# Exploration of Self-regulated Learning through Edmodo

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**Abstract**: This paper aims to describe self-regulated mathematics learning of elementary school teacher education students. This type of research used a qualitative approach. The subject research was taken from the 2nd-semester student's primary school teacher education in 2020. The instrument used in this research is a questionnaire. The questionnaire is used to know the student's self-regulated in mathematics learning with six factors, namely (a) independence of others, (b) having self-confidence, (c) behaving discipline, (d) having a sense of responsibility, (e) behaving based on their initiative, and (f) perform self-control. Based on the results of the research, it can be concluded that self-regulated learning through Edmodo is in the high category
**Keywords:** self-regulated learning, Edmodo, mathematics.

## Introduction

There is no doubt that mathematics exists in all areas of life. Mathematics has taken place in our life with numbers or calculations and our way of thinking and concepts (Altay et al., 2017). College students must also master the cognitive, psychomotor, and affective aspects. In learning mathematics in universities, students are also expected to have higher-order thinking skills and can be good problem solvers. Students are expected to have an attitude of respect for mathematics. Learning mathematics in higher education is also expected to make students independent. In the affective aspect, one of them is also related to self-regulated learning mathematics. Self-regulated learners are actively involved in maximizing their opportunities and abilities to learn. They can critically evaluate and intentionally alter how their thoughts, attitudes, behaviours, and working environments contribute to learning outcomes (Darr & Fisher, 2005). Self-regulated learning is a process that assists students in managing their thoughts, behaviours, and emotions to navigate their learning experiences successfully. This process occurs when a student's purposeful actions and strategies are directed toward acquiring information or skills (Smaldino et al., 2015). Self-regulated learners understand, value, and engage in academic learning differently from their peers who have difficulty in school (Paris & Newman, 1990). Self-regulated learning can be fostered effectively at both primary and secondary school levels. Based on observations, when online learning students pay less attention to discussion instructions, there are often answers from the same student and semester during exams. It is based on observations during the semester exam 60% of students' responses have the same error because students cheated.

The Covid-19 pandemic caused massive changes in learning patterns at all levels of education. Lecturers must be able to adapt to online learning so that learning runs optimally. One of them is to use the available platforms. The learning system, which was initially based on face-to-face in the classroom, must be replaced by a learning system integrated through the internet network (e-learning). One of the free e-learning platforms that are easy to use is Edmodo. This platform offers many features that support the implementation of e-learning. Effective learning certainly needs to apply the right strategy, especially with e-learning, where teachers cannot directly observe student activities. Technological

developments support various activities that can access knowledge. Information technology uses software and hardware that provide options to support and facilitate the learning process. One of the lessons that are expected to increase self-regulated learning in mathematics is e-learning. E-learning includes computer-based learning and various web applications, virtual classes, etc. E-Learning is a form of learning that allows learning materials to be delivered to students without time and space limitations by utilizing electronic media and technology (Afridian, 2012). E-learning is an electronic technology to provide, supports, and enhances teaching, learning, and assessment (ILRT, 2005). More specifically, e-learning to distribute learning materials can be accessed by students from anywhere (Rosenberg, 2001). With the various features in Edmodo, it is hoped that it can train students' independent learning. It is supported by the research results, which conclude that using Edmodo on evaluation indicators of student activity and conclusions of learning experiences can increase learning independence (Aulia et al., 2019). In addition, the research results also show that the application of Edmodo has been optimally used in raising learning independence and students' language awareness (Ekawati, 2013). Other studies' results support a positive correlation between interest in learning-to-learn outcomes in Edmodo-based e-learning and learning independence on learning outcomes in Edmodo-based e-learning, while interest in learning towards learning independence in Edmodo-based e-learning does not show any influence (Hatip & Listiana, 2019).

One of the existing and easy-to-use e-learning is Edmodo. Edmodo can be accessed free of charge and safely through the website www.edmodo.com. The features in Edmodo look almost the same as Facebook, making it easy to use for learning. The existing features make it easier for students so that students are expected to be able to learn independently when online. Furthermore, teachers can use Edmodo to create and run online classes for their students to work online simultaneously with their physical classes and to run workshops on Edmodo for other teachers (Kongchan, 2008). On Edmodo, students can enter a class created by the teacher if invited by a class code. The novelty of this research is that in addition to using Edmodo to train students' independent learning, it modifies it by providing learning videos and quizzes that students can access. In addition, the discussion given is to give problems that are discussed, and students seek solutions.

