

## Implementation of online learning to improve understanding concept and exhaustiveness of learning outcomes on science lesson

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**Abstract.** The aims of this research were improving the understanding of concepts and exhaustiveness of student learning outcomes on science lesson using online learning. It was a classroom action research that using Kemmis and Mc Taggart model. Subject of this research were student of mathematics education program on even semester. Data collection techniques include tests, observations, and questionnaires. It was analyzed descriptively qualitative. From this research founded that student's understanding concept on the first cycle is 70.1%, and the second cycle is 91.5%, the average of student learning outcomes in cycle I is 65 and the second cycle is 83.5. Based on those findings, it could be concluded that the implementation of online learning can increase understanding of concepts and exhaustiveness of student learning outcomes on science lesson.

### 1. Introduction

Along with technology development in the world causes internet to be an effective media to disseminate of information, as well as in education. It makes the educational system has been transformed from conventional into online. The utilization of internet as an instructional media can replace the role of teachers in the classroom. Students ability to accept the subject no longer dependent on the teacher. They can learn themselves by using internet so that the function of teachers only as a mentor[1]. Through the internet, students can access many references from libraries, encyclopedia and other online learning sites. Thus, the access to get information can be done anywhere and anytime without being tied to space and time. It makes students learn independently.

Application of information technology for learning activities in Indonesia more conducive since published of Minister of Education Decree No. 107/U/2001 about the implementation of distance education program [2]. Based on this regulation, the government encourages conventional universities to organize a dual mode education by using various communication media and interactive learning methods [2]. With this condition, several universities have undertaken various preparations such as identifying various electronic learning, join a training of developing electronic learning, and experimenting for using of certain electronic learning to present learning subject.

STKIP Bina Insan Mandiri is one of the undergraduate institution with five programs that apply conventional system. Learning process at there was doing face to face to transfer information. Even though STKIP Bina Insan Mandiri has developed an online learning system since 2013 to adjust with technology development. Online learning is a learning model where delivered information from teacher to student not only face to face but also used internet by accessing the website that designed

for that. It make the learning process not only done face to face in the classroom but can be done anywhere as long as students can access the internet. With this learning model makes students can construct their own knowledge. Zhang states from his research that one of the advantages of using this model was making students can access new and old learning content whenever they need so it can save the time and space [3].

Another problem that found was the exhaustiveness students of learning outcomes on science lesson that only 45%. It cause science lesson is a difficult subject to understand. Science lesson also explain an abstract subject that need a higher thinking skill. Students of the mathematics education that always use mathematical concepts and science materials complain about science subject that less interest to be learned. As many as 85% of students in STKIP Bina Insan Mandiri too difficult to remember the term in science so that the completeness of their learning outcomes are low. Therefore it needs learning innovation to the students. Learning process which is done directly between teacher and students in the classroom can be reach at long distances. Learning with this way we call as online learning model. In the learning model, teacher organize the subject in audio visual that interest the students to learn it. The subject that delivered in online learning can be used by the students whenever and wherever they need. So we can increase the exhaustiveness student learning outcomes with this model.

## 2. Method

This research was a classroom action research using Kemmis and Mc Taggart model. Subject of this research was students of mathematics education at STKIP Bina Insan Mandiri. Data collection techniques using test methods, questionnaires, and observation. The result of this research were analyzed as descriptive qualitative.

## 3. Result and Discussion

The understanding of student's concepts was observed in six categories that include of factual, visual, concept, procedure, skill, and opinion. The results of that observations are presented in the Table 1 and Tabel 2.

**Table 1.** The understanding concept of students on science lesson used online learning in cycle I.

Students	Factual	Visual	Concept	Prosedure	Skill	Opinion	Score	Total score
1	√	√	x	√	√	√	5	83
2	x	√	x	√	√	x	3	50
3	√	√	x	√	√	x	4	67
4	√	√	x	√	√	√	5	83
5	√	√	x	√	√	x	4	67
6	x	√	√	√	x	√	4	67
7	√	√	√	x	√	x	4	67
8	√	√	√	√	√	x	5	83
9	√	√	x	x	√	√	4	67
10	√	√	√	√	x	x	4	67
<b>Percentage</b>								<b>70.1%</b>

**Table 2.** The understanding concept of students on science lesson used online learning in cycle II.

Students	Factual	Visual	Concept	Prosedure	Skill	Opinion	Score	Total score
1	√	√	√	√	√	√	6	100
2	√	√	√	√	√	x	5	83
3	√	√	√	√	√	√	6	100
4	√	√	√	√	√	√	6	100
5	√	√	√	√	√	x	5	83
6	√	√	√	√	√	√	6	100
7	√	√	√	√	√	x	5	83
8	√	√	√	√	√	x	5	83
9	√	√	√	√	√	√	6	100
10	√	√	√	√	√	x	5	83
<b>Percentage</b>								<b>91.5%</b>

At cycle I, teacher was delivered the lesson conventionally while at cycle II they teach the student using online learning. From Table 1 can be observed that there is only one component from the six components that has been mastered by the students. That component is visual. While the components that mastered yet by students are concepts and opinions. From that data can be known that student has not been able to understand the science lesson which is taught by teachers. It causes of students that to be passive when presentation in the class so the discussion is not maximal. Furthermore the complexity of the subject that delivered and the understanding ability of the students when received the lesson also make that component mastered yet by students. Beside that, teacher's technique when teach to the students also became one of the causes of that. This is suitable with the Skinner's learning theory in Diedrich that states that a response or behavior is made stronger by providing reinforce (a stimulus that reinforces responses) [4]. From research of Stack that describe about online vs traditional course, both of these get differences in performance [5]. Based on that theory teachers should give stimulus that can improve student responses in learning at the class.

