

# Improvement of Self Regulated Learning through Flex-Blended Learning Model Assisted by Learning Management System

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## ABSTRACT

Self-regulated learning is an essential aspect for students so that these students can organize and carry out learning activities independently. Self-regulated learning of students during the pandemic has a low average level. Self-regulated affects student achievement. The higher the level of student self-regulated learning, the better the achievement, and vice versa. This study aims to determine the differences and improvement of student self-regulated learning in applying the flex-type blended learning model assisted by Google Classroom. The method in this study uses quantitative methods with an experimental approach. Data collection was carried out through questionnaires and pretest-posttest as supporting data. The study's results showed differences in self-regulated learning before and after applying the flex-type blended learning model assisted by Google Classroom. This is evidenced by the results of the t-test on self-regulated learning, which shows significant differences. Then calculate the increase in self-regulated learning using N-Gain. In self-regulated learning, an N-Gain score of 0.323 is obtained, which means it is included in the medium category. Then to see the effect of self-regulated learning on student achievement, an N-Gain test was carried out on the pretest and post-test scores with a score of 0.436, which means it is included in the moderate category. From these results, it can be concluded that the increase in self-regulated learning is directly proportional to the rise in student achievement.

**Keywords:** Blended learning type flex, self regulated learning, Google Classroom

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## 1. INTRODUCTION

The COVID-19 pandemic has occurred throughout the country, impacting all sectors of life, one of which is the field of education. Academic success is influenced by several factors that intervene in the individual: internal and external factors. Internal factors include various physical conditions, interests, wills, aptitudes, motivations, abilities, and cognitive qualities, then external factors consist of environmental and cultural, social and educational factors, learning programs, infrastructure, and facilities. Motivation is one of the very important internal elements that begins with a person's desire to learn, which encourages students to manage themselves in learning, called self-regulated learning (Dewi et al., 2020). Self Regulated Learning is a process of students arranging learning strategies to get good learning outcomes independently (Heriyanti & Bhakti, 2022). Influential factors in self-regulated learning that come from within and from outside oneself include: 1) knowledge, 2) motivation, 3) willingness, 4) gender, 5) ability, 6) family factors, 7) school factors, and 8) peer factors (Kristiyani, 2016).

Self Regulated Learning is an essential aspect for students so that these students can organize and carry out learning activities independently. A study involving high school, vocational, and college students in the Jakarta area with an age range of 16 to 21 years found that students' self-regulated learning during the pandemic had a low average level (Hidayat et al., 2020).

In learning at SMK IT Smart Informatics class X TKJ in the primary subjects of Computer Network Engineering and Telecommunications, teachers apply an expository learning model that is teacher-centered.

There are fewer active students than students who actively participate in learning, and many are left behind with learning materials. This condition makes educators need to apply the correct learning methods to ensure adequate knowledge.

One of the learning models that can be applied is flex-type blended learning. Blended learning is a method in the teaching and learning process that consists of online and face-to-face learning. This strategy combines traditional learning with learning using computer tools with tablets, cellphones, or other technologies to make students more interested than just offline learning or online learning alone (Capone et al., 2017). In determining the number of compositions of blended learning mixtures, there is no standard formula that regulates them, this is following the statement by Siyamta (2014) which cites research from Graham (2006). In designing the composition of blended learning adapted to the objectives of the subject, analysis of the competencies needed, available resources, and learner characteristics. The composition that is often used in blended learning is 50/50, namely 50% online learning and 50% face-to-face, but some use the composition of 75/25, namely 75% face-to-face learning and 25% online, and some use a 25/75 composition, namely with 25% face-to-face learning and then 75% online learning (Abdullah, 2018; Harahap, 2019; Siyamta, 2014). Blended Learning Type Flex is a type of blended learning where material and instruction are delivered via the internet then teachers provide face-to-face support flexibly and adaptively as needed through group activities, group projects, and individual guidance (Staker & Horn, 2012). According to Elisa (2021) Flex model is one of the blended learning models. In the flex model, most learning occurs online but still in school. Learners can access all learning content online, individually or in groups, for flexible learning. Students can learn according to their abilities, needs, and learning speed. This flexible model allows teachers to act as facilitators through discussion groups, project work, individual and group lessons. This aims to help students who have learning difficulties based on the results of monitoring learning activities carried out online. According to Maulida (2020), the flex model is a blended learning model where online learning is the main learning with offline learning as a support. Materials are provided online, but teachers/instructors are present in class to provide the necessary support. Students can study online in a variety of locations, even in real time. According to Sari (2019). Blended Learning Type Flex has the advantage that it is suitable for students who have problems in completing their education because this learning model provides flexible support online and through group sessions according to personal needs. Meanwhile, the drawback is that it requires services that can be accessed online at any time, and educators need additional time to adjust to student needs.