Edmodo was chosen because it provides a safer and easier platform, such as the Facebook social network (Thongmak, 2013). Edmodo has advantages when viewed from other social media learning management, including (1) Easy to use like Facebook, (2) Class code is closed if not given, (3) Can be accessed online and free of charge and is available for all devices, (4) No need for a server at school, (5) Not limited by space and time, (6) System developers, (7) can continually update the system Edmodo can be accessed and used between classes, schools, cities, and districts, (8) Edmodo can be used for parents, students, and teachers, (9) Edmodo has features such as social media, learning materials, and evaluation, (10) Edmodo can be used by teaching teams, (11) There are notifications, and (12) There is a badge feature that can increase students' learning motivation (Dwiharja, 2015). Based on the description above, this study aims to explore self-regulated learning mathematics through Edmodo for students of primary school teacher education (Mardiana & El-Rumi, 2022).

## Methods

This study uses a qualitative approach. This research method uses quantitative description. The procedures of this research are problem identification, problem limitation, problem focus determination, research implementation, data processing and meaning, theory emergence, and research result reporting. This research procedure consists of five stages. The first stage is reviewing materials and preparing research tools and instruments (development and standardization of devices). The second stage is learning with an online system assisted by Edmodo. The third stage is distributing questionnaires, providing learning outcomes tests, and providing questionnaires to get student responses to the learning (data retrieval). The fourth stage is conducting a study and interpreting the data obtained. The fifth stage is reporting (Mirza & Ade, 2020). This research aims to describe in more detail the achievement of self-regulated learning. In addition, they are analyzing self-regulated learning on mathematics learning through Edmodo. This study's subjects are students of the primary school teacher education program study in Universitas Sarjanawiyata Tamansiswa on subject materials lower grade mathematics academic year 2020 consisting of 2D, 2E, and 2I. Classes 2D have as many as 25 students, 2E classes as many as 31 students, and 2I classes as many as 26 students.

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The data collection technique in this study is a non-test technique. The instruments of the research are self-regulated learning questionnaires. Here is the table of self-regulated instrument learning (Hidayati & Listyani, 2010).

**Table 1**. Indicator of self-regulated learning instrument

| Indicators | Items | |
|---|---|---|
| | (+) | (-) |
| Dependence on others | 6.16 | 1.4 |
| Have self-confidence | 8.17 | 10 |
| Be disciplined | 11.18 | 12 |
| Have a sense of responsibility | 7.14 | 13 |
| Behave on your initiative | 2.3 | 5 |
| Exercise self-control | 9.19 | 15 |

Data analysis in this study used descriptive statistics and data triangulation. Data triangulation was carried out through discussions, interviews, and the results of a self-regulated learning questionnaire

## Results and Discussion

### Results

The research results describe the self-regulated learning mathematics consisting of high, high, middle, low, and very low categories. Data from interviews combined with the results of student work will provide more self-regulated learning with indicators consisting of dependence on others, self-confidence, discipline, a sense of responsibility, behaving on your initiative, and exercising self-control mathematics through Edmodo. The self-regulated learning questionnaire scores describe in table 2.

**Table 2**. Description score of self-regulated learning

| Class | N | Mean | Std. Dev | Minimum | Maximum |
|---|---|---|---|---|---|
| 2D | 25 | 74.88 | 7.26 | 62 | 89 |
| 2E | 31 | 74.32 | 6.69 | 65 | 91 |
| 2I | 26 | 74.50 | 7.64 | 63 | 94 |

Based on table 2, the lowest and highest self-regulated learning mathematics scores in class 2D were 62 and 89. In class 2E, the lowest and highest self-regulated learning mathematics scores were 65 and 91. In class 2I, the lowest and highest self-regulated learning mathematics scores were 63 and 94. The analysis is presented in table 3.

**Table 3**. Categories of self-regulated learning

| Interval Score (X) | Category | 2D | 2E | 2I |
|---|---|---|---|---|
| $76 < X \le 95$ | Very high | 13 | 10 | 11 |
| $63 < X \le 76$ | High | 11 | 21 | 15 |
| $51 < X \le 63$ | Middle | 1 | 0 | 1 |
| $38 < X \le 51$ | Low | 0 | 0 | 0 |
| $0 \le X \le 38$ | Very low | 0 | 0 | 0 |

Table 3 shows that in class 2D, 13 students had a very high category, 11 students had a high category, and one had a middle category in self-regulated learning mathematics. In class 2E, there were ten students with a very high category and 21 with a high category. In class 2I, there were 11 students with a very high category, 15 with a high category, and 1 with a middle category in self-regulated learning. It is in line with the results of the study showing that the use of Edmodo can increase students' independence when viewed from the students' self-confidence, responsibility, initiative, and discipline in carrying out an activity and direct observation in the field to encourage student learning independence to achieve learning goals (Meyyanudin et al., 2022).

