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STUDENT MOTIVATION AND LEARNING OUTCOMES THROUGH ONLINE FLIPPED CLASSROOM BASED ON STUDENT SELF-REGULATION IN COASTAL AREAS

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Abstract : *Most learning motivation research focuses on students' performance with various abilities and skills and still needs to integrate constructive learning technology tools. Therefore, this study answers research questions about differences in stu-dent motivation and learning outcomes using the online flipped classroom based on differences in students' self-regulatory levels. Data was obtained from 108 students in coastal area schools, who were divided into two groups. Students' self-regulative abilities are measured using a four-point Likert scale, and learning outcomes are obtained from multiple-choice questions. The data collection in-strument used resulted from the developing of The Motivated Strategies for Learning Questionnaire (MSLQ). The hypothesis was tested using multivariate analysis of variance to find answers to research questions. The results of this study show higher levels of motivation and learning outcomes in the online flipped classroom group. Furthermore, the research results show the influence of student self-regulation on student motivation and learning outcomes.*

Keywords : *Learning Outcomes; Online Flipped Classroom; Self-Regulation.*

Abstrak : *Sebagian besar penelitian motivasi belajar berfokus pada kinerja siswa dengan berbagai kemampuan dan keterampilan dan masih perlu mengintegrasikan perangkat teknologi pembelajaran yang konstruktif. Oleh karena itu, penelitian ini menjawab pertanyaan penelitian tentang perbedaan motivasi dan hasil belajar siswa dengan menggunakan flipped classage online berdasarkan perbedaan tingkat pengaturan diri siswa. Data diperoleh dari 108 siswa di sekolah wilayah pesisir yang dibagi menjadi dua kelompok. Kemampuan pengaturan diri siswa diukur dengan menggunakan skala Likert empat poin, dan hasil belajar diperoleh dari soal pilihan ganda. Instrumen pengumpulan data yang digunakan merupakan hasil pengembangan The Motivated Strategies for Learning Questionnaire (MSLQ). Hipotesis diuji dengan menggunakan analisis varians multivariat untuk menemukan jawaban atas pertanyaan penelitian. Hasil penelitian ini menunjukkan tingkat motivasi dan hasil belajar yang lebih tinggi pada kelompok flippedclassroom online. Selanjutnya hasil penelitian menunjukkan adanya pengaruh regulasi diri siswa terhadap motivasi dan hasil belajar siswa.*

Kata Kunci : *Hasil Belajar; Online Flipped Classroom; Pengaturan Diri.*

INTRODUCTION

Based on the Program Internationale for Student Assessment poll conducted by the OECD (Organization for Economic Cooperation and Development), Indonesia is ranked 74/76. However, this study needs to describe the condition of Indonesian education comprehensively (Zainuddin, 2018). However, it contributes to other parties' perspectives in viewing the education conditions in Indonesia. It was found that 62.2% of students took the initiative to study due to assignment factors, while 37.8% stated the opposite. This proves that student learning motivation in Indonesia is still low, which impacts student learning outcomes. Research results prove that the student's learning motivation level is influenced by how they learn. Some of them stated that student motivation is relevant to their learning outcomes (Adinda D, 2020).

Other research states that students' self-regulatory abilities influence student learning motivation. The self-regulatory level as a predictor of student academic achievement can develop psychological potential, significantly contributing to how students learn. The creation of independently managed classes helps develop student motivation and learning outcomes. This problem cannot be imposed on students. As the spearhead of successful learning, teachers have an essential role in achieving learning goals. Completion of the curriculum, availability of learning facilities and resources, and detailed academic regulations only influence student motivation and learning outcomes, with quality learning support designed by teachers (Law, Geng, & Li, 2019).

Technology provides opportunities for educational practitioners to bring about changes in the learning paradigm (Mundiri et al., 2021). With technology, learning can be done without distance and time limits through learning all the time. This learning concept is then called Online Learning. From a constructive point of view, the online flipped classroom, a development of flipped learning, becomes a new learning concept and strategy suitable for meeting the needs and solving the problems above (D. L. Dinsmore, P. A. Alexander, 2008).

