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Implementation of Self-Evaluation Exit Tickets in Self-Organized Learning Environments (SOLEs) in Online Learning

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Abstrak

Efektivitas menjadi salah satu permasalahan utama dalam proses pembelajaran daring. Hal tersebut menjadi tolak ukur dalam keberhasilan mencapai tujuan pembelajaran. Oleh karena itu, pendidik harus cermat dalam memilih strategi yang kreatif dan inovatif baik dari segi strategi pembelajaran maupun strategi penilaian. Seperti halnya strategi penilaian *Self-Evaluation Exit Ticket* yang menawarkan berbagai kelebihan untuk pendidik dan peserta didik. Tujuan penelitian ini yakni untuk mengetahui efektivitas penerapan teknik *Self-Evaluation Exit Ticket* sebagai strategi penilaian pada pembelajaran. Subjek dalam penelitian ini adalah delapan belas mahasiswa Pendidikan Matematika di sebuah pegururan tinggi swasta di Indonesia yang mengambil matakuliah Teori Bilangan secara daring. Dimana, materi yang akan diemban pada matakuliah ini adalah konsep dasar kongruensi, sistem residu lengkap, sistem residu tereduksi, konsep euler dan teorema euler. Jenis penelitian ini adalah deskriptif kuantitatif. Berdasarkan hasil penelitian, seluruh subjek mengalami peningkatan selama diterapkan strategi penilaian *Self-Evaluation Exit Ticket*. Peningkatan tersebut terlihat pada pertemuan 2 yakni sebanyak 55% mahasiswa sudah dapat menentukan sendiri capaian pembelajarannya yang sebelumnya pada pertemuan 1 hanya sebanyak 33% mahasiswa. Subjek berpendapat bahwa pembelajaran yang diterapkan menggunakan *Self-Evaluation Exit Ticket* terasa lebih menyenangkan, menarik dan memacu subjek untuk terus belajar. Artinya, strategi penilaian *Self-Evaluation Exit Ticket* dapat dikatakan efektif dan memungkinkan untuk diterapkan dalam pembelajaran daring.

Kata kunci: Pembelajaran Daring, Pembelajaran Mandiri, *Self-Evaluation Exit Ticket.*

Abstract

Effectiveness is one of the main problems in the online learning process. This becomes a benchmark for success in achieving learning objectives. Therefore, educators must be careful in choosing creative and innovative strategies both in terms of learning strategies and assessment strategies. Like the Self-Evaluation Exit Ticket assessment strategy which offers various advantages for educators and students. This research aims to determine the effectiveness of applying the Self-Evaluation Exit Ticket technique as an assessment strategy in learning. The subjects in this research were eighteen Mathematics Education students at a private higher education institution in Indonesia who took Number Theory courses online. Where, the material that will be covered in this course is the basic concept of congruence, complete residue systems, reduced residue systems, Euler's concept, and Euler's

theorem. This type of research is quantitative descriptive. Based on the research results, all subjects experienced improvement while implementing the Self-Evaluation Exit Ticket assessment strategy. This increase was seen at meeting 2, namely as many as 55% of students were able to determine their learning outcomes, whereas previously at meeting 1 only 33% of students were able to determine their learning outcomes. Subjects thought that learning implemented using Self-Evaluation Exit Tickets was more fun, interesting, and encouraged subjects to continue learning. This means that the Self-Evaluation Exit Ticket assessment strategy can be effective and possible to apply in online learning.

Keywords: Online Learining, Self-Organized Learnin, Self-Evaluation Exit Ticket.

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INTRODUCTION

In this digital era, information and communication technology (ICT) has brought significant transformation in various aspects of life, including in the field of education (Mitra et al., 2008; Noviyana et al., 2022). The emergence of the internet and various digital platforms has opened up new opportunities to provide a more flexible, interactive, and personalized learning experience. This gave birth to the concept of online learning which has become a global trend in recent years. Online learning is an effort to continue carrying out learning even though it is not done face to face (Ahmad & Heny Sri Astutik, 2023) (Hardianti & Desmayanasari, 2022).

Currently, online learning has been widely implemented at the tertiary level. However, the implementation is still not optimal and there are several obstacles. Effectiveness is one of the main problems in the online learning process. Some of these problems can be overcome after the implementation of synchronous and asynchronous approaches (Suryananda et al., 2022). The combination of synchronous and asynchronous approaches can make online learning like offline learning that is only separated by space and time. This process actually makes some students feel happy, because learning is carried out flexibly, especially in the asynchronous approach (Asmuni, 2020; Handayani, 2020). In online learning, many skills must be developed, not only the ability to use technology but the ability to study independently and in groups (Eka Sulistyawati & Dwi Shinta Rahayu, 2022).