## Discussion

Learning in low-grade elementary school mathematics was the first time the lecturer created an account on Edmodo. After that, the lecturer makes course classes for each class so that there are three groups, namely classes 2D, 2E, and 2I. The lecturer then gave the class code according to the Edmodo class. In the "create class" window, we can name the class according to our needs. Then you can add information about the level of education that we are guiding, for example, elementary school to advanced education level. Then we can also provide a description of the material area or a description of the class that we will be able to teach regarding the information on the subjects being followed (Puji & Umamah, 2018). Learning using Edmodo has the same principle as face-to-face learning. The educator explains the discussion with Edmodo. Lecturers register for classes and can enter students to join the class after being given a class code, and the lecturer approves the application. When the class has reached the quota based on the real class, the class code can be locked and no longer accept students (Thoiyibi & Nuzli, 2022). First, the lecturer must ensure that all students have joined the Edmodo class. If there are students who have not joined and the lecturer has posted learning materials, then students who have just joined cannot access the posts before they join. If someone is late to join the class, the learning materials are distributed to the WhatsApp group. At the beginning of the lecture, the lecturer provides semester learning plans, lecture contracts, and what materials will be studied in lower-grade mathematics courses. The material in this course consists of numbers (number concept, number numeration system, various numbers); integers (definition and arithmetic operations on integers); fractional numbers (definition, arithmetic operations on fractional numbers and decimal fractions); multiples and factors; greatest common factor (GCF) and least common multiple (LCM); modular arithmetic; social arithmetic. Lectures are held as many as 16 meetings including mid-semester exams and end-of-semester exams. In addition to using edmodo, to facilitate communication and coordination, a whatsapp group was also formed. Lectures at the first to third meetings use explanations from the lecturer, then at the fourth and subsequent meetings students in groups provide explanations of the material according to their group divisions. Group representatives will upload learning materials in the form of teaching materials, provide sample questions and explanations, and provide practice questions that are done by other students, as seen in figure 1. Students can upload answers to questions by commenting on the advanced group post by mentioning the student's name and number. The group presented the report and conclusions in the Edmodo class. Educators and group members cooperatively evaluate their projects and those of other groups. Group members use the evaluation results to refine and improve their projects for the highest results (Saputri, 2021). The selection of the Edmodo class was very helpful for lecturers in implementing the learning process (Helsa & Kenedi, 2019).
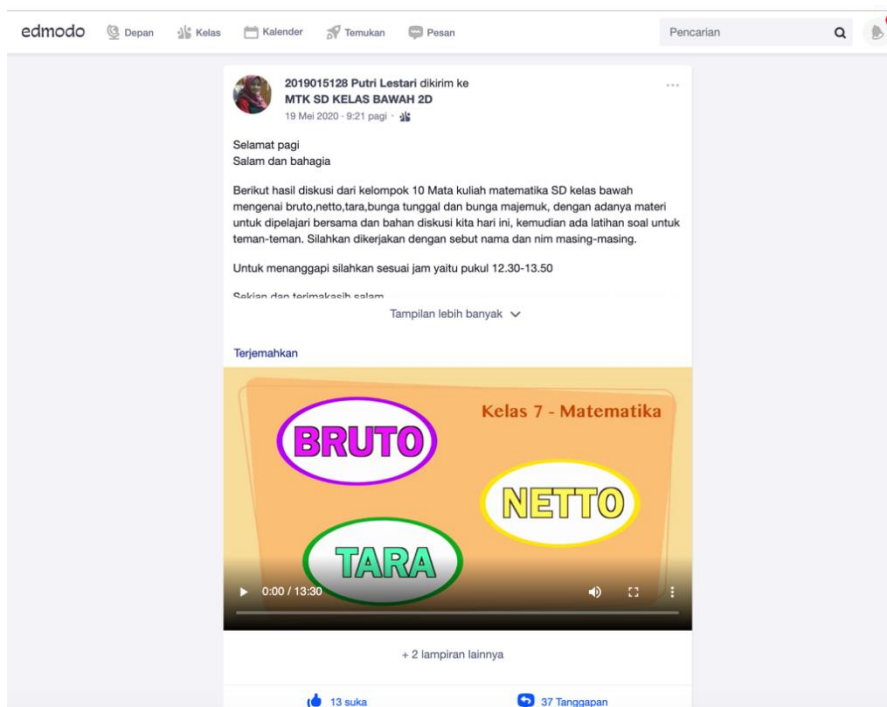
**Figure 1.** Mathematics learning in Edmodo

