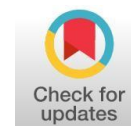


Self-Regulation Differences of Mathematics Education Students Reviewing From Gender

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Abstrak

Tujuan dari penelitian ini untuk mengetahui perbedaan self-regulation mahasiswa Pendidikan Matematika FKIP Universitas Riau selama perkuliahan online ditinjau dari gender. Adapun subjek penelitian ini adalah mahasiswa Pendidikan Matematika FKIP Universitas Riau angkatan 2017, 2018, dan 2019 sebanyak 30 mahasiswa, dengan rincian 15 mahasiswa berjenis kelamin laki-laki dan 15 mahasiswa berjenis kelamin perempuan. Untuk mengumpulkan data pada penelitian ini, penulis menggunakan angket self regulation. Setelah angket self regulation valid dan reliabel, angket tersebut kemudian disebarakan kepada mahasiswa yang menjadi subjek penelitian. Data skor self regulation tersebut kemudian diolah menggunakan teknik statistik deskriptif. Hasil pengolahan data selanjutnya diinterpretasikan di masing-masing gender. Berikutnya untuk melihat apakah ada perbedaan self-regulation mahasiswa yang mengikuti perkuliahan online antara mahasiswa laki-laki dengan mahasiswa perempuan maka dilakukan uji-t. Berdasarkan hasil penelitian yang diperoleh, dapat disimpulkan bahwa tidak terdapat perbedaan self-regulation yang signifikan antara mahasiswa laki-laki dengan mahasiswa perempuan. Tindak lanjutnya, dosen dapat memberikan perlakuan yang relatif sama antara mahasiswa laki-laki dengan mahasiswa perempuan untuk mengoptimalkan self-regulation. Namun, apabila kita lihat dari masing-masing indikator, terdapat indikator strategi tugas dan pencarian bantuan yang mencapai kategori skor berbeda antara mahasiswa laki-laki dengan mahasiswa perempuan.

Keyword: Jenis Kelamin, Pendidikan Matematika, Self-Regulation

Abstract

This study aimed to determine the difference in self-regulation of students of Mathematics Education FKIP Riau University during online lectures regarding gender. The subjects of this study were students of Mathematics Education FKIP Riau University batch 2017, 2018, and 2019 as many as 30 students, with details of 15 male and 15 female students. To collect data in this study, the authors used a self-regulation questionnaire. After the self-regulation questionnaire is valid and reliable, the questionnaire is then distributed to students who are research subjects. The self-regulation score data was then processed using descriptive statistical techniques. The results of data processing are then interpreted for each gender. Next, to see if there is a difference in self-regulation between students who take online lectures between male and female students, a t-test is carried out. Based on the results obtained, it can be concluded that there is no significant difference in self-regulation between male and female students. As a follow-up, lecturers can provide equal treatment between male and female students to optimize self-regulation. However, if we look at each indicator, there are indicators of task strategy and seeking help that reach different score categories between male and female students.

Keyword: Gender, Mathematics Education, Self-Regulation



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INTRODUCTION

The emergence of the Covid-19 virus has caused a paradigm shift from teaching and learning activities in the classroom to online or online teaching and learning activities that utilize internet access. Teaching and learning activities using the internet are implemented at the elementary and junior high school, high school, and college levels.

Online learning is learning whose implementation is supported by technology, information systems, and internet access so that students can construct their knowledge (Pakpahan & Fitriani, 2020). The purpose of online learning is to facilitate teaching and learning activities so learners can access them widely (Yohana, Muzakir, & Dina, 2020). For online learning to be effective, learning materials must be well-designed so that learning can involve students and facilitate independent learning.

In addition to the right learning design, independent learning is an important component of the success of online learning (Dema & Sinwongsuwat, 2020). Ideally, students are expected to have increased learning independence and self-motivation to participate in online learning.

Online learning is learning that allows students to manage their time and environment according to their learning needs. For this reason, students need greater self-regulation in taking online lectures to achieve their learning goals (Bol & Garner, 2011).