Online learning requires students to be able to learn independently. This is stated in research conducted by Hasanah et al. (2020) where students are required to be able to learn independently because the criteria for mastery of understanding the material in learning are determined by the students themselves. In subsequent research, it was stated that there was a

significant relationship between increasing students' independent learning and the online learning process because students had to find their own references to be able to understand the concepts in the material being taught (Jamil & Aprilisanda, 2020; Lasfeto & Ulfa, 2020). So, it can be concluded that online learning allows students to be able to learn independently, because during online learning students will search, find and conclude for themselves what they have learned. Thus, students can also independently evaluate the achievement of learning.

Evaluation can be interpreted as a material consideration in making decisions that can be accounted for. Evaluation must be carried out appropriately in order to accurately measure student capacity (Saraswati et al., 2021).In terms of evaluating learning outcomes, educators are challenged to be able to evaluate students objectively during online learning. Adjusting the learning evaluation during online learning certainly needs to be done to determine the standard for grade promotion and graduation (Salehudin, 2020). The evaluation is carried out not only focusing on the outcome, but includes the teaching and learning process. Based on the Emergency Curriculum during the Covid-19 Pandemic Period issued by the Ministry of Education and Research and Technology, it is stated that the assessment process is divided into two, namely cognitive and non-cognitive aspects. In the cognitive aspect, an educator is asked to apply a qualitative assessment without having to give a score in quantitative form to the learning achievement of each student (Mansyur, 2020). That way, students do not feel burdened in the assessment process. This implies that the assessment process should be more focused on evaluating the process than the final result.

Based on the explanation above, it is necessary to have the right strategy to accurately measure the achievement of students on the process indicators. One of the online learning strategies that can be used so that students can learn independently is Self-Organized Learning Environments (SOLEs). SOLEs is a learning strategy concept initiated by Sugata Mitra through his project called Hole-in Wall. In the SOLEs strategy, students are required to be able to organize their own learning, such as developing their own learning strategies, determining their own references, and concluding their own learning materials. In addition, this strategy also requires each student to be able to evaluate himself (Dolan et al., 2013; Mitra, 2020; Mitra & Crawley, 2014; Mitra & Dangwal, 2017).

Relevant researchs related to SOLE has been carried out. (Qurtubi et al., 2023)stated that learning using the SOLE strategy can improve students' mathematical communication skills. Besides, student motivation, confidence, and engagement in the online learning process can be increased by implementing this strategy (Anis & Anwar, 2020; Effendi et al., 2020; Sinta

et al., 2020.). Previous research has discussed the application of SOLE strategies in learning. However, none has discussed the evaluation stages of this strategy.

The assessment and evaluation stages of the SOLEs strategy are called Self-Evaluation Exit Tickets. According to Izor (2019) Self-Evaluation Exit Tickets are easy and fast educational evaluation materials to support and encourage students to learn and reflect. This evaluation technique requires students to write down their learning progress in each session as a ticket to be able to continue in the next session using the assessment form provided by the educator. In addition, students are also required to determine learning objectives in the next session. Not only students, an educator must also make an evaluation for each student as a comparison to the evaluation carried out by students. The assessment strategy aims to enable students to organize learning outcomes so that a sense of responsibility and independence in learning grows. Therefore, researchers are interested in conducting research on Self-Evaluation Exit Tickets in Self-Organized Learning Environments (SOLEs) learning strategies with the aim of knowing the effectiveness of applying the Self-Evaluation Exit Ticket technique as an assessment strategy in the Number Theory online course.

METHOD

This research is classified as quantitative descriptive research to describe, research and explain what is being studied as it is, and draw conclusions from phenomena that can be observed using numbers. Researchers will describe the results of implementing the Self-Evaluation Exit Ticket assessment strategy during full online learning in the Covid-19 pandemic era in the Number Theory course. The subjects in this research were eighteen Mathematics Education students at a private higher education institution in Indonesia who took Number Theory courses online. The technique used for sampling is saturated sampling technique.