The problem-solving approach in this research was carried out through a pedagogical approach, namely the online flipped classroom (Slomanson, W. R., 2014). This learning is a development of flipped classroom learning in an online learning environment. This type of learning can increase learning flexibility, thereby changing the roles of teachers and students. With an online flipped classroom, students become more active, having the opportunity to contribute and interact with a broader range of resources. This learning strategy helps students improve their knowledge, skills, learning independence, learning satisfaction, critical thinking, and problem-solving skills (Abdullah & Omar, 2022). The online flipped classroom, classified as distance education, requires independent, self-motivated learners. Attitude and motivation are the main predictors in supporting the success of technology-based learning. Online learning requires adequate mental and physical readiness to support students' learning limitations. Especially when some students'

access to the Internet is poor, students need to be empowered to engage in active and independent self-discipline (Baeten, Dochy, & Struyven, 2013).

The online flipped classroom positively influences students' readiness for independent learning. In flipped classroom online learning, students can choose the most appropriate way to acquire new knowledge. Students can develop independent learning skills by studying content the teacher prepares asynchronously before class begins. There is evidence to suggest that the online flipped classroom approach positively influences student motivation and significantly increases aspects of learning independence (Tucker, 2012).

Many studies have been conducted on flipped classroom online learning strategies (Pintrich, 2004). Therefore, the state of the art and novelty of this research is the use of the flipped classroom online learning concept, an online technology integration learning approach with the flipped classroom concept. Learning material is presented online before students attend class so students can study the material independently. During treatment, time usually used for lectures is used for discussion, collaboration, and application of previously learned concepts (Scribner, P, 2015). In the context of student self-regulation, this refers to students' ability to organize and control their learning process. Students with good self-regulatory skills can manage time learning goals, monitor student progress, and use effective learning strategies. In an online flipped classroom, students need to have self-regulating solid skills to utilize online learning materials effectively, manage their time wisely, and manage themselves in the learning process. However, it is essential to remember that this influence may vary depending on other factors, such as the quality of learning materials, support from the teacher or facilitator, and individual student characteristics. As a widely recognized, effective, innovative, and significant strategy in various countries, the online flipped classroom model has recently been recognized as an active learning approach in various fields because researchers and teachers have shown interest in this strategy.

METHOD

Based on its objectives, this research is quantitative with a quasi-experiment design approach (Creswell, J. W., & Poth, 2016). This research used a quasi-experimental pretest-posttest non-equivalent control group design with a 2x3 factorial version.

Table 1: Quasi-experimental Design

		Learning strategies	
		Online Flipped Classroom (X_1)	Flipped Learning (X_2)
Self-Regulatif (Y)	High (Y_1)	X_1Y_1	X_2Y_1
	Medium (Y_2)	X_1Y_2	X_2Y_2
	Low (Y_3)	X_1Y_3	X_2Y_3

The subjects of this research were junior high school students in Besuk, Kraksaan and Pakuniran sub-districts, Probolinggo. The subjects of this research were divided into two treatment groups (classes), namely the experimental class (Flipped Classroom Online learning) and the control class (Flipped Classroom learning) using cluster random sampling.

The types of instruments used in this research are 1) treatment and 2) data collection instruments. Treatment instruments include a Syllabus, Learning Implementation Plan, and Student Worksheets. Its preparation involves subject teachers who are members of the teacher community in the Besuk, Kraksaan and Pakuniran sub-districts of Probolinggo. Data collection instruments in this research include learning outcomes tests consisting of pretest and posttest, learning motivation tests, measured through achievement tests accompanied by assessment rubrics, and student self-regulative questionnaires (Pintrich, P. R., Smith, D., Garcia, T., & McKeachie, 1993). Before the learning outcomes test instrument is tested, a content validation test is first carried out by expert judgment, namely an assessment carried out by experts. Testing of the level of validity of learning outcomes test items was carried out on groups of students who were not subjects in this research. The validity test of the learning outcomes items was conducted on 30 students. Meanwhile, the validity index used is Correlation ≥ 0.37. This research uses Cronbach Alpha calculations with a reliability index ($\alpha \geq 0.70$) for data reliability.