Online learning is closely related to independence, maturity, motivation, and discipline (Goulão & Menedez, 2015). The greater the autonomy, the greater the maturity, motivation, and discipline. This is because, in online learning, students are more flexible in learning activities. However, this flexibility must be followed by great responsibility for their respective learning processes. Therefore, self-regulation skills are needed so students do not delay and complete the work with full responsibility (Goulão & Menedez, 2015).

Self-regulation refers to how students master their learning process, mental abilities, and performance (Zimmerman, 2015). In addition, self-regulation emphasizes the ability of students to manage and understand the whole process that occurs in the social environment (Chaves-Barboza, Trujillo-Torres, López-Núñez, & Sola-Martínez, 2017).

Woolfolk, Winne, & Perry stated that online learning self-regulating is based on activeness and effort to find learning resources to achieve learning goals (Yen, Tu, Sujo-Montes, & Sealander, 2016). Independent learners optimize learning strategies through self-regulation and continuous self-assessment of their success (Cheng, 2011). Therefore, self-regulation as a predictor of success is important to be developed by lecturers through good management of the learning process (Macejka, 2014). Self-regulation in learning is carried out through proactive self-management, self-knowledge, and self-control (Goulão & Menedez, 2015).

Ideally, student learning independence will affect mathematical problem-solving (Meisura, Risnawati, & Amir MZ, 2019). This problem-solving ability will be useful in completing student assignments. Schunk & Zimmerman (Alfiana, 2013) state that independent learning, or self-regulation, is a learning process that is influenced by the ability to self-regulate independently in learning activities.

With self-regulation, students can monitor success or failure during the learning process, which results in learning motivation and increases when it is felt that the learning method applied is successful (Fung, Yuen, & Yuen, 2014). This statement is in accordance with research conducted by Velayutham, Aldridge, & Fraser (2012), which investigated the effect of students' motivational beliefs in science learning on self-regulation in science classrooms. The analysis results show that motivation strongly predicts students' self-regulation in science learning.

Students must have good self-regulation in each subject to participate in learning activities well during the Covid-19 pandemic. One of them is to identify and determine their way of learning. In accordance with what Fathani said that every human being has a unique learning style (Fathani, 2019).

Bandura states that self-regulation is the ability to manage and carry out behavior to improve performance to achieve the desired goal (Chairani & Subandi, 2010). Self-regulation refers to learning that results from students' self-generated thoughts and behaviors that are systematically oriented to achieve their learning goals (Mutawah, Thomas, & Khine, 2017). Self-regulation is an action taken by a person to control not only his behavior but also his thoughts and feelings, then evaluate these actions so that the expected results can be achieved.

Self-regulation requires regulating emotions, thoughts, and behavior to achieve goals (Altun & Erden, 2013). Self-regulation consists of 3 components: cognitive, motivational, and metacognitive (Ramdass & Zimmerman, 2011). The cognitive component of self-regulation is related to how students process information and use it to complete the given task effectively and efficiently.

The next component of self-regulation is motivation. Part of the important motivation that can affect self-regulation is setting goals, self-efficacy, and the desire to get good results. In addition, knowing goals, self-design, values, and how to seek help when experiencing difficulties is also part of motivation, including self-regulation. Together, these parts play a role in determining the actions individuals take to achieve goals. For example, students' success in organizing themselves in a learning activity will increase their motivation to continue learning and determine the next goal.

The third component of self-regulation is metacognition. The metacognitive component means that students determine goals and then evaluate the process of achieving these goals to support the task completion process. For example, students are said to have involved metacognition in completing assignments when students can find the root cause of why they cannot understand the material and find ways to solve the problem.

Self-regulation ability that can evaluate itself is related to how many concepts students understand from a material and ways to overcome obstacles experienced in learning. This makes self-regulation very important for students to have (Sari, 2014). This is in line with the statement (Schunk, 2012) that improving student performance is more effectively done by practicing self-regulation rather than using regular learning. Research conducted by Schunk & Cox (Schunk, 2012) showed that self-efficacy and learning achievement increase when given self-regulation training in children with learning difficulties.