As a research instrument to measure the effectiveness of the Self-Evaluation Exit Ticket assessment strategy, the lecturer in the Number Theory course has prepared a form for students to fill out in order to determine the learning objectives and achievements they want to fulfill. The following is the Self-Evaluation Exit Ticket assessment form.

Table 1. Self-Evaluation Ticket Assessment Form

LEARNING OBJECTIVES		**LEARNING ACHIEVEMENTS**	
Student Name :	**(√)**	**Student Name :**	**(√)**
Basic Concepts of Congruence		Basic Concepts of Congruence	
Complete Residue System		Complete Residue System	
Reduced Residue System		Reduced Residue System	
Euler's concept		Euler's concept	
Euler's theorem		Euler's theorem	

From the assessment form above, it can be seen that there are five learning objectives and five learning outcomes that will be filled out by students. The learning objectives in the Number Theory course are the basic concepts of congruence, complete residual systems, reduced residue systems, Euler's concepts and Euler's theorem, as well as learning outcomes. The Self-Evaluation Exit Ticket assessment strategy is generally carried out at the end of the lesson as an evaluation stage and captures student responses to certain parts of the lesson. (Dixson & Worrell, 2016). Not only students, lecturers in Number Theory courses will also participate in filling out this assessment form for each student. This is done as a comparison of evaluations carried out by students. In addition, students will be given a post-test at the end of the lesson, to prove that the student in question really understands the material.

To measure learning achievement, students take a final test at each meeting. The following is an example of a test question.

1. Complete the following statement so that it is true.
   a. $26 \equiv ... mod(5)$
   b. $10 \equiv ... mod(3)$
   c. $23 \equiv ... mod(12)$
   d. $26 \equiv 4\ mod(...)$
   e. $... \equiv -2\ mod(5)$

2. Prove the following theorem.
   If p, q and m are integers and $m \neq 0$, then $p \equiv q\ mod\ (m)$if and only if there is an integer t so that $p = q + tm$

Figure 1. Questions For Basic Concepts of Congruence

1. Show that the set $K = \{-33, -13, 12, 14, 59, 32, 48\}$ is a complete system of residues modulo 7.

2. Create a set that is a complete residue system modulo 13.

Figure 2. Questions For Complete Residue System

After working on determining learning achievement targets, students then work on questions. After that, the lecturer gives an assessment and provides a checklist on the achievement Table 1 according to the results of the student's work.

RESULTS

Talking about learning strategies, the thing that comes to mind is tricks that can be done so that the learning process feels fun. The learning process, which in the last four years has implemented an online learning system, has been complained by many students. Learning that only relies on technology without any social interaction makes online learning seem monotonous. Gurley (2018) explained that in the online learning process, the criteria that must be met are 80% of the learning materials and activities that are carried out fully online and the rest can be carried out by other methods. In this study, the learning strategy used is Self-Organized Learning Environments (SOLEs) with the Self-Evaluation Exit Ticket assessment strategy. Apart from being an assessment strategy, the Self-Evaluation Exit Ticket can also be used as a measure of the extent to which students understand the given topic (Kandasamy et al., 2022).

Based on the results of the Self-Evaluation Exit Ticket assessment form filled out by subject 1, namely NGG students at meetings 1 and 2, it was found that NGG students filled out learning objectives regarding the basic concepts of congruence and the complete residual system. With learning outcomes, namely the basic concepts of congruence and a complete residual system. Based on the results of the assessment by the lecturer in Number Theory, NGG students have mastered the basic concepts of congruence, but not the complete residual system. This is shown by the results of the post-test given at the end of the meeting, NGG students got perfect scores in the basic concept of congruence but in the complete residual system material, NGG students got imperfect scores. The answer from subject 1 can be seen in the following image.