In this research, the data analysis used is Multivariate Analysis of Variance (MANOVA), which has parametric prerequisite tests that must be fulfilled like other tests, namely the normality test and the homogeneity of variance test. The purpose of conducting a data normality test is to determine the normality of data distribution. The normality assumption will be met if the significance level α of the calculation results is more significant than 0.05. Meanwhile, Levene's Test of Equality of Error Variance was used to test the homogeneity of variance between groups in this study.

A two-way Multivariate Variance test was used as a Multivariate Test of Between-Subject Effect to test the hypothesis in this research. The use of MANOVA in this research is to determine the simultaneous influence of the Flipped Classroom Online learning strategy (independent variable) and Self-regulation (moderator variable) on motivation and learning outcomes (dependent variable). In addition, MANOVA was used to measure the interaction between the Flipped Classroom Online learning strategy and Self-Regulative on motivation and learning outcomes.

RESULT AND DISCUSSION

Categorized as distance education, the online flipped classroom requires self-motivated learners. Attitude and motivation play crucial roles in the success of technology-based learning. Mental and physical preparedness are also vital for overcoming learning limitations in an online setting, particularly for students with limited internet access. Empowering students to develop active self-discipline becomes essential. Moreover, the

online flipped classroom positively impacts students' readiness for independent learning. Students have the freedom to choose their preferred methods for acquiring new knowledge, fostering independent learning skills by asynchronously engaging with teacher-prepared content before class. Research indicates that this approach boosts student motivation and significantly enhances aspects of independent learning.

1. Define Stage Learning Motivation of Students Who Use the Flipped Classroom Online Learning Strategy

The first hypothesis in this research is that the learning motivation of students who use the flipped classroom online learning strategy is different from those who use the flipped classroom learning strategy. The test results of the between-subjects effects show that main effect 1, namely for learning, has a value of F = 13.012 with probability p < 0.05. Because the coefficient is significant, it can be concluded that there is a difference in the average influence of the independent variables on student learning motivation, namely between online flipped classroom learning and flipped classroom learning.

Table 2: Differences in Average Student Learning Motivation Based on Learning Treatment

Dependent Variable	(I) learning	(J) learning	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
learning motivation	experiment	control	4.410*	1.223	.000	1.985	6.835
	control	experiment	-4.410*	1.223	.000	-6.835	-1.985

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Table 2 shows that different learning treatments produce different average student learning motivation. This difference is significant at p < 0.05. The data in the table also support this conclusion. The average learning motivation score for the experimental class with the flipped classroom online learning treatment was 72.65, higher than the average learning motivation level score for the control class with the flipped classroom learning treatment, which was 63.44. Based on the t-test results, the difference in scores of 9.21 is significant at p < 0.05. The analysis presented in Table 2 reveals notable distinctions in the average student learning motivation resulting from various learning treatments. These distinctions hold statistical significance at a level of p < 0.05, as indicated by the data in the table. Specifically, the average learning motivation score for the experimental class, utilizing the flipped classroom online learning treatment,

amounted to 72.65. In contrast, the control class, employing the flipped classroom learning treatment, exhibited an average learning motivation level score of 63.44.

The disparity between these scores, amounting to 9.21, was found to be statistically significant based on the t-test results at a significance level of $p < 0.05$. This outcome underscores a substantial difference in learning motivation between students engaged in the flipped classroom online learning approach and those following the traditional flipped classroom method.