A learning management system is a platform to monitor and distribute subject matter online via the internet (Bradley, 2020). LMS has various benefits including making it easier to deliver materials and assignments, simplifying evaluation, being able to carry out learning anywhere and anytime, and learning materials can be easily accessed repeatedly if there are students who do not understand the material. Students get an optimal learning experience with the features that LMS has. The features contained in the LMS are an easy-to-understand menu display, online registration at the LMS address, online class learning without physical contact, learning evaluations such as quizzes and online exams, online discussions, reports on the progress of the learning process and attendance (Heru Mujianto et al., 2021). Currently, there are several LMS that can be used, namely Edmodo, Schoology, Google Classroom, and Moodle (Alfina, 2020).

Blended learning has been implemented in various schools as long as covid-19 cases remain unstable. In one of the studies on the application of blended learning during the pandemic, this learning method is more efficient because learning can take place online or offline (Suhairi & Santi, 2021). Students are said to have good Self Regulated Learning if students can be independent in learning and have an active motivation to achieve learning goals (Lim & Yeo, 2021). Self-regulated affects student achievement. The higher the level of Self Regulated Learning of students, the better their achievement and vice versa (Handayani & Sholikhah, 2021). Therefore, this research is expected to be used to determine students' Self-Regulated Learning levels, which affect student achievement by applying the flex-type blended learning model. As for the implementation of blended learning, this flex type is used by Google Classroom as an online learning medium. Google Classroom is an application that is connected through an internet connection in the form of a classroom. To be able to interact in class, users need to have a Gmail account as a condition then students can enter the class by using the class code. Teachers can manage classes by providing materials, assignments, quizzes, and class discussions and can provide learning videos (Nurpratiwiningsih, 2021). The choice of Google Classroom as a means of online learning is partly because it can make it easier for teachers to convey information and manage to learn accurately. According to research conducted by strategies using the google classroom application can improve student learning outcomes, this research was conducted during the Covid-19 pandemic on class X MIPA 2 students at SMA Negeri 1 Gamping Sleman with a percentage of student completion has exceeded the minimum limit value.

The formulation of the problems discussed in this study is: (Q1) Whether there are differences in the level of Self Regulated Learning for students in the application of the Google Classroom-assisted flex type Blended learning model; (Q2) Is there an increase in student self-regulation in the application of the Google Classroom-assisted flex-type Blended learning model.

## 2. RESEARCH METHOD

This research is quantitative research with an experimental approach. The design of this study is a one-group pretest-posttest design, namely by comparing the situation before and after being treated (Sugiyono, 2013). Before applying the flex-type blended learning model, a preliminary questionnaire is first given. Then after applying the flex-type blended learning model, the final questionnaire is given. From this questionnaire, a comparison of the results was then carried out.

The population in this study were students of SMK IT Smart Informatics. The sample in this study was class X students of TKJ SMK IT Smart Informatics, totaling 49 students. The sampling technique used is Purposive Sampling. This technique was taken by considering the sample: students who were given special treatment with google classroom-based flex-type blended learning in the basic subjects – Basics of Computer Network Engineering and Telecommunications.

The data collection techniques used are questionnaires and learning outcomes tests as supporting data. Questionnaire to measure students' self-regulated learning levels. According to research conducted by (Rovers et al., 2019) questionnaires are an accurate way of measuring SRL. The initial questionnaire was carried out before treatment, and the final one was given after the experiment. Pretests and post-tests are also carried out simultaneously to measure learning outcomes. Testing instruments include 1) validity with the Pearson formula and 2) reliability using the Cronbach Alpha formula. Data analysis techniques consist of 1) prerequisite tests, including a normality test using Shapiro Wilk, a homogeneity test using Levene Test, and 2) a hypothesis test using paired sample t-test to find out differences and gain test to determine improvement.