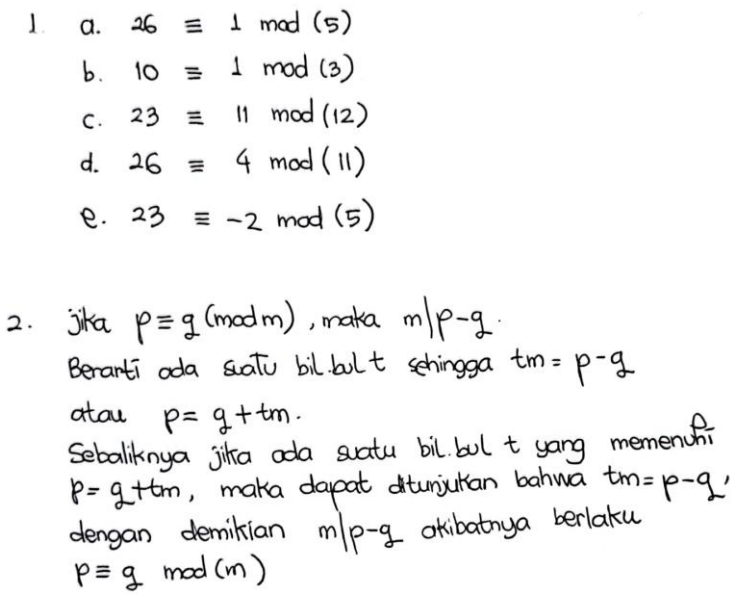

Figure 3. The answer of subject NGG about basic concepts of congruence

Like subject 1, LS students who are subject 2 and RYP students as subject 3 both want to master the basic concepts of congruence and the complete residual system at meeting 1. However, based on the lecturer's assessment of the learning achievements of LS and RYP students and the post-test results, both students have not mastered the complete residual system material. This means that at the first meeting, NGG, LS and RYP students could only master the basic concepts of congruence. The complete residue system material is the responsibility of NGG, LS and RYP students to be studied at the next meeting. At meeting 2, NGG, LS and RYP students filled in the learning objectives only regarding the complete residual system which at the previous meeting had not been mastered. The same applies to learning outcomes, students of NGG, LS and RYP only want to master the complete residual system. Based on the results of the lecturer's assessment at meeting 2, the three students had mastered the complete residual system material. This is indicated by the acquisition of a perfect score on the post-test. That is, between the learning objectives, learning achievements and assessments of the lecturers on the three students seem to be appropriate. This is in accordance with what was stated by Bularzik & Bogiages (2020) namely the Self-Evaluation Exit Ticket strategy can improve students' understanding from time to time.

Furthermore, the EO students as subject 4 wrote down the learning objectives and achievements at the 1st meeting, namely only on the basic concept of congruence. The same thing was also done by AV students as subject 5, where he only targeted the basic concepts of congruence to be mastered at meeting 1. From the results of the lecturer's assessment, EO and AV students both mastered the basic concepts of congruence at meeting 1. Assessment This is

reinforced by the post-test results of EO and AV students who got perfect scores on the basic concepts of congruence. That is, at the first meeting, the EO and AV students were able to determine what was targeted and what was to be achieved. At meeting 2, EO and AV students both determine learning objectives and learning outcomes to be mastered on the complete residual system material. Based on the results of the lecturer's assessment, the two students had mastered the complete residual system material. This is shown from the post-test results of each student who got a perfect score. So, it can be concluded that EO and AV students have been able to determine learning targets and achievements according to their abilities. Furthermore, Pérez Jurado & Martínez Aznar (2020) mentions that the Self-Evaluation Exit Ticket strategy makes students more active in building their own learning.

Finally, the NS student as the sixth subject wrote down the learning objectives and achievements that he wanted to master at the first meeting, which was the basic concept of congruence. Based on the results of the lecturer's assessment, NS students have not been able to master the basic concepts of congruence at meeting 1. This is reinforced by the post-test results which show that NS students get imperfect scores. This means that NS students have not been able to determine the targets and achievements they want to achieve at meeting 1. Thus, NS students need to learn more about the basic concepts of congruence at the next meeting.

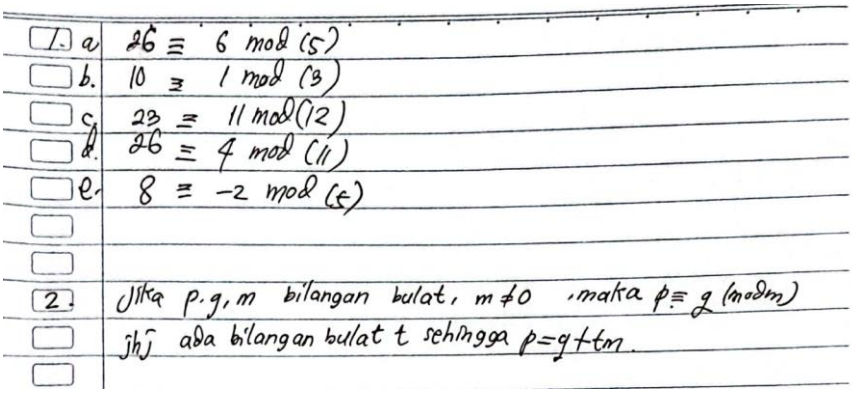

Figure 4. The answer of subject NS about basic concepts of congruence

At meeting 2, NS students wrote down the objectives and learning outcomes on the basic congruence concept material that he had not had time to master at the previous meeting plus the complete residual system material. Based on the results of the lecturer's assessment, NS students who previously had not mastered the basic concepts of congruence, now have mastered the basic concepts of congruence along with the complete residual system material which he wrote on the Self-Evaluation Exit Ticket assessment form. This is reinforced by the results of