2. The Level of Learning Motivation of Students With High Self-Regulation

The second hypothesis in this research is that the level of learning motivation of students with high self-regulation differs from that of students with moderate and low self-regulation. The test of between-subjects effects shows that main effect 2, namely for self-regulation, has a statistical F value equal to 511.901 with a probability of $p < 0.05$. Because the coefficient is significant, it can be concluded that there is a difference in the average influence of the independent variables on student learning motivation, namely between students who have high, medium and low self-regulation.

Table 3: Differences in Average Student Learning Motivation Based on Self-Regulation

Dependent Variable	(I) self_regulative	(J) self_regulative	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
learning motivation	High	Medium	18.923*	1.166	.000	16.083	21.762
		Low	49.721*	1.597	.000	45.833	53.608
	Medium	High	-18.923*	1.166	.000	-21.762	-16.083
		Low	30.798*	1.678	.000	26.714	34.882
	Low	High	-49.721*	1.597	.000	-53.608	-45.833
		Medium	-30.798*	1.678	.000	-34.882	-26.714

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Table 3 shows that different self-regulation produces different average learning motivations. This difference is significant at $p < 0.05$. Data from the table also support this conclusion. The average level of learning motivation for students with high self-regulatory is 82.02, higher than the average score for the level of learning motivation with moderate self-regulatory of 62.89, and for students with low self-regulatory is 31.94; the difference in the respective scores is equal to 19.13 and 30.95 are significant at $p < 0.05$.

The analysis depicted in Table 3 indicates noticeable variations in average learning motivations based on different levels of self-regulation among students. These

differences are statistically significant at a significance level of $p < 0.05$, a conclusion supported by the data presented in the table. Specifically, the average learning motivation level for students categorized with high self-regulation stands at 82.02. In contrast, students with moderate self-regulation exhibit an average learning motivation score of 62.89, while those with low self-regulation show a notably lower average learning motivation level of 31.94.

The discrepancies between these scores, amounting to 19.13 for moderate self-regulation and 30.95 for low self-regulation, are both found to be statistically significant at a significance level of $p < 0.05$. This outcome emphasizes a substantial difference in learning motivation levels across students categorized by their varying degrees of self-regulation - high, moderate, and low.

3. Interaction Effect Between the Flipped Classroom Online Learning Strategy and Self-Regulation on Student Learning Motivation

The third hypothesis in this research is an interaction effect between the flipped classroom online learning strategy and self-regulation on student learning motivation. The test results of the between-subject effect show that for the interaction variable, the statistical F value is 4.946 with a probability of $p < 0.05$. This conclusion is supported by the results of the estimated marginal means output profile plot, as shown in the following figure 1.

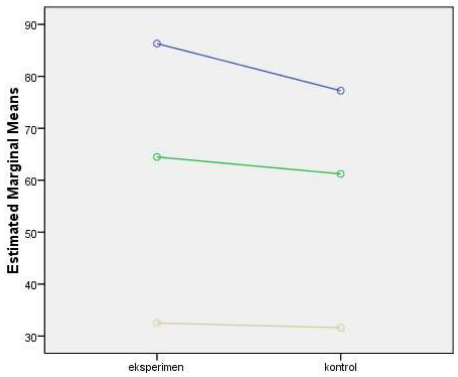

Figure 1: Marginal Means of Learning Motivation

The figure above shows that students treated with online flipped classroom learning with a high level of self-regulation tend to have a high level of learning motivation. It can also be interpreted that students treated with flipped classroom learning with low self-regulation tend to have low levels of learning motivation. The extended description of the aforementioned discussion would involve several aspects regarding the influence of the combination of online flipped classroom learning and students' levels of self-regulation on their learning motivation. Firstly, the findings

highlight that students with a high level of self-regulation tend to leverage online flipped classroom learning more effectively. They may possess the ability to manage study time, set clear goals, and independently regulate their learning process. This allows them to access learning content more effectively, utilize available resources, and actively engage in learning activities that reinforce their motivation.