## 3. RESULT AND ANALYSIS

An initial questionnaire and pretest are conducted to determine the initial ability. Before being given treatment, the initial questionnaire and pretest are given; after the treatment, the final questionnaire and post-test are given.

Testing this hypothesis to determine the difference in students' Self Regulated Learning levels. The test used is a paired sample t-test. The hypothesis is accepted when the value of Sig(2-tailed) < 0.05. Before the t-test, a prerequisite test is carried out with a normality test and a homogeneity test. Then to find out the improvement of Self-Regulated student Learning and student achievement, an N-gain test is carried out. This test was performed with SPSS software.

### 3.1. DATA DESCRIPTION

#### 3.1.1. PRETEST QUESTIONNAIRE DATA

The collection of questionnaire data before being given treatment aims to find out the initial data on students' self-regulated learning levels. The valid and revised questionnaires totaled 32 statements. Table 1 shows that the initial questionnaire results obtained the lowest value of 68, and the highest value of 131, with an average of 108.94 and a standard deviation of 12,096.

Table 1. Initial Questionnaire Data

Preliminary Questionnaire Data Statistics	Value
Average	108,94
Lowest Value	68
Top Rated	131
Standard Deviation	12,096
Variance	146,309

#### 3.1.2. POSTTEST QUESTIONNAIRE DATA

After being given the application of flex-type blended learning with the help of google classroom as an online learning medium, the final questionnaire data was taken to find out changes in the level of self-regulated learning of students. The data was taken with the same number of students, 49 students with 32 statements. From this final questionnaire, as can be seen in Table 2, the lowest value was obtained, namely 88, with the highest value of 153, with an average of 124.78 and a standard deviation of 13.020.

Table 2. Final Questionnaire Data

Statistics of Questionnaire Final Data	Value
Average	124,78
Lowest Value	88
Top Rated	153
Standard Deviation	13,020
Variance	169,511

### 3.1.3. PRETEST SCORE

The data from this pretest are taken before students get treatment in applying Flex Type Blended Learning. The pretest questions consist of 10 multiple-choice questions with 49 students. As found in Table 3, the pretest results obtained are an average value of 58.37, then the lowest value of 20, the highest value of 90, a standard deviation of 16.63, and a variance of 276.4.

Table 3. Pre Test Data

Pretest Data Statistics	Value
Average	58,37
Lowest Value	20
Top Rated	90
Standard Deviation	16,63
Variance	276,4

### 3.1.4. POSTTEST SCORE

The post-test result data is the student's score after applying flex-type blended learning. The post-test questions consist of 20 multiple-choice questions with 49 students. As can be seen in Table 4, the pretest results obtained an average value of 77, then the lowest value of 30, the highest value of 100, a standard deviation of 15, and a variance of 211.

Table 4. Post Test Data

Posttest Data Statistics	Value
Average	77
Lowest Value	30
Top Rated	100
Standard Deviation	15
Variance	211

## 3.2. INSTRUMENT TESTING

Instrument testing was conducted in the trial class on 32 students. The questionnaire consisted of 38 statements. The validity test results were that 30 statements were declared valid, and eight were declared invalid. Of the eight weak statements, revisions were made to 2 statements, and six statements were deleted. After the validity test, a reliability test was carried out, and a value of 0.916 was obtained to be included in the Very High-reliability category. The results of this test are presented in Table 5.

Table 5. Validity and Reliability Test of Self-Regulated Learning Questionnaire Instruments

Types of Testing		Test Results	Sum
Validity	Valid	2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 34, 35, 36, 38	30
	Do not Valid	1, 6, 9, 14, 15, 32, 33, 37	8
Reliability	Very High	0,916	38

## 3.3. PREREQUISITE TEST RESULT

### 3.3.1. NORMALITY TEST

This test is carried out to determine the distribution of data and whether the data is normally distributed or not. After it is known that the data is normally distributed, then a paired sample test can be carried out. However, if the data is not normally distributed, non-parametric statistical tests can be continued. The normality test used in this study was the Shapiro-Wilk test using SPSS. The Shapiro-Wilk test was used with the consideration of the number of samples, which was under 50 respondents.

Based on the results of the normality test shown in Table 6, it was obtained that the significance level was greater than 0.05. The significance level of the pretest questionnaire is  $0.081 > 0.05$ , and the significance level of the post-test questionnaire is  $0.859 > 0.05$ . It can be concluded that the questionnaire data, both pretest and post-test, are normally distributed.

