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# Application of the Search Solve Create Share Learning Model to Metacognitive Awareness and Learning Outcomes

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**Abstract:** This research aims to determine metacognitive awareness and learning outcomes through the search, solve, create and share (SSCS) learning model. This research was conducted on second-semester Biology Education Study Program students who took the Introduction to Education course. Metacognitive awareness data was collected using a modified questionnaire from the Metacognitive Awareness Inventory, then analysed qualitatively with four categories from not yet developed to very well developed. Learning outcome data is collected through tests and then analysed qualitatively, using five categories: very poor to very good. The metacognitive awareness results were dominated by students in the very well-developed category, as many as 48 people (96%), while the learning outcomes were dominated by students in the good category, as many as 24 people (48%). In conclusion, through the SSCS learning model, students can (1). Manage their cognitive abilities and overcome their shortcomings very well; (2). Building independence, critical thinking, creativity, and self-confidence improves learning outcomes.

**Keywords:** Learning Outcomes; Metacognitive Awareness; SSCS Learning Model.

## Introduction

Learning in the current era requires skills in designing student-centred learning, encouraging them to be active and creative in solving problems. Biology learning aims to develop scientific thinking through research and experiments, developing practical knowledge to solve problems. To achieve learning objectives/good learning outcomes, students must be able to solve the problems they face. [1] states that problem-solving abilities are needed to produce significant knowledge from finding solutions to problem-solving.

Learning is a process of developing the potential and character of each student because of the synergy of education in the family, school and community. Effective learning will provide maximum results. Student involvement in learning is closely related to student potential, both cognitive, such as intelligence and talent, and affective, such as motivation, interest, and self-confidence. Interest is the main factor determining active learning. Students will learn effectively if they are genuinely interested in their lessons.

Metacognitive awareness develops from just knowledge and organising knowledge into strategies and skills that encourage students to solve problems and think at a higher level. According to [2], metacognition includes various cognitive processes, such as feeling, thinking about one's thoughts and responding to one's thoughts. Metacognitive awareness includes planning, monitoring, and assessing the processes that students are currently carrying out and have carried out in learning. Metacognitive awareness is very important in managing and controlling cognitive processes in learning to make learning and thinking more effective and efficient.

Student-centred learning will increase motivation and interest, ultimately improving learning outcomes. Factors that can increase learning success include creating learning plans to combine learning, the ability to think in teaching materials, appropriate learning models and methods, the use of media according to current developments, and problem-based learning. The learning model must be chosen appropriately to achieve a learning process where students can actively seek, discover and formulate problems. A learning model appropriate to the material presented can improve students' high-level thinking abilities and make the learning atmosphere innovative and varied.

The ability to think at a high level or think critically is very important for students to have because it involves the process of mental activity in receiving, processing, analysing, synthesising and evaluating the information obtained to make decisions or act in solving problems. The problems students face is not only found in lessons but also in everyday life problems that will be faced, so they must have critical thinking skills to make the right decisions or actions in solving every problem they face [3]. For this reason, the choice of learning model must really provide opportunities for students to develop their potential in learning.

The Search Solve Create Share (SSCS) learning model was chosen to involve students in each stage, namely the search stage, the solving stage (problem-solving stage),

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the create stage (concluding stage), and the sharing stage (display stage). The SSCS model of learning provides a big role for students, thereby encouraging them to eand creative, think critically and independently [4]. The SSCS learning model makes active learners explore their thoughts so that they can produce solutions to problems and have active discussions during the learning process [5].

## Research Method

This study was conducted on 2nd-semester students of class C and class E of the Biology Education Study Program who took the Introduction to Education course in the 2023/2024 academic year. This study aimed to determine metacognitive awareness and learning outcomes through the search, solve, create and share (SSCS) learning model. The implementation of learning was carried out according to SSCS syntax, and students were given problems that must be solved in groups according to the stages in SSCS.

