a range of ranging score from 300-380 with standard deviation was 20,587. The average post-test TOEFL score in experimental class was 360.83 with a range of ranging score from 303-400 with standard deviation was 24.146 (STAD and PBL p-value were 0.019 and 0.026, respectively). The results of development and application of innovative educational technology based on STAD and PBL e-learning could have significant influence on the result of student TOEFL score.

**Keywords:** TOEFL; sustainable learning, Innovative Learning model, STAD, PBL

### Introduction

Higher education is one way to improve the quality and potential individual (Antony et al., 2015, Syakur and Azis, 2020). Improving the quality and potential of people on an ongoing basis is very important, especially in the current globalization era (Henard and Roseveare, 2012, Syakur, 2017, Syakur and Panuju, 2020). Increasing the potential of high-quality human resources who are able to develop the potential they have and can solve problems in

the future (Soenens and Vansteenkiste, 2005, Syakur, 2015, Syakur et al., 2020d). Higher education has a real role in realizing improvements in human resources quality that are seen in implementation of educational activities (Shah et al., 2011, Syakur, 2018b). Educational activities in Higher education generally have not significantly changed academic insight and behavior (Kurniawan and Syakur, 2017, Sulam et al., 2019). It can be seen from the point of view, the way of thinking that does not show differences with people who have no higher education

(Salmon, 2003, So and Kim, 2009).

National Education of Indonesian Ministry included the concept of education for sustainable development as a basis for national education in Indonesia in 2011 which is a sustainable concept as one of the basic principles in developing of national education (Syakur et al., 2020e). This is shown in the National Education Law and Strategic Plan of National Education Ministry 2010-2014 which makes Education for Development, Development and / or Sustainable Development (PUP3PB) as one of national education development paradigms. Education for Sustainable Development (ESD) is expected to be able to change attitudes and behavior of individuals, groups, economists, governments, and wider community so that they can live sustainably, understanding of economic, social and environmental problems (Henard and Roseveare, 2012, Syakur, 2014, Aysan, 2015, Syakur, 2017, Shahroom and Hussin, 2018). Sustainable development is always connected with development and environment. This is reason why education for sustainable development is often equated with environmental education (Syakur, 2018a, Syakur et al., 2020f).

Relationship formed between the objectives of implementation of character education and education for sustainable development (ESD) based on the description is very closely related (Yuliana et al., 2013, Syakur, 2017). The values embedded in the character education policy have same direction as the goal of sustainable development education. ESD policy is expected to form noble people who have very high concern for development and environment. Social and natural responsibilities that can know exactly which is done for development in the present and future (Azis and Lestariningsih, 2018, Hariyati and Syakur, 2018, Azis and Kurniawan, 2019).

Innovative learning models in the 2013 curriculum as well as several learning models that are relevant to Student Centered Learning (SCL) including cooperative learning, problem-based learning, project-based learning (PBL), group discussions, contextual learning, role play and simulation, discovery learning, self-directed learning, and collaborative learning (Syakur and Rakhmawati, 2014, Syakur et al., 2020c). Learning models above often overlap with each other, both in terms of terms used and in practice of implementing learning (Syakur, 2020, Syakur et al., 2020a). The term contextual learning as a learning model here is aligned with

problem-based learning, whereas in Contextual Teaching and Learning (CTL) itself, problem-based learning which is essentially problem solving is an important part of CTL (Ningsih et al., 2014, Syakur et al., 2020b).

Using of the term also shows the emphasis of the intended model. Problem-based learning of the emphasis is problem. This learning model starts by displaying problem in front of the students, then all subsequent learning activities are directed to solve problem (Barrett and Moore, 2010, Azis and Lestariningsih, 2018, Syakur et al., 2020c).