Conversely, students with low self-regulation might encounter difficulties in optimally utilizing online flipped classroom models. They may struggle with time management, face challenges in setting clear goals, or even experience hurdles in maintaining focus during the learning process. This can lead to a less effective learning experience for them and overall influence their level of learning motivation. Furthermore, this finding also highlights the importance of instructional design that considers individual differences in students' levels of self-regulation. Educators can adopt strategies that support the development of students' self-regulation skills through various approaches, such as providing clear guidance, facilitating self-monitoring, or even integrating exercises to enhance self-regulation abilities into their curriculum. Therefore, understanding the role of self-regulation levels in the effectiveness of online flipped classroom learning can provide deeper insights for educators in designing more inclusive and supportive learning strategies for all students, without overlooking their individual needs in managing their learning process.

4. That The Learning Outcomes of Students Who Use the Flipped Classroom Online Learning Strategy

The fourth hypothesis in this research is that the learning outcomes of students who use the flipped classroom online learning strategy are different from those of students who use the flipped classroom learning strategy. The results of the test of between-subjects effects can be interpreted that main effect 1, namely for learning, has a value of F = 32.967 with probability p < 0.05.

Table 4: Differences in Average Student Learning Outcomes Based on Learning Treatment

Dependent Variable	(I) learning	(J) learning	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
Leaning outcomes	experiment	Control	11.140*	1.940	.000	7.292	14.989
	control	Experiment	-11.140*	1.940	.000	-14.989	-7.292

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Table 4 shows that different learning treatments produce different average student learning outcomes. This difference is significant at $p < 0.05$. Data from the table also support this conclusion. The average learning outcome score for the experimental class with the flipped classroom online learning treatment was 72.07, higher than the average learning outcome score for the control class with the flipped classroom learning treatment, which was 67.69. Based on the results of the t-test, the difference in scores of 9.38 is significant at $p < 0.05$. Table 4 illustrates that various learning methods yield different average student learning outcomes. This variance is statistically significant at $p < 0.05$. The data presented in the table also corroborate this finding. The average learning outcome score for the experimental group utilizing online flipped classroom learning treatment was 72.07, surpassing the average learning outcome score for the control group employing the traditional flipped classroom learning treatment, which was 67.69. According to the outcomes of the t-test, the 9.38-point difference in scores is statistically significant at $p < 0.05$ confidence level.

5. The Level of Learning Outcomes of Students With High Self-Regulation

The fifth hypothesis in this research is that the level of learning outcomes of students with high self-regulation differs from that of students with moderate and low self-regulation. The results of the test of between-subjects effects show that main effect 2, namely for self-regulation, has a statistical F value equal to 173.353 with a probability of $p < 0.05$.

Table 5: Differences in Average Student Learning Outcomes Based on Self-Regulation

Dependent Variable	(I) self_regulatif	(J) self_regulatif	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
learning_outcomes	High	Medium	22.096*	1.851	.000	17.591	26.602
		Low	43.514*	2.535	.000	37.345	49.684
	Medium	High	-22.096*	1.851	.000	-26.602	-17.591
		Low	21.418*	2.663	.000	14.937	27.900
	Low	High	-43.514*	2.535	.000	-49.684	-37.345
		Medium	-21.418*	2.663	.000	-27.900	-14.937

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Table 5 shows that different self-regulation produces different average learning outcomes. This difference is significant at $p < 0.05$. Data from the table also support this

conclusion. The average level of learning outcomes for students with high self-regulation is 86.61, higher than the average score for learning outcomes with moderate self-regulation, which is 62.76, and for students with low self-regulation, which is 32.50. The difference in the respective scores equals 23.85, and 30.26 are significant at $p < 0.05$.

6. Interaction Effect Between the Flipped Classroom Online Learning Strategy and Self-Regulation on Student Learning Outcomes

The sixth hypothesis in this research is that there is an interaction effect between the flipped classroom online learning strategy and self-regulation on student learning outcomes. The test results of the between-subject effect show that for the interaction variable, the statistical F value is 4.328 with a probability of $p < 0.05$.