The features used by lecturers in learning mathematics with Edmodo are very varied. The system, feature content, and security are developed and performed by Edmodo. We don't have to worry about the server and security devices used. The Edmodo system is very reliable and helpful for the needs of schools or institutions with a limited budget but wants to continue developing online learning because Edmodo is free. (Nurvitasari et al., 2020). The first feature used is a lecturer poll using opinion polls, for example, regarding the selection of the midterm exam using Edmodo or the academic portal. The second feature used is a quiz. Quizzes are used after learning ends in the form of multiple-choice questions or essays. The third feature used is the assignment. This feature is used to collect assignments given by lecturers, namely by uploading files in word or pdf form. This feature is also used during the midterm and end-of-semester exams in low-grade elementary mathematics courses, as seen in figure 2. During the midterm and final exams, students are given essay questions that must be done independently and handwritten. The answers will be photographed and made into a single file in pdf. This work is limited in time according to the exam schedule. With the Edmodo feature, we can limit the collection time according to the due date when the exam takes place. If there are problems, students will communicate through the WhatsApp group that has been formed. The results of student work can be directly corrected and given a value in the Edmodo system so that students can immediately find their exam results directly in the system without having to ask the lecturer directly. In addition, there are still many easy-to-use features, namely giving rewards, sharing videos, learning materials, and others. Edmodo is easy for students, so it does not make it difficult for them to do online learning (Angraini, 2018). Students' preference in using Edmodo is that they agree that communication with lecturers, between students and peers, or with parents is very easy and fast with Edmodo's user-friendly online help. Students prefer to make online appointments with lecturers because communication is faster through Edmodo (Balasubramanian et al., 2014).
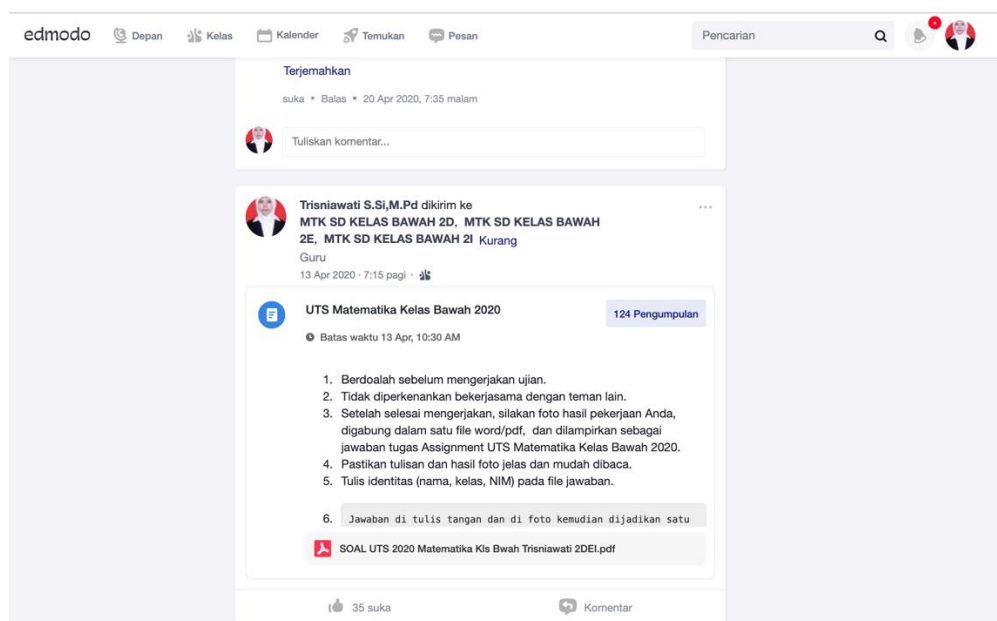
**Figure 2.** Features of Edmodo

Most of the participants in the class agreed that Edmodo is indeed a very good platform to use because of its full features. Edmodo is very useful in active participation in online classes, an easy feature in collecting assignments online and accessing materials or references. Edmodo can also increase motivation because there are independent online discussions and activities (Hobsbawm, 2007). The obstacle faced by students using Edmodo in lectures is that if they forget their username and password, they must return the class code to the lecturer. Then periodically, the Edmodo system of class code can change, so it is necessary to give the class code back if anyone wants to rejoin the class. Another further obstacle when uploading files when submitting assignments is that some students do not succeed because the file size is too large, so the file needs to be compressed first. In areas where the signal is difficult, the signal is also constrained when logging into Edmodo. At the end of the lesson, the lecturer gave a self-regulated learning questionnaire to be filled out by students, which was shared using Edmodo. Then the lecturer tabulates the data obtained and analyzed according to the indicators contained in the self-regulated learning questionnaire.