the post-test which obtained a perfect score. This means that NS students experienced an increase in meeting 2. This increase occurred because NS students received assistance from peer tutors. As stated Akhtar & Saeed (2020) that the Self-Evaluation Exit Ticket can assist educators in summarizing concepts and ideas as well as gathering information about concepts that will later be used when planning the next lesson, so that students can prepare themselves optimally.

The results showed that at the first meeting, as many as 33% of students were able to determine their own learning achievement. This can be seen from the suitability between the assessment form filled out by students and the assessment form filled out by the lecturer in Number Theory course. Kirzner et al. (2021) mentioned that the Self-Evaluation Exit Ticket supports the confidence and ability of students to remember the subject matter in a certain period. This was shown at meeting 2, as many as 50% of students or half of the subjects used were able to determine their own learning achievements. That is, at meeting 2 more and more students are able to organize their learning activities according to their abilities.

DISCUSSION

The implementation of online learning has become increasingly widespread in Indonesia since the Covid-19 pandemic. Kaur (2020) explained that online learning is one of the right choices to reduce the risk of infection for educators and students. On the other hand, online learning that has been carried out for the last four years has caused many students to feel bored while studying. This happens because there is no interaction between students and their peers, students and educators and even students and the community. Not to mention the effectiveness of online learning which is still in doubt. Maybe in some areas of the city with internet access and adequate electricity online learning can be carried out well. However, in rural areas that still lack internet access and electricity, online learning is carried out with limited time and circumstances. However, online learning still needs to be implemented because in the current era the use of technology is something that must be applied in learning (Noviyana et al., 2022)Therefore, educators must be careful in reading the conditions of their students during the implementation of online learning. Of the several problems faced during online learning, some have been overcome by synchronous and asynchronous approaches.

According to Lin & Gao (2020) the synchronous approach refers to learning activities at the same time using media in the form of teleconferencing, while the asynchronous approach refers to learning activities at different times using the media in the form of a Learning Management System (LMS). That is, the synchronous approach allows students and educators

to carry out learning activities at the same time, while the asynchronous approach allows students and educators to carry out learning activities at the time agreed upon between the two. In the context of online learning, students are usually involved either asynchronously, synchronously or a combination of both (Shoepe et al., 2020). Through these two approaches, the online learning process will be more enjoyable. Not to mention if the online learning process is implemented in conjunction with the Self-Organized Learning Environments (SOLEs) strategy. Where, this strategy has been widely studied with very satisfying results, because students are asked to be involved during learning. Apart from that, the application of SOLEs can also improve students' mathematical communication skills, motivation and self-confidence (Anis & Anwar, 2020; Effendi et al., 2020; Qurtubi et al., 2023; Sinta et al., 2020.)

Self-Organized Learning Environments (SOLEs) is a learning strategy that is widely known and even applied. This strategy focuses on students who are willing to learn by utilizing technology and smart devices they have. Based on the results of the research that has been done, it was found that SOLEs are sufficient to support distance learning activities for social activists, can be applied in elementary schools with the help of technology and the internet, can increase students' understanding of polymer material, can improve the literacy skills of kindergarden teachers , can increase children's learning independence and improve student learning outcomes (Celina et al., 2016; Weisblat et al., 2019; Suciati, 2021; Asmawati et al., 2021; Firdaus et al., 2021; Nyoman & Wati, 2021). In addition, SOLEs provide opportunities for students to control and design their own learning activities. So that educators only act as facilitators by observing and supervising the learning activities of their students. This will encourage students to be able to study independently or in groups. This means that the SOLEs strategy can be applied to technology-based learning such as online learning. Of the many stages that can be applied, one of the stages in SOLEs that can be used is the Self-Evaluation Exit Ticket.