Than, in cycle II teacher was repairing how they teach. They use online learning model in all learning activities include the process of delivered the subject until the evaluation process. From the results of observations in cycle II obtained a significant result. Between six components that observed, there are five components have been mastered by the students as seen in Table 2. It means that students' understanding concept to the delivered subject has been increased from 70.1% to 91.5%. That is indicating that the online learning model can improve student's understanding concept on science lesson. Thisgaard and Makransky on their research find that virtual learning simulations are at least as efficient in enhancing learning and self-efficacy as traditional lessons, and high schools can thus use them as supplementary educational methods [6]. This result was suitable with Rosenberg who says that online learning is a lesson that emphasizes the use of internet technology to deliver some of solutions that can improve students' knowledge and skills [7].

Than student's exhaustiveness of learning outcomes also observed by researcher. It obtained by giving test questions to the students in form of pre and post test. The results of pre test and post test are presented in the Table 3.

**Table 3.** Pre and post test in cycle I

Students	Pre Test	Post Test
1	40	50
2	55	70
3	55	70
4	65	65
5	55	70
6	60	70
7	40	65
8	55	70
9	55	70
10	35	50
<b>Average</b>	<b>51.5</b>	<b>65</b>

**Table 4.** Pre and post test in cycle II

Students	Pre Test	Post Test
1	70	80
2	65	85
3	60	80
4	70	80
5	60	90
6	70	95
7	60	75
8	65	85
9	60	75
10	60	90
<b>Average</b>	<b>64</b>	<b>83.5</b>

Table 3 shows that the average of student learning outcomes in pre test is 51.5 and post test is 65 when the teacher still use conventional models to deliver the subject to the students. Based on that result indicate that the score before and after learning process was increase. It means that learning models that used has an influence to students for about 13.5%. But if we compare that score with KKM for about 75, students was mastered yet. Therefore it need to give cycle II by using online learning model to improve it. At second cycle after given the online learning model, the average of student learning outcome in pre test is 64 and 83.5 in post test. It shows that the learning models has an influence to students for about 19.5. The learning outcomes of students also increase from 64 in first cycle to be 83.5 in second cycle. It means that there is an increase in student learning outcomes before and after using the online learning model. The increase in learning outcomes caused by learning model that innovated by teachers with adapt to the students ability to understand the lesson. Romiszowski states that learning outcomes is influenced by many factors that come from inside and outside of the student's self [8]. Xu and Sakhti on their research find that overall student satisfaction with online learning is significantly affected by how the course is organized and how the content is sequenced [9]. It means that external factors such as learning facilities, how to teacher's teach, feedback systems, and so on was giving an influence. While outside factors such as learning strategy, motivation, and more also get an impact to students learning outcomes. Stacey also says on her research that the importance of using a form of online learning with online interaction, is an important trend in teaching practice [10].

#### 4. Conclusion

The implementation of online learning was a right way for teacher to apply tecnological development in education. It can improve the understanding concepts of students. The exhaustiveness of learning

outcomes of students on science lesson also more increase use this model. So it needed to develop and apply in other subject.

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### **6. References**

- [1] **B** Anggara 2014 *Konsep E-Learning dan Online Learning* Accessed through <https://anggaradian.wordpress.com/2014/12/05/konsep-e-learning-dan-online-learning/> at November, 13<sup>th</sup> 2017
- [2] Menteri Pendidikan dan Kebudayaan Republik Indonesia 2001 Penyelenggaraan Program Pendidikan Jarak Jauh psl 1
- [3] **D** Zhang 2005 *The American Journal of Distance Education* **19** 3 pp 149-162
- [4] **J L** Diedrich 2010 Motivating student using positive reinforcement Education and human development master's thesis (The College at Brockport: State University of New York) 9
- [5] **S** Stack 2015 Learning Outcomes in an Online vs Traditional Course International Journal for the Scholarship of Teaching and Learning **9** 1 Art 5
- [6] **M** Thisgaard and **G** Makransky 2017 Virtual Learning Simulations in High School: Effects on Cognitive and Non-cognitive Outcomes and Implications on the Development of STEM Academic and Career Choice Journal Frountiers in Psychology **8** 805
- [7] **M J** Rosenberg 2006 *Beyond E Learning: Approaches and Technologies to Enhance Organizational Knowledge, Learning, and Performance* (San Fransisco: Pfeiffer) pp 16-20
- [8] Romiszowski 1984 Designing Instructional Systems: Decisions Making in Course Planning and Curriculum Design (USA: Nichols Publishing Company) p 151
- [9] **H** Xu and **S** Mahenthiran 2016 Factors that Influence Online Learning Assesment and Saticitation: Using Moodle as a Learning Management System International Bussines Journal **9** 2 pp 1-18
- [10] **E** Stacey and **F** Wiesenberg 2007 A Study of Face-to-Face and Online Teaching Philosophies in Canada and Australia *Journal of Distance Education* **22** 1 pp 19-40



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