Students who have good self-regulation will benefit in achieving their learning outcomes. On the other hand, students whose self-regulation is not optimal will have a negative impact. Maddux (Grahani & Mardiyanti, 2019) states that self-regulation that does not work properly will result in serious psychological problems, such as depression and anxiety disorders. Characteristics of students who cannot do self-regulation are not independent, having difficulty adapting, lacking the ability to cooperate, underdeveloped critical thinking skills, lack of motivation, do not believe in their abilities, and so on (Manuella & Mangunsong, 2017). When self-regulation is not optimal, students will often delay task completion time and are not serious about completing the task. As a result, students will feel frustrated with the lecturer's assigned tasks (Alfiana, 2013).

Various studies have shown the importance of self-regulation in improving student academic achievement. For example, research conducted by Lin et al. found that self-regulation in blended learning will increase participation in learning activities, better self-management, and better learning achievement (Lin, Lai, Lai, & Chang, 2016). self-regulation allows for better academic achievement (Bai & Guo, 2021). Students who have self-regulation will be more independent and have high self-confidence when expressing opinions or ideas during the learning process (Qadaristin, 2021) Students can also better manage themselves and not give up easily when facing learning difficulties. In addition, self-regulation also affects independence in carrying out assigned tasks, planning, managing, and being competent in managing their time (Qadaristin, 2021)

However, in reality, some students have adequate self-regulation, but some are not. Therefore, many students still need to develop self-regulation due to their inadequate self-regulation (Dema & Sinwongsuwat, 2020). On the other hand, mathematics education students at Riau University already have good self-regulation and can adapt to learning during the Covid-19 pandemic (Siregar & Siregar, 2021). In addition, some students understand self-regulation but have not been able to apply it in their learning process (Meesong & Jaroongkhongdach, 2016)).

For students who do not have adequate self-regulation, lecturers can design a lesson that can develop independent learning activities by considering the diverse needs of students. Students from various circles can feel the benefits of self-regulation by providing content tailored to each level of achievement. Providing content that can develop students' self-regulation with various ability levels will increase their achievement (Stoeger, Fleischmann, & Obergruesser, 2015). With good self-regulation, students play an active role in choosing appropriate learning resources, planning their study time, and monitoring and managing their cognitive learning activities.

Students' self-regulation in learning is influenced by various factors, one of which is gender. Gender is used to identify differences between men and women from a non-biological point of view (Arbain, Azizah, & Sari, 2017). Gender is a major part of the personality that determines an individual's social and psychological development, thus enabling differences in learning independence between men and women (Baist & Pamungkas, 2019; Sutrisno AB, 2021). Carvalho stated that gender differences had been studied as affective predictors. And cognitive performance in mathematics, both sexes have the same level of intellectual ability (Saputri, Sugiarti, Murtikusuma, Trapsilasiwi, & Yudianto, 2018). Therefore, there may be differences in self-regulation between male and female students. This is supported by the results of research related to self-regulation in vocational students, namely, female self-regulation is higher than male self-regulation (Saputra, Alhadi, Supriyanto, Wiretna, & Baqiyatussolihat, 2018).

Seeing the importance of self-regulation in achieving one's goals, it is necessary to know the description of student self-regulation to obtain facts about students' self-regulation levels. This information on the level of self-regulation can then be the basis for further actions that need to be taken by lecturers so that students have optimal self-regulation and obtain good results in learning. In addition, the possibility of differences in self-regulation of male and female students also needs attention. Differences in self-regulation of female and male students should be addressed by giving different treatments for optimizing self-regulation. Therefore, the authors are interested in investigating whether there are differences in self-regulation of students of Mathematics Education FKIP Riau University during online lectures regarding gender. This study aimed to determine the difference in self-regulation of students of Mathematics Education FKIP Riau University during online lectures regarding gender. By knowing the description of self-regulation, lecturers can consider the next action that needs to be taken, both for female and male students, so student self-regulation is more optimal when lectures must be carried out entirely online.

METHOD

This study focuses on finding out the description of self-regulation of students of Mathematics Education FKIP Riau University in terms of gender. Therefore, this study uses a quantitative approach. The subjects of this study were students of Mathematics Education FKIP Riau University batch 2017, 2018, and 2019 as many as 30 students, with details of 15 male and 15 female students. The data obtained from students is the self-regulation score of students of Mathematics Education FKIP Riau University during online lectures. This research was conducted at the Mathematics Education Study Program, FKIP University of Riau.