The Self-Evaluation Exit Ticket is an assessment stage in the SOLEs learning strategy. This assessment strategy allows students and educators to be able to evaluate themselves (Martínez-Izaguirre et al., 2018). Students will be given an assessment form by the educator related to the learning objectives and achievements to be achieved at the next meeting. Later, the results of student answers will be compared with the results of the teacher's assessment. Kandasamy et al. (2022) states that the Self-Evaluation Exit Ticket strategy can be used as a means of measuring student understanding, reflecting on students, expressing students' thoughts on new information and honing students' critical thinking skills. Furthermore, Paz-Albo et al. (2021) argues that the Self-Evaluation Exit Ticket can improve the learning process because students can evaluate from their learning experiences and encourage educators to develop and

improve their quality based on student responses. This is shown from the results of research that has been done, where students experience an increase in each meeting. Thus, according to Anderson & Richards (2021) The Self-Evaluation Exit Ticket strategy can be said to be effective if it is carried out in online learning because this strategy can be used as a step in evaluating learning and supporting educators in learning to use the curriculum.

Currently, the curriculum that is being discussed a lot is the independent curriculum with the independent learning program which was only recently issued by Kemendikbudristek. The purpose of the launch of this independent learning program is as a form of implementation of Ki Hadjar Dewantara's student-centered teaching philosophy, strengthening students' numeracy and literacy competencies so that each student achieves the expected learning goals (Kemendikbud-Ristek, 2020). According to Sherly & Sihombing (2021) the reason behind the establishment of the independent learning program is the number of complaints from parents in the applicable national education system, including the minimum completeness scores that students must achieve in each subject. In this program, components in schools are given the freedom to innovate the learning process. Like the Self-Organized Learning Environments (SOLEs) learning strategy and the Self-Evaluation Exit Ticket assessment strategy, for example, these two strategies can be used as new innovations in the learning process. Where, students who are the subjects of this study can feel the difference in learning that applies the Self-Evaluation Exit Ticket strategy and those who do not apply the Self-Evaluation Exit Ticket. This is in line with what was stated by Fifer (2019) namely Self-Evaluation Exit Ticket will provide many cognitive benefits to students. In addition, the independent learning program designed by the Ministry of Education and Research and Technology allows students to be able to actively learn independently.

Learning independence can be interpreted as a person's ability to carry out learning activities with initiative and willingness in himself without the help of others. More precisely, this ability is carried out independently but does not learn on its own or separate itself from others (Hasibuan et al., 2019). The lecture method, which has been widely applied by educators, causes students to be less responsive in terms of responding so that their independent ability in learning is still relatively low (Hafidzah et al., 2021). This ability may be difficult if there is no encouragement from within and outside the students themselves. This encouragement can be carried out by educators by implementing strategies such as Self-Evaluation Exit Tickets. Because the Self-Evaluation Exit Ticket asks students to be able to report what they feel from the learning process and the extent to which they contribute in class (Krumm et al., 2020). That

way, students will be encouraged to plan, implement and evaluate their own learning activities according to their level of ability

CONCLUSION

The conclusion that can be given in this study is that the Self-Evaluation Exit Ticket assessment strategy can assist educators in gathering information about the learning process that has been carried out and can be used as evaluation material and planning learning activities at the next meeting. Not only that, students can determine their own learning achievements, so that a sense of responsibility will grow to increase independence in learning. The results of the study stated that the six subjects experienced an increase when learning was applied to the Self-Evaluation Exit Ticket assessment strategy. This increase was seen at meeting 2, namely as many as 55% of students were able to determine their own learning achievements, which previously at meeting 1 only 33% of students. The subject thought that the learning applied using the Self-Evaluation Exit Ticket was more fun, interesting and spurred the subject to continue learning. This is because the subject must meet the learning achievements that he has written on the Self-Evaluation Exit Ticket assessment form. This means that the Self-Evaluation Exit Ticket assessment strategy can be said to be effective and possible to be applied during online learning.

Suggestions that can be given in this research is that educators should be able to use appropriate assessment strategies during online learning. This needs to be done because of the limitations that occur during online learning so that educators do not only assess and evaluate students through the final learning outcomes. One of the assessment strategies that can be used is the Self-Evaluation Exit Ticket because this strategy can help students achieve learning goals based on their abilities. For other researchers, it is suggested to carry out research related to the implementation of SOLEs evaluation stage over a longer period of time so that students are more familiar with this strategy and the results obtained are more detailed.

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