

# Utilization of Moodle in Increasing Motivation of Learning Chemistry Students

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## ABSTRACT

The ability and motivation of learning are different for each student, making the teacher to keep on changing, developing, and seeking the solutions in teaching. The core problem is motivation. Low motivation will impact the learning outcome. In the 21<sup>st</sup> century, model and learning methods have changed many times. One of them is the use of e-learning method. Learning Management System (LMS) is a part of e-learning. The example of LMS is Moodle. The aim of this research is to find out whether there is an increase in motivation of learning chemistry after using Moodle. This research is using a quantitative experiment design with one group pre-test and post-test design. The population of the research was all the students of BPK PENABUR Pharmacy Vocational School Jakarta academic year 2018/2019. Purposive sampling technique defines students of grade XI. Learning in the classroom had been done by using a direct learning method, in which Moodle was used as a supplement/complement learning at home. The research instrument was a motivation questionnaire with 20 numbers of statements. The sample of the research was fewer than 30 students, hence the test used was a non-parametric test. Based on the data analysis and hypothesis testing, we know that asymp. Sig. (2-tailed) is 0.002, where  $0.002 < 0.05$ . In conclusion, the use of Moodle can increase the students' motivation in learning chemistry of grade XI BPK PENABUR Pharmacy Vocational School Jakarta.

**Keywords:** Chemistry education, e-learning, learning motivation, LMS, Moodle

## 1. INTRODUCTION

Indonesia as a big country should take part in educating and further for the nation's life. As written in the opening of UUD 1945 amendments, that the Indonesian government required to educate every citizen. Hence, the school has an important role to establish the country. The results of previous studies have concluded that the quality of teachers in Indonesia is still low (Andriani, 2012; Sukasni and Efendy, 2017).

Students who slow in studies will find it difficult, as a result, they will tend to blame the situation and lack of motivation to attend the classes, especially in calculation subjects such as mathematics and chemistry (Ormrod, 2006).

Learning is influenced by several factors, namely internal and external. Internal factors, including health, intelligence, attention, motives, talents, etc. The ability to think of students in absorbing and receiving lessons also varies. External factors, which are external conditions, for example, is the teaching method, class conditions or atmosphere, and others, influence teaching and learning activities (Furman, 1998). The results of

previous study concluded learning difficulties occur because of inadequate facilities, such as textbooks (Kolias et al., 2013; Maas et al., 2008). Timeliness, good quality of teachers and understanding, and providing consultation outside the classroom, can improve learning outcomes (Riaz, 2008). Meanwhile, high learning motivation has an impact on success in teach (Carbone et al., 2009).

Based on the results of the study at BPK Penabur Jakarta Christian Junior High School 1 stated that there was a significant relationship between students' interest and learning motivation (Aritonang, 2008). Growth in the technology field could harm the students, like having difficulty interacting, concentrating and playing with their peers because they are not used to doing it (Kiili, 2007; Manski, 2000; Walker and Sobel, 2016).

In this 21st century, teachers must be able and understand how to utilize technology. Principally, technology exists to facilitate human needs. Problems will arise when teachers do not master technology. E-learning program exists as a result of growth in educational technology, to improve the quality of education. Integrating e-learning in the education system is a challenge that must be faced. The secondary education system in

developing countries is running very fast, especially in the increase in the number of schools and student enrollment related to the new methods used in schools. The consequence of applying this new method is the lack of competent subject teachers (Siemens, 2011).

Chemistry has important and useful relationships with everyday life. But found facts that state that chemistry is a lesson that is seen as uninteresting and difficult by students (Kusuma and Siadi, 2010). E-learning is a learning process that is supported and facilitated by the use of technology, for example, is Moodle. Moodle stands for Modular Object-Oriented Dynamic Learning Environment is an application program that transforms lessons into web forms. This system can create a digital classroom, where students can use it anywhere and anytime (Ahmadi et al., 2010; Joyo Sampurno et al., 2015; Sujono, 2010).

Based on previous research stated that interactive multimedia (Moodle) can significantly improve student learning outcomes with (Arief, 2013; Costa et al., 2012; Fathoni et al., 2010; Hasbullah and Somantri, 2009; Octriana et al., 2019; Oproiu, 2015; Siemens, 2011; Sujono, 2010). Furthermore, Moodle has a good design, complete with features such as material, exercises, quizzes, animations, images, sounds, graphics, and audio (Ahmadi et al., 2010; Sujono, 2010).