To collect data in this study, the authors used a self-regulation questionnaire. The form statements in the questionnaire are presented as a scaled answer consisting of strongly agree, agree, disagree, and strongly disagree. Respondents were asked to choose the answer according to their personality. The self-regulation questionnaire used contains 15 statement items.

The variable in this study is students' self-regulation in attending online lectures. Aspects of self-regulation used in this study are goal setting, environmental management, task strategy, time management, seeking help, and self-evaluation (Barnard, Lan, To, Paton, & Lai, 2009).

Before the self-regulation questionnaire is given to students who are research subjects, the questionnaire is assessed first. To test the validity of the questionnaire, the authors asked for the help of two experts as validators. Of the 15 statement items in the questionnaire, 9 items need to be corrected according to the validator's suggestions. After the questionnaire was corrected according to the suggestions of the two validators, the questionnaire was then tested on 2015 and 2016 students. The writer first changed the self-regulation score, which is ordinal data, to interval using the MSI method to process the data on the validity of the statement items.

Furthermore, the data is processed using the Pearson Product Moment correlation to determine its validity and Cronbach's Alpha to determine its reliability. The validity and reliability testing results show that the questionnaire has been declared valid for each statement item and is reliable. After the self-regulation questionnaire is valid and reliable, the questionnaire is then distributed to students who are research subjects. The self-regulation score data was then processed using descriptive statistical techniques. The descriptive statistical technique is used to obtain information about data without going through the hypothesis testing procedure and generalizing the test results.

The self-regulation score data obtained were then categorized by referring to the categories compiled by Azwar (2012), which can be seen in the following table.

Table 1. Categories of Self-Regulation

Score Range	Category
$x < 24$	Very Low
$24 \leq x < 33$	Low
$33 \leq x < 42$	Medium
$42 \leq x < 51$	High
$x \geq 51$	Very High

The student score data were then grouped based on these categories, and the percentage was calculated for each category for both male and female gender. Furthermore, the authors also determine the percentage of achievement of each self-regulation indicator and the percentage of achievement of self-regulation as a whole. The category of self-regulation achievement percentage used refers to Purwanto (2012), as presented in the table below.

Table 2. Category of Self-Regulation Achievement Percentage

Percentage	Kategori
$86 \leq p \leq 100$	Very Low
$76 \leq p < 86$	Low
$60 \leq p < 76$	Medium
$55 \leq p < 60$	High
$p < 55$	Very High

The results of data processing are then interpreted for each gender. Next, to see if there is a difference in self-regulation between students taking online lectures between male and female students, a t-test was carried out with the help of SPSS. The results of the t-test were then interpreted to see if there were differences in self-regulation among the students of Mathematics Education FKIP UNRI during online lectures between male and female students.

RESULTS AND DISCUSSION

The student self-regulation score data in this study were processed to obtain an overview of the self-regulation of students of Mathematics Education at FKIP Riau University. The self-regulation scores of each student are grouped into the self-regulation category that has been determined previously in Table 6.

Table 3. The Results of the Grouping of Students' Self-Regulation

Category	Total		Percentage(%)	
	Male	Female	Male	Female
Very	0	0	0	0
Low				
Low	0	0	0	0
Medium	14	8	93.3	53.3
High	1	7	6.7	46.7
Very	0	0	0	0
High				

Based on the table, it can be seen that in each gender, students' self-regulation is in the medium and high categories. For male students, 14 people (93.3%) were in the moderate self-regulation category, and 1 person (6.7%) was in the high self-regulation category. As for female students, 8 people (53.3%) were in the moderate self-regulation category, and 7 (46.7%) were in the high self-regulation category. Therefore, it means that the self-regulation category obtained by male students is not different from that of female students. However, if we look at the number of students and the achievement percentage, it can be seen that more female students have high self-

regulation categories than male students.