Meanwhile in CTL, the emphasis is on the authenticity of learning, namely that learning must be real according to what is happening everyday (problem solving activity). Problem-based learning models, it is possible to do in groups, and thus also means cooperative learning. Another example, in cooperative model what is highlighted group's work activities, which are expected to have an optimal impact on the development of the learning to live together pillar (Syakur, 2018b, Syakur et al., 2020c). Therefore, even though the name is still needed, in the selection of models to be used, the teacher needs to base on learning objectives (basic competencies and indicators) that have been determined.

The use of cooperative learning model type STAD is the simplest cooperative learning model and is a model that is widely used in cooperative learning. An essential part of this model is students working in groups to learn teach others (Syakur, 2018b, Syakur et al., 2020f). Besides learning that could help students to have creative thinking, problem solving, and interaction as well as assisting in investigations that lead to solving real problems is PBL (Syakur et al., 2020c). PBL could stimulate motivation, process and improve student learning achievement by using problems related to certain subjects in real situations. This study aims to produce an online-based educational and Innovative Learning model on STAD learning and PBL learning towards learning outcomes of e-learning TOEFL in Higher Education.

## Material and Methods

This research is a quasi-experimental research design with a quantitative approach that uses pre-test, mid-test and post-test. The subjects of this study were 65 students, Department of English Education in English courses at Malang Malang 7<sup>th</sup> Semester. The sampling method in this study uses purposive sampling which was non-random sampling by determining the sam-

pling by setting special characteristics and 2.75 GPA in accordance with the research objectives that was expected to answer the research problem.

### Data Collection

1. Data collection was done by giving a set of written questions to respondents to be answered.
2. Data collection was done by TOEFL (pre-test, mid-test, and post-test) scores on the application of conventional models and cooperative learning models to students. TOEFL test scores were analyzed using statistical methods, namely the one way ANOVA test.
3. Questionnaire data collection was carried out to determine the relationship between STAD cooperative learning methods and PBL on the results of student TOEFL scores. Respondents' score scores were analyzed using statistical methods, namely structural equation modeling.

### TOEFL Test

Learning outcomes data conducted through the Pre-test, mid-test and post-test with TOEFL test at the beginning before, learning process and the middle of the learning process and the end after the learning process was carried out.

- a. Pre TOEFL Test. The TOEFL Pre Test was given to both classes for the seventh semester of the academic year 2017/2018 after it was found that the two classes used were actually the same according to

Table 1. Expert Team Treatment

No	Expert Team Treatment	Time	Conventional Learning Model
	Class A		
1	19 September 2018	18.30 - 19.30	Pre Test TOEFL
2	20 September 2018	18.30 - 19.30	
3	26 September 2018	18.30 - 19.30	
4	27 September 2018	18.30 - 19.30	
5	24 October 2018	18.30 - 19.30	
6	25 October 2018	18.30 - 19.30	
7	30 October 2018	18.30 - 19.30	Mid Test TOEFL
8	31 October 2018	18.30 - 19.30	
9	14 November 2018	18.30 - 19.30	
10	15 November 2018	18.30 - 19.30	
11	21 November 2018	18.30 - 19.30	
12	22 November 2018	18.30 - 19.30	
13	28 November 2018	18.30 - 19.30	
14	29 November 2018	18.30 - 19.30	

statistics ( $H_0$  is accepted if  $t$  arithmetic  $<$  table).

- b. Pre Test. Pre-Test TOEFL Results are given to students of the Department of English Education Brawijaya University to see that initial interest held by each class was same.
- c. Research Treatment. The treatment in this study was carried out 14 times by researchers in the experimental class and control class. The treatments in this study used the same material, lecturers, and class conditions and the same time (Table 1). How to teach experimental and control classes using cooperative learning type STAD and PBL models. The treatment models of each class were (Table 2) as follows:

Table 2. Research Treatments in the Experimental Class

Expert Team Treatment		Time	STAD And PBL Learning
Class B			
1	19 September 2018	19.30 -20.30	Brain Storming, Discussion group work
2	20 September 2018	19.30 -20.30	Question Answer, Brainstorming, Mapping, Group Work
3	26 September 2018	19.30 -20.30	Question Answer, Brainstorming, Trial E- Toefl
4	27 September 2018	19.30 -20.30	Brain Storming, Group Discussion.
5	24 October 2018	19.30 -20.30	Brain Storming, Question Answer.
6	25 October 2018	19.30 -20.30	Brain Storming, Question Answer, Cooperative Learning
7	30 October 2018	19.30 -20.30	Brain Storming, Question Answer, Minute, Mid Test in E- Toefl
8	31 October 2018	19.30 -20.30	Brain Storming, Question Answer, PjBL
9	14 November 2018	19.30 -20.30	Brain Storming Question Answer. Practicing the work sheet
10	15 November 2018	19.30 -20.30	Question Answer, PjBL, Game
11	21 November 2018	19.30 -20.30	Question Answer, Writing in E- Toefl
12	22 November 2018	19.30 -20.30	Question Answer, Reading in E- Toefl
13	28 November 2018	19.30 -20.30	Question Answer, Listening in E- Toefl
14	29 November 2018	19.30 -20.30	Post Test TOEFL

- a. Mid Test TOEFL. Mid Test was given by using the TOEFL based on Test as a good and valid test instrument (Valid, Reliable, and Practical) for students in both classes after the treatment lasts for 7 times based online. The items in the test instrument are the same as the test items in the Pre Test.
- b. TOEFL Test Post. Post Test was given by using the TOEFL Test as a good and valid test instrument (Valid, Reliable, and Practical) for students in both classes after the treatment lasts for 14 times. The items in the test instrument are the same as the test items in the Pre Test and Mid Test.

### Research Instrument

1. There were 5 kinds of questionnaires. For lecturers (10 questions), for students (10 questions), conventional learning questionnaire (for control class students), questionnaire Cooperative Learning Type STAD and PBL learning model (for Experiment class students).
2. The E-TOEFL Test was used on the Pre, Mid and Post Test to determine student learning outcomes before and after treatment. This TOEFL Test was valid (valid, reliable, and practical). There was no need to calculate the content validity of the test. That was in accordance with the Higher Education curriculum, and the validity of the items from the TOEFL need not be doubted, because its test had been used in all countries, moreover the practicality of this instrument was very practical easy to read, understand and accompanied by an answer so that all assessors in all countries will give the same value to the same work (Sharpe, 2008); Miranda et al., 2012).

Video was used for material TOEFL and recording images, especially treatment time by using the Cooperative Learning type STAD and PBL learning model.

### Data Analysis

The results of TOEFL test scores include Pre-Test, Mid-Test, and Post-Test on the application of conventional models and Cooperative Learning type STAD and PBL learning models. This stage would be ANOVA One Way test, used to test the treatment effect in which more than two treatments and to find out the relationship between the achievement of innovative Cooperative Learning type STAD and PBL Learning model on the results of TOEFL score.

Table 3. Comparative analysis of english TOEFL skills with STAD model

	Experiment	Control
	35 orang	30 orang
Pre Test TOEFL	Minimum	300
	Maximum	397
	Mean	344,71
	Delta Mean	93,56
	<i>Std.Deviation</i>	29,368
Skor Mid Test TOEFL	Minimum	300
	Maksimum	380
	Mean	345,46
	Delta Mean	106,61
	<i>Std.Deviation</i>	20,587
Skor Post Test TOEFL	Minimum	303
	Maksimum	400
	Mean	360,83
	Delta Mean	89,4
	<i>Std.Deviation</i>	24,146

### Results and Discussion

The result of this research has compared conventional methods of learning models of Cooperative Learning Type STAD and PBL model that had been carried out in learning process. Analysis comparison of ability of respondents data and outcomes of Cooperative Learning Type STAD was described in Table 3.