The results of other studies indicate that the analysis of student journals shows that attitude factors can influence the final results that focus on the use of online orders (Kimberlin and Yeziarski, 2016; Lamb and Annetta, 2013). In the world of education, the use of e-learning makes conventional learning more attractive and can be used by anyone, anytime and anywhere without the limitations of classrooms (Costa et al., 2012; Hasbullah and Somantri, 2009; Oproiu, 2015; Sujono, 2010). Blended learning or hybrid learning is a learning method that combines face-to-face processes and online learning (Sjukur, 2013).

Based on the description above, it is important to make research entitled "Utilization of Moodle in Increasing Motivation of Learning Chemistry Students of Grade XI BPK Penabur Pharmacy Vocational School Jakarta". This research aims to find out whether there is an increase in motivation of learning chemistry after using Moodle.

**2. METHODS**

This study is experimental quantitative research methods, with the design of one-group pretest-posttest design. The population in this study were all BPK PENABUR Jakarta Pharmacy Vocational School students, the academic year 2018/2019. Purposive sampling, as the sampling technique and the research sample, was students of grade XI.

The research instrument was a motivation questionnaire with 20 numbers of statements. The questionnaire used a Likert scale with 4 choices, which are strongly agree (SS), agree (S), disagree (TS), and strongly disagree (STS) as described in Table 1.

Table 1: Likert scale questionnaire

Indicator	No.
Ambition and desire to succeed	1, 6, 8, 9, 12, 16
Encouragement and learning needs	2, 3, 4
Hopes and ideals of the future	13, 10
Acknowledgement in learning	15
Interesting activities in learning	14, 17, 18, 19, 20
A conducive learning environment.	5, 7, 11

Construct validation is used to validate the research instrument. Construct validation is a technique to validate an instrument by using expert judgment or expert opinion. The expert judges will decide whether the instrument is valid/invalid and give some suggestions to improve the instrument. The instrument was made by using the Likert Scale, which is part of interval data. Interval data is data that has the same distance but does not have an absolute or absolute zero value (Sugiyono, 2016).

Wilcoxon Signed-Rank Test or Wilcoxon Match Pairs Test is a test that used to find the differences between two dependent samples in pairs with continuous data, and it is an alternative test for Paired T-test if the data is not distributed normally. The Wilcoxon Signed-Rank Test usually used to test a small sample and big sample (Sugiyono, 2016). The researcher using IBM SPSS 23 to analysis data.

The hypothesis of this research are:

Ho : There is no increase in learning motivation by utilizing Moodle.

Ha : There is an increase in learning motivation by utilizing Moodle.

### 3. RESULT

This questionnaire has 20 numbers of statements. That has been used for pre-test and post-test. This questionnaire was used to measure students' learning motivation in chemistry before and after using Moodle. There are 6 indicators of motivation used in the questionnaire, and the essence indicator of this research is the existence of interesting learning activities (Moodle). Fourteen respondents filled this questionnaire and the results are described one by one as follows.

#### Indicator 1- Ambition and desire to succeed

Based on Table 2, it can be seen that questionnaire number 1 has the highest increase of 5 points, with the statement "I am trying to study chemicals first before being discussed in class". Questionnaire number 6 has decreased by 2 points, with the statement "I ask the teacher or friend if there is material that I do not understand or practice questions that are difficult to do".

Table 2: Pre-test and post-test result indicator 1

No	Pre	Post
1	28	33
6	47	45
8	33	35
9	41	41
12	39	39
16	47	48
Total	235	241
Average	39	40

#### Indicator 2-Encouragement and needs of learning

Table 3: Pre-test and post-test result indicator 2

No	Pre	Post
2	42	41
3	39	42
4	43	46
Total	124	129
Average	41	43

Based on Table 3, it can be seen that questionnaire number 2 has decreased by 1 point, with the statement "Chemistry is useful in everyday life".

#### Indicator 3- Hopes and ideals of the future

Based on Table 4, both statements decreased. Statement number 10, "I want to continue studying in chemistry". Statement number 13, namely "I hope my chemistry will be maximized on PAT (End of

Year Assessment) and USBN (National Joint School Examination).