The indicator of the self-regulated learning mathematics the students studied consisted of 6 aspects: dependence on others, self-confidence, discipline, a sense of responsibility, behaving on your initiative, and exercising self-control. Instilling and growing learning independence requires motivation in students first, a sense of wanting to learn independently, responsibility, and confidence that they can solve problems in dealing with learning materials. Both independence can be done with the support of learning media facilities, internet networks, and costs. Third, the pandemic has brought new changes in the world of education. There is a need for habituation from an early age in getting used to using technology, learning styles, and independent learning to get used to new things, fourth to increase learning independence can be assisted with models and suitable learning media so that students are more accustomed to independent learning (Patimah & Sumartini, 2022). Based on table 2, the average self-regulated learning mathematics questionnaire score in both of the three classes, 2D, 2E, and 2I, is in the high category. Students determine methods and media according to mathematical concepts. Students learning independence can be seen when making material with various references, making sample questions according to the material, and making practice questions done by other students. Then students also upload answers to questions so that it looks like students work because they use handwriting when doing practice questions. Then, students are given a time limit for discussing or doing quizzes, and most do assignments and quizzes on time.

Furthermore, using Edmodo, the learning outcomes are in a good category (Trisniawati et al., 2021). Regarding responsibility, when the presentation is approaching, the group that will advance to the presentation first consults with the lecturer to get input and suggestions in writing papers or presenting the material. In self-confidence, students provide feedback if there are students who have

done the practice questions given. Suppose there is an incorrect answer. The group that makes the question will justify the answer. There is an effect of self-regulated learning based on Edmodo (Hatip & Listiana, 2018). Students discuss in the Edmodo class very actively by providing comments and asking if things are unknown to their friends. Students will also work on questions that other student presenters have given. It is similar to the resulting research that (1) Edmodo learning is better than conventional learning in terms of the mathematical connection ability of high and low-classification students; (2) learning with Edmodo is better than conventional learning in terms of students' self-regulated; and (3) there is a positive correlation between self-regulated learning and mathematical connection skills (Yaniawati et al., 2017).

The initial stage that students do is to download the material that is already on Edmodo and study. Students can also use other references related to the material to be studied. Based on the results of interviews with students about the tasks given by the lecturer, it is very clear. Then the lecturer also provides a learning atmosphere that activates students. Besides e-learning being something new, Edmodo is also not far from what is called a gadget (Android phone). The same thing also happened when students strongly agreed to use this platform to ask about information posted by lecturers (Balasubramanian et al., 2014).

Lecturers play a very important role in the development of self-regulated learning in students, namely encouraging group work, encouraging learners to predict how well they did on tests, setting some learning goals, using authentic text, involving learners to keep learner diaries, building reflection and extension into activities, encourage self and peer editing. In Edmodo, there is no web meeting feature. However, lecturers can create a meet and then embed a meet link in the Edmodo class. Learning using Edmodo should be modified with other online learning to provide a variety of learning for students. The results of interviews with students show that using Edmodo has easier features because its use is similar to Facebook's social media. Lecturers can also provide facilities/condition lectures by choosing the right strategy or model, which in this study is an online learning model so that it can help improve student self-regulated learning. Finally, the implications of the self-regulated learning perspective on students' learning and achievement are considered (Leidinger & Perels, 2012). With students learning independently, learning outcomes will also increase using Edmodo.

## Conclusion

Based on the results, the average self-regulated learning mathematics questionnaire score was obtained for the three classes, namely 2D, 2E, and 2I, in the high category. In class 2D, there were 13 students with very high category, 11 students with high category, and 1 with middle category. In class 2E, ten students had self-regulated learning mathematics in the very high category, and 21 had self-regulated learning mathematics in the high category. In class 2I, there were 11 students in the very high category, 15 in the high category, and 1 with self-regulated learning mathematics in the middle category. Suggestions can be used that other researchers should use Edmodo with more creative and innovative media to develop self-regulated learning in mathematics through Edmodo.

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