Based on Table 3, it was known that experimental class and control class of 7th semester of English Education using Cooperative Learning type STAD learning model. Total number of students was 65 student. The result of experimental class minimum pre-test score was 300 and maximum score was 397 with average score was 344.71. While in control class minimum pre-test score was 400 and maximum 470 with average score was 438.27. In experimental class, minimum mid-test score was 300 and maximum was 380 with an average was 345.46, while in the control class, minimum score mid-test score was 420 and maximum was 475 with an average score 452.07. In experimental class, minimum post-test score was 303 and maximum score was 400 with average score was 360.83, while in the control class, minimum score of post-test score was 410 and maximum was 475 with average was 450.23.

Learning outcomes using Cooperative

Table 4. Comparison of the result of TOEFL abilities Cooperative Learning Models type PBL model.

Respondent		Experiment	Control
		35 Student	30 Student
Pre Test TOEFL	Minimum	367	450
	Maximum	483	510
	Mean	417,03	470,53
	Delta Mean		53,5
	<i>Std.Deviation</i>	27,690	21,218
Mid-Test TOEFL	Minimum	400	440
	Maximum	480	500
	Mean	445,17	463,90
	Delta Mean		18,73
	<i>Std.Deviation</i>	20,492	16,095
Post-Test TOEFL	Minimum	380	450
	Maximum	490	510
	Mean	450,06	476,67
	Delta Mean		26,61
	<i>Std.Deviation</i>	27,566	17,486

Learning Type PBL as in Table 3, the collection of questionnaires through the TOEFL results as Table 4.

The result of student learning using Cooperative Learning Type PBL learning model in Table 4. The total of student as data was 65 students. In experimental class, minimum pre-test score was 367 and maximum was 483, with average score was 417.03, while in control class, minimum pre-test score was 450 and maximum was 510, with average score was 470.53. In experimental class, minimum of mid-test score was 400 and maximum was 480, with average score was 445.17, while in control class, minimum of mid-test score was 440 and maximum was 500, with average was 463.90. In experimental class, minimum of post-test score was 380 and maximum was 490, with average score was 450.06, while in control class, minimum of post-test score was 450 and maximum was 510, with average was 476.67.

Evaluation of learning model stated that 60% of English lecturers considered the student learning outcomes in subjects, they were teaching were satisfactory. However, its needed to improving as an effort. According to (Yuliana, 2013, Wayman and Jimerson, 2014, Syakur et al., 2020d), improvement in delivery of education, especially in the method of teaching mate-

rials were very important to do. As many as 80.0% of English lecturers strongly agree the application of new curriculum requires in Learning application Model. Its different from what has been applied by most lecturers in higher education.

Based on the results above that 60.0% of English lecturers agree that efforts to raise attitudes, student interest in learning. Its must be change the Learning Model that had been applied. Learning Model was the key to success of education process. The existence of various information media and computer support in the classroom allows various learning creations, such as interactive learning based on online learning. The other result of survey showed 100% of English language lecturers agree that one of the efforts to improve students' abilities in the ability to cooperate, critically thinking, responsibility and social empathy. Its through to development and application of cooperative learning type STAD and PBL according to development of sustainable online-based on innovation technology .

Based on the results of questionnaire for students, it was obtained that 61.5% of students agreed that the implementation of learning to included the implementation of continuing education in accordance with the character of the nation which included, Religious, Independent, Na-

tionalist, Mutual Cooperation, Integrity as conveyed by lecturers in the Syllabus and Learning Plan Semester (RPS) in the first face-to-face lecture. As many as 13.8% of student respondents in the survey stated neutral that the learning implementation that had been delivered by lecturers in the syllabus and RPS on the first face-to-face lecture. 64.6% of students agreed that the student learning outcomes in the courses received were satisfactory.