Table 4: Pre-test and post-test result indicator 3

No	Pre	Post
15	34	38
Total	34	38
Average	34	38

#### Indicator 4-Acknowledgement in learning

Based on Table 5, it can be seen that questionnaire number 15 has increased by 4 points, with the statement "I will get appreciation if I get good grades in chemistry". Through the Moodle, users can immediately find out the results of the achievement of the problem exercises that are done. So that more enthusiastic in working on practice questions.

Table 5: Pre-test and post-test result indicator 4

No	Pre	Post
15	34	38
Total	34	38
Average	34	38

#### Indicator 5-Interesting activities in learning

Based on Table 6, the highest increase was 27 points, number 18 and 20 with the following statement: "Repetition of chemical materials at home is easier by using Moodle" and "I am happy to be able to immediately see the results of evaluating my learning using Moodle".

Table 6: Pre-test and post-test result indicator 5

No	Pre	Post
14	19	41
17	18	42
18	17	44
19	18	44
20	18	45
Total	90	216
Average	18	43

#### Indicator 6-A Conducive Learning Environment

Based on Table 7, it is known that questionnaire number 5 dropped by 1 point, with the statement "I am active in discussions or learning takes place". Questionnaire number 7 has an increase of 3 points, with the statement "I dare to answer questions or express my opinion in front of the class even though I'm not sure that's true".

Table 7: Pre-test and post-test result indicator 6

No	Pre	Post
5	38	37
7	34	37
11	35	37
Total	107	111
Average	36	37

Overall the average pretest and posttest has increased from 33 to 40. In other words, the use of Moodle can increase student learning motivation.

Table 8: Pre-test and post-test average score

Indicator	Number	Pre	Post
Desire to succeed.	1, 6, 8, 9, 12, 16	235	241
Encouragement and need of learning.	2, 3, 4	124	129
Future's hopes and ideals.	13, 10	74	68
Appreciation in learning.	15	34	38
An interesting learning activities.	14, 17, 18, 19, 20	90	216
A conducive learning environment.	5, 7, 11	107	111
Total		664	803
Average		33	40

#### 4. DISCUSSION

Based on the results of research at BPK Penabur Jakarta Pharmacy Vocational School, that the use of Moodle in home learning can increase student learning motivation. Although there are some obstacles, such as forgetting the Moodle password, there is no laptop or internet connection at home, but that is not a reason to learn chemistry using Moodle. Students try to access the Moodle, by learning together or using a cellular phone. So that the questions given through Moodle can be useful to better understand chemistry lessons. With drilling methods and practice at home, students are accustomed to working on chemical practice questions.

Repetition done at home can help students to understand the material being taught. Students look enthusiastic in learning in class, some are seen trying to be actively involved in discussions or discussion of questions in class. But there are still some students who are shy or choose to be quiet in answering questions. Motivation is needed consistently and encouragement from the teacher to make all students actively involved in the class.

Based on Table 2, it is known that statement number 6 is "I ask the teacher or friend if there is material that I have not understood or the problem of practice that is difficult to do", has decreased by 2 points. After the interview with the students stated that the use of Moodle is very helpful in doing practice questions. Sequential explanations make the questions easier to understand.

In Table 3, it is known that statement number 2 namely "Chemistry is useful in everyday life", has decreased by 1 point. Based on the results of interviews students stated that they had not felt / understood the benefits of chemistry in daily life in relation to the lessons learned at school. This reinforces that the basic concepts or benefits of studying a material are very important, so students can be more motivated to learn it when they know the benefits directly in their lives. Just as learning mathematics is important because it is used directly in daily activities, whether in buying goods or other things.

In Table 4, indicator number 3 has decreased in both statements. Questionnaire number 10 is "I want to continue studying in chemistry", as many as 2 points. Based on the results of interviews with students, in general students stated that they wanted to work and study immediately but not in chemistry. Chemistry is still considered a difficult lesson for students and they say they do not know what will happen if they have to study chemistry during college.