Table 6. Normality Test Results

No	Questionnaire	Itself	$\alpha=5\%$	Conclusion
1	Pre Test Questionnaire	0,081	0,05	Normal
2	Post Test Questionnaire	0,859	0,05	Normal

### 3.3.2. HOMOGENEITY TEST

To find out whether the homogeneous data is the same or not the variance of two or more distributions, a homogeneity test is carried out, but it is not an absolute requirement. The homogeneity test used is the Levene Test using SPSS software.

Based on the results of the homogeneity test in Table 7 below, the results were obtained, namely 0.429. Because 0.0429 is bigger than the error level of 0.05, it can be concluded that the data is homogeneous.

Table 7. Homogeneity Test Results

No	Factor	Result	Homogeneity Test	Information
1	Pre Test Questionnaire and Post Test Questionnaire	0,429	$0,429 > 0,05$	Homogeneous

## 3.4. HYPOTHESIS TEST RESULTS

### 3.4.1. HYPOTHESIS 1

Hypothesis 1: There are differences in students' self-regulated learning levels in the application of the Google Classroom-assisted flex-type Blended learning model

Table 8. Hypothesis Test Results with Paired Sample T Test

Questionnaire	N	Sig (2-tailed)	$\alpha=5\%$	Criterion	Information
Pretest – Post Test	49	0,000	0,05	$0,000 < 0,005$	H1 accepted

Based on Table 8, testing using the Paired Sample T Test obtained a significance value of 0.000, then this value is less than 0.05, meaning that  $H_0$  is rejected and  $H_1$  is accepted. Because  $H_1$  is accepted, it means that there is a significant difference in the level of Self Regulated Learning of students before and after the application of the Google Classroom-assisted flex-type Blended learning model.

### 3.4.2. HYPOTHESIS 2

The second hypothesis test uses the N-gain test. This test aims to find out how much influence or contribution effectiveness on an intervention.

Hypothesis 2: There is an increase in student Self Regulated Learning in the application of the Google Classroom-assisted flex-type Blended learning model

Table 9. Test Results N-gain Pre-Test and Post-Test Questionnaires

Factor	Average Pretest Questionnaire	Average Posttest Questionnaire	Gain	Category
Pre Test Questionnaire and Post Test Questionnaire	108,94	124,78	0,323	Keep

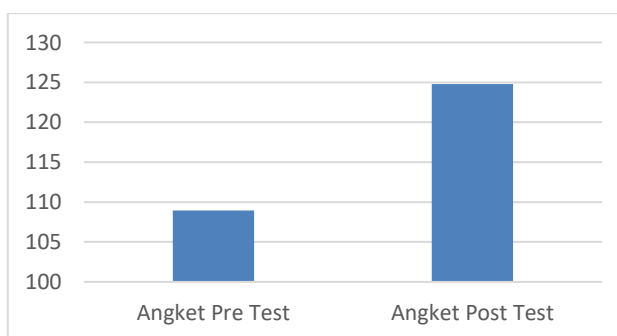


Figure 1. Comparison of Average Pretest and Post-Test Questionnaire Scores

Based on Table 9 and Figure 1, the gain score on student self-regulated learning was 0.323, which means it is included in the "Medium" category. Then the average difference was obtained in the pretest questionnaire and the post-test questionnaire. The average score of the pretest questionnaire is 108.94, while the average post-test questionnaire score is 124.78.

Then to see the effect of self-regulated learning on student achievement, N-gain testing was carried out on pretest and post-test scores with the following results.

Table 10. N-gain Pre Test and Post-Test Results

Factor	Average Pretest Value	Average Posttest Score	Gain	Category
Pre Test dan Post Test	58,37	77	0,436	Keep

