Students’ creative and innovation skill on chapter of Newton's law using SSCS learning model

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Abstract. Creative and innovative thinking skills were among essential skills in a rapidly expanding world. These skills served to understand and solve real problems in the 21st century. The research aimed to analyze the improvement of students' creativity and innovation skills in Newton's law material using SSCS or Search, Solve, Create, and Share. The research method used is pre-experimental with the one group pretest-posttest design. The research samples were 29 grade 8 students of junior High school who were taken randomly at a school accredited A. Data collection using the Instrument test Essay on Newton's law at the assessment rubric adapted from the P21 validated indicators. The instrument test used was valid and reliable. The results of N-gain on indicators consisting of Think Creatively, Work Creatively With Others, Implement Innovation were 0.47, 0.32, 0.55, and were in the medium category. Therefore, the SSCS learning model could improve creativity skills and innovation students primarily on the indicators think creatively and implement Innovation.

1. Introduction
Creativity skills were skills related to the development of ideas and beneficial products while innovating is the result of creativity [1]. Creativity and innovation were intertwined because of innovation skills depending on their creativity [2]. Another definition of innovation was the development of an idea or a more widely beneficial product [3]. Based on the US-Based Partnership for 21st Century Skills or P21, creativity and innovation had three essential indicators: think creatively, work creatively, and implement innovation.

The skill of creativity and innovation was one of four essential skills, according to P21. This skill was indispensable to face the challenges of the global world. The last decade had been the development of technology and high-speed information, so it takes creativity and innovation skills [4]. Creativity often got special attention because it relates to economics and promotion related to idea development [3]. P21 partnership revealed that creativity and innovation became a qualified and professional person because the global economy was driven by the digital technology of "creativity and innovation" and information [5].

Creativity was the most crucial resource of a human being because it increased progress so people will not repeat the same pattern. This skill became very important for the community's sustainability, because the information and resources were not accessible by humans without creativity [6], so that people would be trapped in old habits and hope that will disrupt the emergence of new ideas [7]. P21
partnership revealed that the success of the business is heavily influenced by creativity and innovation. The importance of this skill for human life was the foundation for education to develop creativity and innovation through the learning process.

The importance of creativity and innovation skills is not balanced by the skills of creativity and innovation of students in Indonesia. Most of the research related to creative thinking resulted in the conclusion that the students' creative thinking skills were relatively low [8], so a solution was needed to allow students' creativity and innovation skills to increase. The internal factor that caused low creativity and innovation of students was the assumption that the creativity owned by the students was limited so that students' doubt had a creative talent [6]. Another internal factor that could be a barrier to student creativity and innovation was students' cognitive development, motivation, and personality [9]. One solution to overcome this was awareness from within students that had a talent for creativity and innovation and participated in the learning process that teachers did to develop their creativity and innovation. Furthermore, students needed to be aware of the importance of creativity and innovation skills to face the rapid development of technology and information.

Based on the research results, creativity skills could be learned and taught [10]. Therefore, teachers had a role in developing the students' creativity and innovation. However, the learning process that teachers undertake was less able to develop student skills so that students' creativity and innovation became less than optimal [11]. Therefore, teachers needed to use diverse models and learning strategies because there was a positive relationship between creativity and learning environment [10]. Teachers needed to manipulate the learning environment through acceptable risk behavior as it could enhance students' creativity [12] Besides, manipulating a proper learning environment make students less worried about failures and more excited [13]. The process of manipulation of the learning environment could be done by election model learning. A learning model capable of developing creativity and innovation was a learning model that guides and avoids punishment because punishment could inhibit students' creativity [14].

