IMPLEMENTATION OF THE SELF-ORGANIZED LEARNING ENVIRONMENTS LEARNING MODEL TO ENHACE LEARNING OUTCOMES AND STUDENT INDEPENDENCE

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Abstract: This study aims to describe student learning outcomes and independence through SOLE (Self Organized Learning Environments) learning. The subjects of this study were 21 Biology Education students who took the Introductory Education course. Data on learning outcomes were collected using tests, while independence using a non-test with a Likert scale. The collected data were analyzed qualitatively into five categories. Cognitive learning outcomes in the good category were 11 (52%), and very good was 10 (48%) students. The results of the analysis of independence with categories fairly good, good, and very good were 2(10%), 8(32%), and 11(52%) students, respectively. The achievement of student independence on the indicators of not depending on others, self-confidence, discipline, responsibility, and self-control varies from fairly good to very good. In contrast, the self-initiative indicators vary in the good and very good categories. The analysis of the relationship between independence and learning outcomes shows that in all categories, independence shows learning outcomes in very good and good categories. Conclusion: (a) Student cognitive learning outcomes in completing lectures vary in very good and good categories. (b) Students' independence in completing lectures varies from fairly good to very good categories but is dominated by very good categories. (c) student independence in each indicator varies from fairly good to very good, except for the initiative indicator, which is in the good and good categories. (d) the level of student independence determines learning outcomes that vary in very good and good categories.

Keywords: *SOLE Learning Model, Learning Outcomes, Student Independence*

INTRODUCTION

21st Century Learning was developed to provide the widest possible range of student-centered activities, technology-based pedagogic content knowledge (TPACK), and HOTS (Higher Order Thinking Skills). The chosen model, media, and learning method must be innovative according to the times. Muhtadi [1] stated that the selected innovative learning model must develop students' critical thinking, creativity, collaboration, and communication skills. Teaching and learning activities are structured to enable students to develop their full potential.

In 21st-century learning, lecturers act as facilitators, mediators, motivators, and leaders in the learning process. Fundamental changes in the world of education in the 21st century are called "disruption phenomena" with the following signs; (1) learning is no longer limited to structured knowledge packages, but learning without limits according to interests (continuum learning), (2) learning patterns become more informal, (3) learning skills Independent (self-motivated learning) plays an increasingly important role, and (4) there are many ways to learn and many sources that can be accessed [2].

21st-century learning requires lecturers to be able to prepare all students to have the ability to think critically, create solutions, and study independently and in groups. Teachers must find ways to encourage and develop the fulfillment of all students' needs based on their potential so that learning is meaningful. Learning is said to be meaningful; if students experience what they learn, they do not know it, emphasizing the concepts, the learning process, and the quality of learning [3]. The quality of learning in the digital era is determined by the quality of teachers using digital technology skills [4]. Learning is no longer seen as transferring knowledge from a teacher to students [5]. Teachers must have good logical thinking to sort learning material, formulate it in short and concise formulations, and sort it in a logical and easy-to-understand structure [6]. Teachers are required to be able to master skills and the ability to adapt to new technologies and global challenges.

The goals of national education include developing the potential of students to become human beings who believe in and fear God Almighty, have a noble character, are healthy, knowledgeable, capable, creative, independent, and become citizens of a democratic and responsible state [7]. Government Regulation 58 of 2014 [8] explains that the 2013 curriculum applies a scientific approach to authentic learning and assessment that uses the principle of assessment as part of learning. The 2013 curriculum was developed by perfecting the mindset

related to learning patterns, namely: (1) student-centered; (2) interactive learning (interactive teacher-student-community-natural environment, other sources/media); (3) learning is designed in a network (students can gain knowledge from anyone and from anywhere that can be contacted and obtained via the internet); (4) learning is active-seeking (the science approach learning model further strengthens active-seeking students); (5) study groups (team-based); (6) multimedia-based learning; (7) learning based on the needs of customers (users) by strengthening the development of the special potential of each student; (8) learning patterns become multidisciplinary learning; and (9) critical learning.

As an institution that educates prospective teachers, it should always provide examples of student-centered learning, which helps students learn by providing supporting facilities and situations to build concepts and self-understanding. Students have a responsibility to learn, while teachers have a responsibility to create learning situations that encourage initiative, motivation, and responsibility for lifelong learning [9]. Prawiradilaga [10] states that independent learning adapts to advances in theory and technology, open learning, distance learning, e-learning, and so on. Independent learning is developed so that students can manage their learning process. Teachers or teachers only handle certain things, such as presenting a material framework through learning media and evaluating. The SOLE (Self Organized Learning Environments) learning model is a learning that focuses on independent learning by utilizing media that is connected to the internet network [11]. In the context of learning at school, the SOLE model can be used by lecturers to explore the depth of understanding of the material to students by utilizing students' curiosity. The SOLE model, students can be directed to actually learn and understand a material independently by being literate in technology and ready to communicate it to others [12]. The SOLE (Self Organized Learning Environments) learning model is a learning designed to help teachers encourage students to be curious from within themselves by organizing student-centered learning.