This conclusion is supported by the results of the estimated marginal means output profile plot, as shown in the following figure,

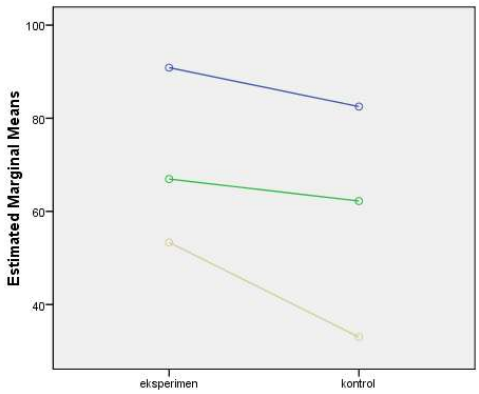

Figure 2: Marginal Means of Learning Result

The picture above shows that students treated with online flipped classroom learning with high levels of self-regulation tend to have high learning outcomes. It can also be interpreted that students who are treated with flipped classroom learning with low self-regulation tend to have low levels of learning outcomes as well. The extended description of the discussion regarding the sixth hypothesis entails understanding the interaction effect between the online flipped classroom learning strategy and students' self-regulation concerning their learning outcomes, as indicated by the statistical analysis and profile plot findings.

The research hypothesized an interaction effect between the flipped classroom online learning strategy and students' self-regulation on their learning outcomes. The statistical analysis of the between-subject effect yielded a significant F value of 4.328 with a probability (p) of less than 0.05 for the interaction variable. This statistical significance suggests that there is indeed an interaction effect between the variables under consideration. Further support for this conclusion emerges from the visual representation provided in the estimated marginal means output profile plot. The figure depicts that students exposed to online flipped classroom learning, combined with high

levels of self-regulation, exhibit tendencies towards higher learning outcomes. Conversely, it is noticeable that students treated with flipped classroom learning, yet possessing low levels of self-regulation, tend to demonstrate lower learning outcomes. This observation emphasizes the importance of considering students' self-regulation abilities in implementing online flipped classroom strategies to optimize learning outcomes. It underscores that while the flipped classroom approach can be beneficial, its effectiveness may significantly vary based on students' self-regulation skills. Students with better self-regulation seem to derive more benefit from the flipped classroom methodology, enhancing their learning outcomes compared to those with lower self-regulation skills. Educationally, these findings imply the necessity for educators to tailor instructional approaches, provide additional support, or implement strategies that foster and enhance students' self-regulation skills alongside the flipped classroom model. By doing so, educators can better cater to diverse student needs, ultimately improving the effectiveness of the online flipped classroom approach for all learners.

Scientific studies investigating the relationship between online flipped classrooms and student learning motivation have defined the three most basic cognitive needs of autonomy, relatedness, and competence. Students feel capable of managing their learning, connected when working collaboratively, and competent in mastering knowledge (S. Velayutham & J. M. Aldridge, 2013). The online flipped classroom approach has created scenarios for developing intrinsic and extrinsic aspects to increase student learning motivation. Empirical findings in this research prove that students with high motivation can complete learning activities inside and outside the classroom. Several findings confirm the opinion of this research, which states that the online flipped classroom provides the opportunity to create space for student motivation to study with high motivation. As a result, they can complete assignments inside and outside the classroom (S. Kingir, Y. Tas, G. Gok, 2013;).

Another impact shown is that students are actively involved in learning. Their self-confidence has increased, and they have been well-prepared in pre-class activities. For student interaction in the online flipped classroom, 72% reported increased interaction between students, teachers and their peers. Thus, the potential for student involvement and interaction in the learning process increases (Shahrebakbaki, 2015). It is not surprising that the online flipped classroom has been identified in several articles as an effective way to improve student performance in learning. Empirical findings from the results of this study also show that, compared to the traditional flipped classroom, students can improve their academic performance in the online flipped classroom if they use learning materials outside the classroom before class starts (Schunk & Mullen, 2013).