The self-regulation categories of students in the medium and high categories indicate that students already have good self-regulation during lectures. This can be seen from the condition of students during lectures. During online lectures, some students already have targets to be achieved from each subject they take. In addition, students have also tried to condition the atmosphere and surroundings during online lectures, for example, by choosing a quiet place that can reach internet signals and not doing other work while attending online lectures. Furthermore, in attending online lectures, students evaluate what they have and have not understood.

The achievement of good student self-regulation is supported by online lectures that are going well. As stated by Bates (Suhartono & Indramawan, 2020), the online learning process (on the network) has a positive impact on students, namely, 1) increasing the intensity of interaction between students and lecturers, 2) learning can be done anywhere and anytime. Course, 3) the learning process can reach students in a large scope, 4) facilitates perfecting, storing, and accessing learning materials, 5) can attract student interest and activity, and 6) can improve learning outcomes. In line with Bates (Thomson, 2010) argues that online learning is accessible to all students, allowing them to learn independently, in-depth, and at their own pace.

Next, the writer determines the percentage of achievement of self-regulation for each indicator and compares it with the pre-determined categories. Finally, a calculation of the percentage of achievement of self-regulation in each indicator is carried out to see whether there are indicators of self-regulation that need to be improved. The results of determining the percentage of students' achievement of self-regulation can be seen in the following table.

Table 4. The Results of Calculating the Percentage of Students' Achievement of Self-Regulation for Each Indicator

Indicator	Percentage (%)		Category	
	Male	Female	Male	Female
Goal setting	65.8	65	Medium	Medium
Environmental management	72.5	72.5	Medium	Medium
Task strategy	59.7	65	Low	Medium
Time management	63.3	66.7	Medium	Medium
Seeking help	40	55	Very Low	Low
Self-evaluation	90	87.5	Very High	Very High

Based on Table 4, it can be seen that there are self-regulation indicators with low and very low achievements. For male students, the indicator of seeking help is in the very low category; task strategy indicators with the low category; indicators of goal setting, environmental management, and time management are in the medium category; and self-evaluation indicators are in the very high category. Furthermore, for female students, seeking help is in a low category; indicators of goal setting, environmental management, task strategy, and time management are in the medium category; and self-evaluation indicators are in the very high category. A comparison of the percentage of achievement of self-regulation for each indicator for male and female students can be seen in Figure 1 below.