RESEARCH METHOD

This study aims to describe student learning outcomes and independence through SOLE learning. The subjects of this study were 2nd-semester Biology Education students in class E who took the Introductory Education course in the even semester of the 2021/2022 academic year, with a total of 21 people. Data collection was carried out in March-April 2022; students in groups were tasked with describing the subject matter and sub-topics, which

then developed the material to look for on the internet. The steps taken by students are a). look for learning resources related to lecture material, including journal articles; b). Identify important or basic concepts from the content of learning resources; c). Formulate questions, d). Write answers to questions that have been prepared; answers are written based on the results of studies from relevant references or related to the learning sources being analyzed; e) Reflect by writing the most meaningful learning experiences from the learning sources analyzed, f) compile power point from the title, learning resources to supporting references, g) present in class and report on all the activities that have been carried out.

Data was collected using observation guidelines compiled based on independence indicators, with a Likert scale of 1-5 answer choices [13], while learning outcomes data used tests. The independence score was obtained by calculating the instrument, which totaled 15 items with a score range of 15-75. The scores obtained are then categorized into five categories, namely:

Tabl 1. The independence score category

No	Score	Category
1	15-26	Very not good
2	27-38	Not good
3	39-50	Fairly good
4	51-62	Good
5	63-75	Very good

The total score obtained for each indicator is calculated to see the achievement of independence in each indicator. The average is included in the independence category: 1. Not very good, 2. Needs improvement, 3. Fairly good, 4. Good, and 5. Very good [14]. Data on cognitive learning outcomes were obtained from scores obtained through tests; then scores were analyzed qualitatively into five categories (table 2). This study also analyzed the relationship between independence with the learning outcomes obtained.

Table 2. Data on cognitive learning outcomes score category

No	Score	Category
1	0-20	Very not good
2	21-40	Not good
3	41-60	Fairly good
4	61-80	Good
5	81-100	Very good

RESULTS AND DISCUSSION

The learning process with the SOLE model shows the cognitive learning outcomes achieved by students (Table 1) in the very good (48%) and good (52%) categories; there are no students in the good enough to very bad categories. It is understandable because the SOLE learning model is designed to reflect students' overall understanding of their learning process, balancing HOTS activities and learning that is deep. The SOLE learning model aims to shape students' competence in thinking creatively, thinking critically, solving problems, and improving student communication. The SOLE learning model can make it easier for participant students to understand in depth of the learning material by using the smart tools they have so that students can solve HOTS-based evaluation questions, namely the ability to think that is not just remembering, restating, or referring without processing (recite) [15].

Table 3. Number and Percentage of Students in Cognitive Learning Outcomes

No	Category	Total	%
1	Very not good	0	0
2	Not good	0	0
3	Fairly good	0	0
4	Good	11	52
5	Very good	10	48

SOLE learning conditions students to study as a group, answer assignments in the form of questions by conducting investigations/searches using the internet, then students present their collective findings in front of the class. SOLE learning is an activity with a cooperative-constructivist approach consisting of the question, investigation, and review stages [16]. Trianto [17] mentions constructivism as a paradigm that argues that knowledge is obtained through the interaction between previously acquired knowledge and various continuously accumulated experiences.

At the investigative stage, students work in groups by collaborating and cooperating. Each student contributes to completing group assignments by dividing the assignment material. Based on these different findings, there is interaction between individuals and groups in SOLE learning. The next process is that students hold discussions with group partners about the information provided needing to be understood, additional information they would like to know, and clarification of the information they find. To solve problems, one needs to construct knowledge based on experience [18]. The knowledge gained is an active reconstruction of activities carried out by oneself.

The knowledge built independently by students will be able to last longer than the knowledge only given passively. The contributions made by each group member are in the form of different findings, information, and sources of information. Various findings and interactions between individuals then enrich students' knowledge of learning materials. The presentation of the group assignments shows that students have mastered the material properly and correctly, which is supported by their ability to select and sort the conceptions found by discussing with the group. The lecturer straightens out the opinions of students who need to be more right, so there are no misconceptions. The depth of mastery of the material is shown in the ability to explain the material using one's sentences, explain the meaning of a concept to others, and distinguish between correct and incorrect conceptions. Mastery of the concept is students who can provide responses to questions/stimuli that vary in the same group or category. Concept mastery is a student's ability to understand science scientifically, both in theory and in its application in everyday life [19]. Dahar [20] added concept mastery is the ability of students to understand meaning scientifically, both in theory and in its application in everyday life.