One of the learning models that were assessed to improve the ability of student creativity and innovation was the learning model of SSCS (Search, Solve, Create, and Share). Based on the research [15], the SSCS learning model could improve students' creative thinking skills. The SSCS model was a learning model that can expand and apply the concept of science through problem-forming and high-level thinking skills [16]. SSCS had four phases. First, the search phase related to the process of the dissemination of the problem being discussed. Secondly, the solve phase was related to the scaffolding process and implementation of investigations in the problem-solving process—the Create phase related to data analysis and interpretation. Stages of search, solving and creating involve creativity and innovation of students' skills through the process of analyzing, producing, executing and generating specific products about proposed solutions. The sharing phase related to communication and evaluation of analysis results in the creation phase [16]. Table 1 showed the syntax of SSCS learning model [16].

| Phase | Activity |
|-------|----------|
| Search | 1. Understanding the phenomena or problems given to students  
2. Observation of problems  
3. Create a question  
4. Perform analysis to create ideas |
| Solve | 1. Plan a solution  
2. Use critical and creative thinking skills in making hypotheses  
3. Determine the troubleshooting method  
4. Data collection and analysis |
| Create | 1. Create products from the solve phase  
2. Test the hypothesis  
3. Display results creatively |
| Share | 1. Communication with teachers, group friends, and between groups  
2. Express thoughts, feedback, and evaluations |
The study aimed to analyze students' increasing creativity and innovation in Newton's law using the SSCS learning model. This research was expected to contribute to and novelty for teachers in the teaching and learning process. There were no studies focused on implementing SSCS learning models to develop student creativity and innovation skills in relevant research.

2. Methods
The research aimed to analyze the increase in students' creativity and innovation on Newton's law using SSCS learning models. Twenty-nine students from the A-accredited school were made samples in this study. Samples were taken randomly with random sampling techniques, so all samples had the same opportunity [17]. The research method used is pre-experimental with one group pretest-posttest only design [18]. Data on creativity and innovation skills were obtained from student essay test results on Newton's law. Test instruments and scoring rubrics were based on the US-Based Partnership for 21st Century Skills or P21 indicators. Test essay instruments were used to know the idea and creativity of students [19]. The instrument test had been validated and tested so that the item was valid and reliable. Student test results were classified into three categories: low, medium, and high, based on the classification, according to Azwar [20]. Results of an improved analysis of creativity and innovation skills using again score. The Gain score showed the difference in pretest and posttest results from the sample [21].

3. Result and Discussion
Table 2 showed the results of students' creative and innovation skill before and after using the SSCS learning model.

Table 2. A descriptive statistic of student creativity and innovation skills

| Descriptive Statistic | Pretest Indicators | Posttest Indicators |
|-----------------------|--------------------|---------------------|
|                       | Think Creatively   | Work Creatively with Others | Implement Innovation | Think Creatively | Work Creatively with Others | Implement Innovation |
| Low                   | 65.5%              | 96.6%               | 79.3%               | 6.9%            | 37.9%              | 31.0%               |
| Medium                | 34.5%              | 3.4%                | 20.7%               | 51.7%           | 37.9%              | 13.8%               |
| High                  | 0%                 | 0%                  | 0%                  | 41.4%           | 24.1%              | 55.2%               |