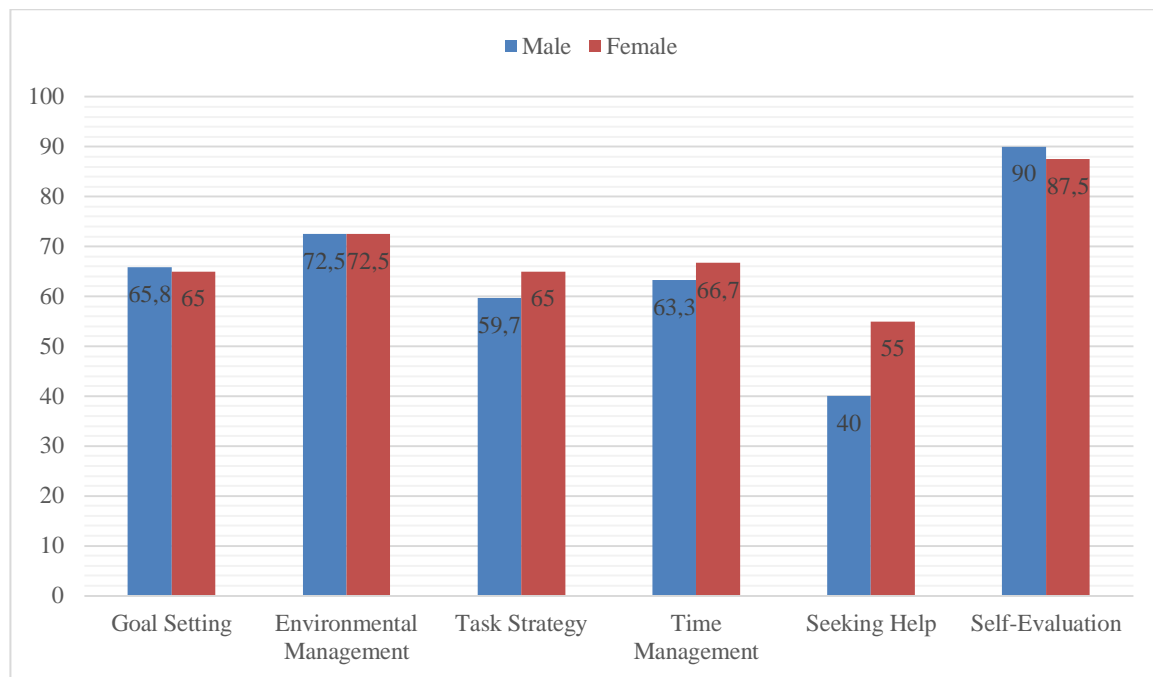


Figure 1. Percentage of Achievement of Self-Regulation for Each Indicator

From the Figure 1, it can be seen that for both male and female students, the highest percentage of achieving self-regulation is an indicator of self-evaluation. The next highest percentage of achievement of self-regulation is an indicator of environmental management, followed by goal setting, time management, task strategy, and seeking help.

Task strategy is an indicator of self-regulation, which is in the low category for male students. This happened because only a few students prepared before attending lectures, such as by studying the material to be discussed and making notes on things they did not understand. In addition, in attending lectures, some students work on practice questions only when asked to do so. Even for the assigned questions, some students just copied the answers of other friends. For this reason, the task strategy indicators still need to be optimized for achievement. Having a good assignment strategy means that students can choose the actions that need to be taken to understand the lecture material. One form of having a good task strategy is that students can complete the tasks assigned by the lecturer independently and with discipline. This will certainly affect student achievement. As stated by Nisa & Leonard (2018), completing assignments well, independently, and with discipline can improve student learning outcomes.

The help-seeking indicator is also an indicator with a very low category for male students and a low category for female students. This means that students need to increase their initiative to find help if they are constrained in learning. For example, they are trying to increase their understanding of the material considered difficult by asking lecturers and friends and studying materials and videos that can be accessed using the internet. Therefore, students can improve their learning outcomes by determining what help they need to overcome learning difficulties. In accordance with what was stated by Sari (2014), seeking help is one of the strategies students can use to overcome the obstacles they experience while studying.

Based on the score and percentage of students' self-regulation achievement, it can be seen that the self-regulation of male students is not much different from that of female students. To ensure this, a t-test was conducted with the help of SPSS. The results of SPSS calculations can be seen in Table 5 below.

Table 5. Differences in Self-Regulation Test Results for Male Students and Female Students

Independent Samples Test										
		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
score_self_r	Equal variances assumed	5.222	.030	.618	28	.542	.77547	1.25554	-1.79639	3.34733
egulation	Equal variances not assumed			.618	22.621	.543	.77547	1.25554	-1.82422	3.37516

Table 5 shows that $\text{sig} = 0.542 > \alpha = 0.05$, meaning that there is no difference in self-regulation of male and female students during online lectures. This means that, in general, lecturers can provide equal treatment between male students and female students to optimize self-regulation. However, if viewed from the achievement of self-regulation on task strategy indicators, lecturers must provide different treatment between male and female students. This is because, in the task strategy indicator, the achievement of male students is still in the low category. This happens because some male students have not completed assignments independently and are disciplined by copying other friends' work. Therefore, lecturers need to direct male students to develop strategies to complete assignments, such as by studying in groups, arranging study schedules at home, and being disciplined in completing assignments with full responsibility. For indicators of seeking assistance, both male and female students have not received satisfactory results.

CONCLUSION

Based on the results obtained, it can be concluded that there is no significant difference in self-regulation between male and female students. As a follow-up, lecturers can provide relatively equal treatment between male students and female students to optimize self-regulation. However, if we look at each indicator, there are several indicators that achieve different score categories between male students and female students. As in the task strategy indicator, where male students are on low indicators, while female students are on medium indicators. Next is the indicator of seeking help, which although has not achieved optimal results in both genders, the categories obtained are different. Male students are in the very low category, while female students are in the low category.

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