Metacognitive awareness data were collected using a questionnaire modified from the Metacognitive Awareness Inventory developed by [6]. The questionnaire consists of 52 statements translated into Indonesian and adjusted to the student's condition, yes and no answer choices. Yes answers are given a score of 1, and no answers are given a 0. The scores obtained are then made into a scale of 100 and then analysed qualitatively with four categories: involved not yet developed, starting to develop, well developed and Very well developed. Learning outcome data is collected through written essay tests. The scores obtained from learning outcomes are then made into a scale 100 and then analysed qualitatively with 5 categories, involving very poor, poor, fairly good, good and very good.

## Results and Discussion

The results of the metacognitive awareness calculation (Table 1) show that there are 2 (4%) students in the category of having developed well and 48 (96%) students in the category of having developed very well. These results are understandable because metacognition relates to how students think about themselves and the ability to use appropriate learning strategies. According to [7], every elementary and secondary education unit has competencies in three dimensions: attitude, knowledge and skills. One dimension of knowledge that students must have been metacognitive knowledge. It is further explained that metacognitive knowledge is about one's strengths and weaknesses and is used in learning technical, detailed, specific, and complex knowledge. [8] states that metacognition is an adjective for metacognition, which is interpreted as a person's awareness of their thinking process when performing a particular task, then using their awareness to control what they do.

Metacognitive awareness is essential for successful learning because, with metacognition, students can manage their cognitive abilities and are able to see their weaknesses so that they can be improved in the next step. Metacognitive awareness can guide their way of thinking so that they can understand the concept correctly. Metacognitive awareness can encourage students to become independent learners. How students determine their learning goals, choose strategies and evaluate learning methods provides an overview of their metacognitive abilities [9]. Metacognitive awareness is needed to achieve success in learning [10]. Students with high metacognitive awareness can manage their cognitive skills and know their weaknesses, and they will be accustomed to planning, developing, and monitoring their learning process. Good metacognitive awareness supports students in achieving good learning outcomes [11].

**Table 1.** Frequency Distribution of Students in the Metacognitive Awareness Category

| Category | Frequency | Percentage (%) |
|---|---|---|
| Well developed | 2 | 4 |
| Very well developed | 48 | 96 |
| Total | 50 | 100 |

The SSCS learning model allows students to develop the problem-solving skills given by lecturers and work together to find solutions to a problem, making learning more meaningful. The results of the students' metacognitive awareness show that 96 percent have developed very well. This can happen because the SSCS learning model involves students at every stage, according to the SSCS learning syntax, which consists of 4 phases [12]: search aims to identify problems, solve seeks to solve problems, create aims to implement problem-solving, and share aims to convey problem-solving. [13] added that at the search stage, students are trained to find their knowledge by searching for information from various references and journals. Students are trained to develop thinking skills at the solving stage by collecting and analysing information obtained at the search stage. The creating stage trains students to create ideas or concepts in answering the solution to a problem, with the product of this stage being the result of the analysis of the answer to the problem posed. At the sharing stage, students are trained to confidently communicate the results of the discussion in the form of solutions and conclusions from the problem. At this stage, students make presentations, ask questions and respond to each other.

The SSCS model provides problem-solving experience and independence in solving problems. In this study, students are divided into groups. Each group is given a problem that must be solved by searching for appropriate literature and journals. Students develop their critical thinking skills, and the task is completed through presentation and class discussion. Students can ask questions individually. Students are trained to work together, accept other people's opinions, learn to respond to questions, and create questions for other groups that present. As stated by [14], the advantages of the SSCS learning model are: (1). At the beginning of learning, students are faced with real problems, so they are interested in learning; (2). Students learn in groups, and teachers provide more

problem-solving opportunities; (3). Student activities start with discussions and presentations with questions and answers so that students are enthusiastic and do not feel bored. [15] stated that the advantages of the SSCS learning model are increased student interaction and development skills and allowed students to learn responsibility and teamwork. [16] added that the SSCS model facilitates factual, conceptual and procedural knowledge of students.

Cognitive learning outcomes obtained through written tests show varying categories from quite good, good and very good; no students are in the very poor or poor categories. Learning outcomes are dominated by the good category (Table 2) as many as 24 people (48%), while the very good category ranks the least as many as 11 people (22%). Learning outcomes are closely related to metacognitive awareness because learning outcomes result from cognitive processes. This follows the results of the calculation of metacognitive awareness, which is dominated by the very well-developed category. Metacognitive awareness can guide students to recognise their way of thinking so that they memorise concepts and understand them well. Lack of metacognitive awareness can result in difficulties in learning and have an impact on learning outcomes. [17] stated that metacognitive awareness plays a very important role in the learning process. Students must be able to control the development of understanding new concepts, which is important for effective learning.