Based on the Table 2, Before using SSCS learning models, most of the students' creativity and innovation skills were low in the category, and no students were in the high category. Once the learning process used the SSCS learning model, most students were in the medium and high category. One of the factors that lead to a percentage of student creativity and innovation skills was the implementation of the SSCS learning model in the classroom. Based on the advantages, the SSCS learning model was seen as a learning model that can improve students' creativity and innovation skills. Advantages of SSCS learning models include (1) Stimulating students to use simple statistics, (2) Effective and easy to practice, (3) Creating context studies, developing higher thinking skills, and transferring thinking abilities from one scope to another [22]. The SSCS model could accommodate students' interests more broadly, make students more active in the learning process, train high-level thinking skills, and improve understanding of science, technology, and its application in daily life [22]. Several studies showed that the SSCS learning model could improve critical thinking skills [23], improving creative thinking skills [24], developing student creativity [25]. Therefore, the SSCS learning model was considered able to develop students' creativity and innovation skills as seen in Figure 1.
Figure 1 showed N-Gain Score skill creativity, and innovating students are in the medium category. Therefore, the SSCS learning model could effectively and adequately develop the skills of creativity and innovation of students. The N-gain value on the Think Creatively aspect was 0.47. Think Creatively skills allowed students to develop, create, and maximize creative ideas in resolving problems in the search phase. The N-gain value in the Work Creatively with other was 0.32. The skills of Work creatively with others were skills related to the ability of the students in developing, communicating from the originality of the idea as well as seeing the odds of failure. The N-gain value in the implement innovation aspect was 0.55. The skill to implement innovation was the ability of students who relate to the application of useful ideas [5]. Based on Figure 1, work creatively with others had the lowest value because students struggle to communicate ideas and build collaborations in the problem-solving process, especially in create and share. The SSCS learning model could increase three indicators of creativity and innovation (think creatively, work creatively, and implement innovation) because the SSCS learning process guided students to ask questions, develop understanding and understanding of concepts, become independent thinkers, and emphasized in the learning process [26].

The SSCS learning model consists of 4 phases learning, namely identifying problems (Search), planning and solve the problem (Solve), stating the results of the solution of the problem as creatively as possible (Create) and communicate the results of the problem (Share) [16]. The first phase, which was to identify the problem (search). Students were given a problem. Then students were asked to writing information, observing and investigating the issue of providing. In this phase, it aimed to develop students' ability to give many ideas to the given problem. So, the indicator of creativity and innovation skills developed in this phase is Think creatively and implement innovation.

The second phase was to plan and solve [16]. In this phase, students produced and executed a plan to obtain a solution to the given problem. This solve phase developed students' ability to make guesses about some solutions that could be used to resolve problems and solved them through detailed steps. The indicators of creativity and innovation appropriated and could be developed from this phase were think creatively, work creatively, and implement innovation.

The third phase is creating [16]. In this phase, students could create a workaround based on the guesses selected in the Previous. Students build their knowledge of the results of identifying and analyzing the related to the given issue. Not only that, at this phase, but students can also display results that are as creative as possible graphics and media. So, the indicators of creativity and innovation developed at this stage are think creatively, work creatively, and implement innovation.

The last phase to communicate the results of troubleshooting (share) [16]. In this phase, students could explain the troubleshooting results by presenting their findings in front of teachers and classmates. Not only that, in this phase, but students could also articulate their thoughts to receive feedback and evaluate solutions. So, the indicator of creativity and innovation skills developed at this stage was thinking creatively and implement innovation. Based on the above description, it appeared that science learning using SSCS learning enabled to improve creativity and innovation skills.
Students responded positively to SSCS learning models. A positive response from the survey results showed that students were more interested in practical learning methods and investigations than lecture methods. Assuming a problematic subject of science was a problem that prevents students from studying science. The SSCS Learning Model provided opportunities for students to express ideas, originality of ideas, the interaction between members, and enthusiastic in following the learning process. Students' environment became one of the factors that influenced the development skills of creativity and innovation of students through the learning process [27].

Some research results showed that SSCS models affect students' creative thinking skills that were part of the student's creativity because students were directed to solve and propose problem-solving through the collaborative process through group work [28]. The SSCS learning Model also played an active role in improving students' creative completion skills at the junior high school level [29], enhancing significant concept mastery and impacting learning outcomes [30]. Therefore, SSCS learning models could be used as a reference for educators in developing students' creativity and innovation skills.

4. Conclusion
Data analysis results show the N-gain value in the think creatively, work creatively with others, and implements innovation are 0.47, 0.32, 0.55, and are in the medium category. Therefore, SSCS learning models can improve creativity skills and innovation students primarily on the think creatively and implement innovation indicators. The research is expected to be implemented in schools to improve creativity and innovation skills using the SSCS learning model.

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