The analysis of student independence in participating in lectures shows categories from good enough to very good with varying students; there are no students in very bad or not good categories (Table 2). Students in the very good category (52%) dominate the independent data obtained, and the good category (38%). It follows the chosen learning model, which encourages students to be independent and develop their potential. SOLE learning allows students to explore, and the teacher does not intervene. Students explore material from anywhere independently. The SOLE learning model trains students to organize themselves in groups and learn to use computers (gadgets, laptops, cellphones, and other devices) connected to the internet [21]. SOLE was formed to encourage students to work and study to answer questions that spark enthusiasm for learning using the internet; questions, self-discovery, knowledge sharing, and spontaneity drive SOLE's learning direction [22].

Table 4. Number and Percentage of Student Independence

No	Category	Total	%
1	Very not good	0	0
2	Not good	0	0
3	Fairly good	2	10
4	Good	8	38
5	Very good	11	52

The internet is now no stranger to being used in various activities, including education. The internet can facilitate the presentation of material and can offer information acquisition quickly. The internet as a learning strategy is an innovative source of learning from existing learning resources so that learning is good, fun, and adapts to the demands of the times. Completing tasks on SOLE learning shows that students can generate and exchange ideas by exploring material from various sources independently. The internet in learning can be applied using websites such as Google, Wikipedia, and Youtube to support the learning process [23].

Learning in the 21st century has undergone many changes; integrating the internet and social media provides a new perspective on learning. Learning with social media allows students to interact, collaborate, and share information and thoughts. Similar to learning through social media, learning via the web also provides opportunities for students to complete one or more assignments via the internet network [24]. SOLE was created to encourage students to work and study as a group to answer inquiry questions that trigger enthusiasm for learning to use the internet. Nowadays, finding answers to questions is very easy, with easy access to information and communication technology. It stimulates students to be able to solve the problems they face independently. The questions they get will lead them to an understanding of new knowledge, which also generates new questions requiring answers. Knowledge discovered by themselves or constructively can last longer. Learning by finding material independently can improve students' scientific reasoning abilities. Its rotating process is expected to produce the ability to solve problems. The answers obtained, of course, will be distributed to fellow students using more flexible language.

The analysis results of the number of students in each indicator of independence show that the indicators with the very good category are mostly responsible, while the good categories are mostly in a discipline (Table 3). It is understandable because achieving SOLE learning requires high responsibility and discipline so that all investigations can be completed correctly and reviews or presentations can also be carried out properly. It is supported by the number of students in the 'very good' category after successive responsibilities, including self-confidence, independence, others, and initiative. After successive discipline, the 'good' category included self-initiative and self-control (Table 3). It means that SOLE learning can foster student independence, which eventually becomes a habit in completing all assignments or problems. The benefits of SOLE learning for students include: a). they were controlling the learning experience independently, b). computer literacy skills, c). improve reading comprehension, attitudes, language, creativity, and problem-solving skills [25].

If looking at the relationship between independence and learning outcomes, it was found that the level of student independence showed varying learning outcomes in the very good and good categories (Table 4). This can be understood because independence is the attitude of how students solve problems while learning outcomes are cognitive processes in understanding learning material. Understanding and retention will increase if the subject matter is arranged using a certain pattern or logic, from simple to complex. Study Understanding will be more meaningful than learning to memorize. New information must be adapted and related to students' knowledge to be meaningful. Learning outcomes are a process to see how students can master learning after following the teaching and learning process [26]. Sudjana [27] added that learning outcomes in the cognitive domain are related to student intellectual learning outcomes, which consist of 6 aspects: memory, understanding, application, analysis, evaluation, and creating.

Table 5. Number of Students in Each Independence Indicator

Category	Not dependent	Self-confident	Discipline	Responsibility	Self Initiative	Self-control
Very not good	0	0	0	0	0	0
Not good	0	0	0	0	0	0
Fairly good	5	2	3	1	0	2
Good	11	9	17	8	16	16
Very good	5	10	1	12	5	3

Table 6. Relationship between Independence and Learning Outcomes

Independence	Learning outcomes		Total
	Very Good	Good	
Very good	6	5	11
Good	3	5	8
Fairly good	1	1	2
Total	10	11	21

CONCLUSION

Based on the results and discussion, it can be concluded: (a) Students' Cognitive learning outcomes in completing lectures vary in very good and good categories. (b) Students' independence in completing lectures varies from fairly good to very good categories but is dominated by very good categories. (c) student independence in each indicator shows categories varying from fairly good to very good, except for the initiative indicators in the good and good categories. (d) the level of student independence determines learning outcomes that vary in very good and good categories.

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