Statement number 13, namely "I hope my chemistry will be maximal on PAT (Year End Assessment) and USBN (National Joint School Examination), as many as 4 points. Based on the results of interviews with students, it was generally said that they were unsure of the abilities they had and did not want to over-force or target too high because they realized that chemistry was a difficult lesson. On the other hand students also get pressure or targets from parents to study seriously and get good grades, even if it's not perfect. The encouragement from the parents is far greater than personal desires. The desire to please parents with good results is still the main motivation in learning.

In Table 5, it is known that there is no decline and vice versa is an increase of 4 points. This table provides an assessment of the appreciation of learning. In the use of Moodle students can immediately see the results of learning. If the answer is wrong then the system will automatically provide the correct answer, along with the explanation. Based on Sadirman (2016), there are several ways that can be used to increase student learning

motivation. One of them is giving numbers and knowing the results. When students can immediately find out the results (right or wrong answers), students will feel more excited in learning because their business is valued and gets a quick response. The problems that existed so far were when students worked on the problem and did not get direct feedback. So that when the desire to learn is high, but they don't get immediate feedback, their learning desires will decrease.

Table 6, shows an increase of 126 points. This table states indicators of interesting activities in learning. Moodle is a tool used to give students other activities in learning. So far students are still learning conventionally for chemistry lessons. With the Moodle, students can learn in other interesting ways. Moodle is not limited to time and place, this system can be opened anywhere and anytime, whether using cellular phones, laptops or computers. So there is no reason not to be able to study. This system can also be used to study together with other friends.

In Table 7, it is known that questionnaire number 5 with the statement "I am active in discussions or learning takes place", has decreased by 1 point. Based on the results of interviews with students, stated that shame and lack of confidence are still the biggest factors here. Students become unsure of answering if they do not know for sure the answers to what is discussed. So that some prefer to be silent and not answer. Some also stated that they did not want to look too prominent in the class, always answering the questions or material discussed.

Overall, based on the results of the analysis, it is known that the average posttest has increased from 33 to 40. The indicator that experienced a significant increase was the presence of interesting activities in learning, in this case Moodle. This is in accordance with the motivational indicators initiated by Uno, that interesting activities in learning can increase student learning motivation (Uno, 1996). In addition, this is in line with the theory is giving numbers and knowing the results can increase student motivation. In the use of Moodle, students can immediately find out the results of learning, if the answer given is wrong then the system will automatically provide an explanation of the correct answer. So that it can be said that the use of Moodle can increase student learning motivation.

Based on the results of hypothesis testing using IBM SPSS 23, Table 4.8 can be seen that the asymp value. Sig. (2-tailed) is 0.002, where  $0.002 < 0.05$ . Because the value is smaller than 0.05, it can be concluded that there are differences in motivation

before and after the use of Moodle. So from that  $H_0$  is rejected and  $H_a$  is accepted. Based on self-determination theory developed by Ryan and Deci, motivation is divided into several levels or stages. If sorted from lowest to high, there is a-motivation, extrinsic motivation (external regulation, introjected regulation, identified regulation, integrated regulation) and intrinsic motivation. Based on self-determination theory, this is included in external regulation & introjected regulation. Where student's motivation depends on how to make their parents happy. But based on the researcher's observation, during 4x meetings with students (1x meeting for pretest, 2x meetings for the lesson, and 1x meeting for posttest), as the result 5 students using Moodle intensively, whereas 2 students were not good enough in chemistry they used Moodle regularly. This phenomenon described the results of the Gain test which shows an increase in student motivation by 0.3 at a moderate level.

Based on the observations and interviews about the results of the posttest with students, it concluded that Moodle can increase student motivation. This is proved by the existence of students which although not good enough in chemistry lessons, they still want to try to use Moodle to review the lesson and do the exercise. They know and understand their responsibilities. At the end of the lesson, the researcher gave prizes or rewards to the students who were diligent in using Moodle. Based on self-determination theory, this is included in internal motivation. Where students consciously and without coercion learn to use Moodle because they want to understand and understand chemistry lessons.

## 5. CONCLUSIONS

Based on the results of research and discussion, it can be concluded that (1) There is an increase in students' motivation to learn chemistry by utilizing Moodle, which is based on the results of hypothesis testing with the Wilcoxon Signed Rank Test where  $Z$  is - 3,173 with significant (2 tailed) 0.002, smaller than 0.05. (2) The increase of based on the Gain test is 0.3, included in the medium category.

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