As many as 15.4% of the student respondents in the survey agreed that student learning outcomes in the courses received were satisfactory. 49.2% of students agree that they feel monitored in order and discipline in the process of implementing education in higher education. As many as 30.8% of student respondents in the survey stated neutral. They feel monitored in order and discipline inside and outside the classroom in the process of implementing education in tertiary institutions. As many as 30.8% of student respondents in the survey stated neutral that they felt monitored in order and discipline inside and outside the classroom in the process of implementing character education in tertiary institutions.

Questionnaire data shows that 72.3% of students strongly agree and the remaining 27.7% of students agree that they feel that the student learning outcomes are influenced by good learning processes and methods. Questionnaire data shows that as much as 78.5% of students strongly agree and the remaining 21.5% of students agree that they feel agree with the implementation of exemplary habituation by important lecturers so that students get reinforcement of good behavior. 87.7% of students agree that they feel agree with the implementation of the new curriculum based on the project and the learning methods that have been applied by most of the lecturers in higher education today. As many as 9.2% of the student respondents in the survey stated neutral that they felt neutral with the implementation of the new project-based curriculum and the learning methods that had been applied by most lecturers in tertiary institutions at this time.

Questionnaire data shows that as many as 56.9% of students strongly agree and the remaining 43.1% that they feel interested and get good learning outcomes because they use Innovative learning methods. 83.1% of students agree that they feel the ability to work together, think critically, responsibility and have a social spirit that you feel right now is appropriate and

appropriate. As many as 10.8% of student respondents in the survey stated neutral that they felt the ability to work together, think critically, responsibility and have a social spirit that you feel now is appropriate and appropriate. With regard to the cooperative method, as many as 66.2% of students agreed that the application of Cooperative Learning type STAD and PBL learning model in the TOEFL learning process based on e-learning was one of the effective efforts to improve student learning outcomes (Yadav et al., 2011, Yusuf et al., 2015, Ferina, 2016). This proves that this research is important where as many as 73.8% of students feel agree with the application of the Cooperative Learning model STAD and PBL Learning Model in improving student learning outcomes of TOEFL (Duda and Nicholls, 1992, Pala, 2011, Syakur, 2019).

### **PBL Influence Toward Students Learning Outcomes in English Subject**

The results of one way ANOVA test in the experimental class the significant score was 0,000. Because significant  $< 0.05$  ( $0,000 < 0,05$ ), it can be concluded that H2 was accepted, meaning that the treatment influences of the three TOEFL tests namely pre-test and post-test in the experimental class were different, or there were significant differences. The test outcomes showed that the PBL model control class the sig was 0.031. Because significant  $< 0.05$  ( $0.031 < 0.05$ ), it can be concluded that H2 was accepted, meaning that the treatment influences of the three TOEFL tests namely pre-test and post-test in the control class were different, or there were significant differences.

Based on Table 5, it was known that that the learning application based on PBL to the learning outcomes of e-learning based TOEFL have influence with p-score of 0.026 means that there was significant influence between PBL to the learning outcomes of 7<sup>th</sup>

Table 5. Hypothesis test results of PBL learning education toward student learning outcome

Hypothesis	Coef-ficient	T count	P-Scores
Learning Outcome PBL of E-Learning Based TOEFL	0.433	2,244	0.026

semester students at English Education of Brawijaya University Malang. The influence of PBL to the learning outcomes of e-learning based TOEFL of 0.433 (Yadav et al., 2011, Syakur, 2019, Syakur and Azis, 2020).

## Conclusion

Based on the results of the analysis above it can be concluded that the application of PBL can help in developing abilities student critical thinking. Thinking ability critical needs to be developed by students as an effort to prepare themselves to face challenges and problems that will be encountered now and later. Implementation of PBL as one of the models and techniques in solving the problem of the TOEFL score of the students gives a significant effect, so that the TOEFL score results are better.

## Suggestion

PBL learning model can be used as one alternative learning model to improve the ability of students. The application of PBL learning models to improve other abilities. The application of the PBL learning model to subjects that other.

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