The SSCS learning model trains students to solve problems so that learning experiences are obtained independently and with the presentation of problem-solving results, creating a strong sense of self-confidence that impacts good learning outcomes. As [18] argues, problem-based learning models can improve cognitive learning outcomes. According to [19], applying the SSCS learning model can support students in being more actively involved during the learning process to master the material and get good cognitive learning outcomes. [20] The advantages of the SSCS learning model are that it increases problem-solving abilities and social interaction, develops skills, and makes students learn to be responsible and cooperate.

**Table 2.** Frequency Distribution of Students in the Learning Outcome Category

| Category | Frequency | Percentage (%) |
|---|---|---|
| Fairly good | 15 | 30 |
| Good | 24 | 48 |
| Very Good | 11 | 22 |
| Total | 50 | 100 |

The learning outcomes show that the SSCS learning model provides a good experience; all processes in each stage of SSCS provide meaning for self-development and character that supports understanding of the material, and the material becomes no longer embedded in memory. At the search stage, students can sort out suitable material from books, e-books or journals to solve problems given by lecturers. Thus, students can easily understand the material discussed. The collected material is then discussed to ensure that the selected material is appropriate for solving the problem. The next stage is for students to formulate the material as a solution to the problem actively. The final stage of problem-solving is a class discussion process for each problem that has been solved; with each group communicating the results and other groups responding and asking questions, the discussion becomes lively so that learning becomes meaningful and understanding of the material can be stored longer. As stated by [21], the SSCS learning model significantly increases student activity, including oral activity. Further stated, the solve and share stages effectively increase oral activity. Indicators of oral activity at the solving stage are discussing with group members how to solve problems, while indicators of oral activity at the sharing stage are discussing, expressing opinions, asking questions, giving suggestions, and responding to presentations of problem-solving results between groups. [22] The SSCS learning model is a model that raises real-world problems so that students can learn problem-solving skills. According to [23], the SSCS learning model is very effective, making students more actively involved and accustomed to high-level thinking. [24] added that the SSCS learning model is centred on students, the learning process with problem-solving solutions from students and teachers as facilitators.

Learning outcomes can be of quality if students are consciously able to control their cognitive processes continuously, which impacts increasing metacognitive abilities. Through the SSCS model, students can test ideas, make reasons, make conclusions in solving problems, and assess statements or opinions from themselves and others. The right way to learn is by studying regularly in everyday life, which also helps achieve very good learning outcomes. Effective learning habits will positively impact learning outcomes. In learning, students must have good conditional knowledge, determine a good strategy to use when the strategy is not used, and why a strategy is better used than another [25]. Conditional knowledge is about when to use a procedure, skill or strategy and when not [26]. In addition, good metacognitive awareness will encourage students to be independent. They know and realise their weaknesses and strengths and know their abilities. With metacognitive awareness, students can know about themselves as learners [27]. They can overcome their weaknesses and shortcomings in the learning process to develop the right strategy to solve problems faced in the learning process. According to [28], students skilled in metacognition will be good at measuring themselves so that when they are aware of their abilities, they will do strategic thinking better than those incapable of their mental work system. Learning outcomes reflect the learning process results to what extent the specified goals have been achieved [29].

## CONCLUSION

The application of the search, solve, create and share (SSCS) learning model provides experience and independence in solving problems; students can test ideas, create reasoning, make conclusions, and assess statements or opinions from themselves and others. Students'

metacognitive awareness is developing very well, and the learning outcomes achieved are also good; this shows that students can understand themselves as learners, they understand strategies, when and why to use the most appropriate strategy, and they can overcome their shortcomings in learning. It can be concluded, through the SSCS learning model students can: (1). Manage their cognitive abilities and overcome their shortcomings very well, (2). Build independence, critical thinking, creativity and self-confidence, which impact good learning outcomes.

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