Although we found several benefits from implementing the online flipped classroom, we also noted several challenges. Students still need to adapt to this foreign and

new approach (Baeten et al., 2013). Apart from that, the learning load in pre-class and after-class is considered too large, so the completion of assignments does not match the set time target. Student interaction with learning activities is proven to impact student learning success positively. However, task readiness only sometimes guarantees that students can complete it and interferes with achieving the learning objectives expected from the online flipped classroom design (Gilboy, M. B., Heinerichs, S., & Pazzaglia, 2015).

To answer this problem, teachers should ensure that the material before and after class is relevant to class activities so that students assume that the material is essential and meaningful. Ideally, the material is presented in an innovative and interactive format to stimulate their attention and get involved (Yamada Y, 2015). Some researchers are experimenting with using gamification aspects in online flipped classroom designs to attract students' attention and discover new information through these learning activities. Researchers have also attempted to devise effective learning management strategies to reduce pedagogical risks in online flipped classrooms. Thus, the intensity of communication outside the classroom and its influence on the success of this learning approach need to be researched in depth (Robinson JD, 2020).

An educational study proves that motivation and self-regulation determine student success in learning. Motivation directs and encourages students to behave positively and be active in learning. Students with this behaviour tend to be focused, actively asking questions, and taking time to learn. In addition, students with high motivation tend to carry out self-regulation so that aspects of self-regulation are maintained. The findings of this research show that students with high self-regulation can make decisions to solve problems. This is relevant to various research literature, which shows that students' high motivation and self-regulation abilities are formed by their learning environment (Kohan N, Arabshahi KS, Mojtahedzadeh R, Abbaszadeh A & A, 2017).

Based on the empirical findings in this research, psychosocial factors of the learning environment have an essential influence on the orientation and investigation of learning motivation and self-regulation (Maison, et al., 2019). However, research analysing motivation and the formation of learning arrangements still needs to be improved, thus hampering the process of generalising the conclusions in this research. To address this research gap, observations were made of the impact of learning environmental factors on motivation and self-regulation strategies by building a structural model of the relationship between the learning environment, motivation and students' self-regulation strategies in learning (Slomanson, W. R., 2014). At the same time, an evaluation of the main components of motivation, which significantly influenced students' use of self-regulation strategies, was carried out. It was found that self-regulation helps meet various demands and encourages setting, evaluating and adapting to realise goal achievement (Lalitha T, 2020). The results of other research also show that self-regulation in learning has a significant role in achieving a person's academic achievement in line with the research opinion, which states that

independent learning encourages stimulation of freedom and learning activities in the context of metacognition, action control and motivation (Slomanson, W. R., 2014). Furthermore, it is necessary to organise learning objectives, prepare plans, select strategies, and monitor and evaluate which impact minimises learning obstacles.

CONCLUSION

We conclude that students carry out self-regulation well. Students are confident in their ability to acquire new information systematically in learning activities. They can access notes and increase understanding of critical issues through asynchronous learning. Students work in groups, hear diverse opinions, and gain inspiration. Online Flipped Classroom facilitates the development of students' critical thinking skills. Developing these skills through collaboration online can also be done by analyzing concepts, principles, potential misconceptions, and ideas. At each stage, there is reinforcement and feedback. If online learning is still necessary, then the online flipped classroom is worth choosing. This research suggests that different materials and subjects in the online flipped classroom may be necessary.

Collaboration has motivated students to work hard during class sessions. The asynchronous learning management system correlates positively with students' desire for learning and self-control. The more students are exposed to asynchronous activities, the desire to learn and self-control in the learning process increases. Additionally, to facilitate learning and interaction between students and teachers in a fully online learning environment, a learning management system must support the flexibility of asynchronous learning activities. It is also essential to support real-time interactive sessions in synchronous online learning sessions by providing video conferencing that allows students to meet each other, talk freely, and share resources.

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