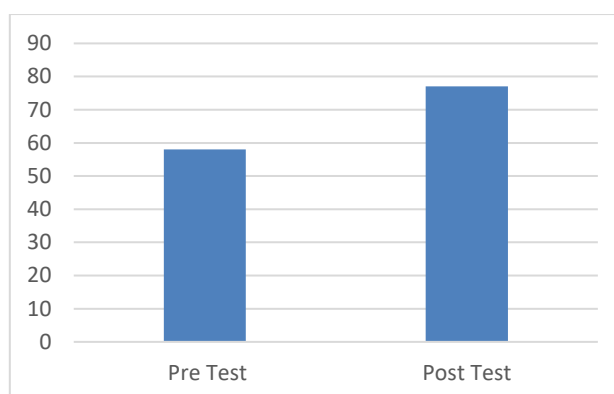


Figure 2. Comparison of Average Pretest and Post-test Scores

Based on Table 10 and Figure 2, the gain score on student achievement of 0.436 is obtained, which means it is included in the "Medium" category. Then the difference in the average value on the pretest and post-test is obtained. The average pretest value is 58.37, while the average post-test value is 77.

Based on hypothesis testing that has been carried out, it is concluded that there are significant differences in the level of student self-regulated learning before the application of flex-type blended learning and after the application of flex-type blended learning in students of SMK TKJ Class X at SMK IT Smart Informatics and there is an increase in self-regulated learning of students with moderate categories. Then after it was discovered that self-regulated learning students increased learning outcomes also increased.

The results of this study are supported by a statement by Anggraini et al. (2022) that the blended learning method contributes to the self-regulated learning of students with a good average. This research was conducted on 35 students of SMP Negeri 40 Palembang class VII.11. The percentage increases when students learn through PMRI-based blended learning.

Then the research conducted by Febriani (2021) related to the influence of the google classroom assisted blended learning method in improving self-regulated learning concluded that the application of blended learning assisted by google classroom is effective in improving student self-regulated learning. This research was conducted with a total of 25 students in class XI science in three high schools. This research was in the form of experimental research and research design of a One-Group Pretest-Posttest. The google classroom application was chosen because it is very easy to operate. The results of this study found that students are actively involved in learning and are relevant to blended learning, with a percentage of 95%.

The research conducted by Novitayati (2013), namely blended learning methods and self-regulated learning on the cognitive learning outcomes of social studies, this research was carried out at the SMK class XI level. The results of this study showed that there were differences in learning outcomes between the experimental group and the blended learning method compared to the group of students with traditional internet-based learning. Then based on testing, it was found that different self-regulated learning factors affect student learning outcomes, students with high SRL have high learning outcomes, and vice versa, students with low SRL also have low learning outcomes. This study also concluded that there is an influence interaction between blended learning methods and self-regulated learning, which affects cognitive learning outcomes.

Research conducted by Lestaria Ningsih & Misdalina (2017) which aims to see an increase in learning independence and learning outcomes in statistical methods with blended learning shows that learning outcomes increase better than students who are taught with ordinary learning than student learning independence is higher

overall than students who are taught with ordinary learning. The research was conducted with the subject of 5th-semester students in the Mathematics Education study program at PGRI Palembang University. The design of this study is a pretest-posttest control group design with a quasi-experimental method.

#### 4. CONCLUSION

Based on statistical testing reviewed in terms of self-regulated learning, it shows that there is a difference between learning carried out offline and learning carried out with flex-type blended learning in the basic – basic computer network and telecommunications engineering subjects in class X TKJ SMK IT Smart Informatics from the average pretest questionnaire score of 108.94 while the post-test questionnaire score is 124.78 and the significance value of the t-test is 0.000. Based on the second hypothesis test, there is an increase in self-regulated learning in flex-type blended learning in the basic subjects of Computer Network engineering and Telecommunications in class X TKJ SMK IT Smart Informatics in the medium category. This is evidenced by the N-gain score of 0.323. Then the difference in the average value on the pretest and post-test is obtained. The average pretest value is 58.37, while the average post-test value is 77. Based on the N-gain test in terms of learning outcomes, the increase in student self-regulated learning is in line with learning outcomes which also increase. This is evidenced by the N-gain score at a moderate level of 0.436.

Based on hypothesis testing, it can be concluded that this can be considered by teachers in applying flex-type blended learning to increase the level of self-regulated learning of students so that learning objectives can be achieved effectively.

#### 5. SUGGESTION

Based on the conclusions can be obtained the following suggestions. First, teachers can apply flex-type blended learning to increase the level of self-regulated learning of students and to make learning more effective. Second, the school can support teachers in applying varied learning models so that learning objectives can be achieved effectively. Third, researchers need to do better planning so that the research carried out can be more effective and efficient.

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