MUDIR (Jurnal Manajemen Pendidikan) P-ISSN : 2655-9331 E-ISSN : 2657-2230
Avalaible online at: **https://ejournal.insud.ac.id/index.php/mpi/index**
Volume 5, Nomor 1, Januari 2023 | DOI: https://doi.org/10.55352/mudir

THE EFFECTIVENESS ANALYSIS OF SEARCH, SOLVE, CREATE AND SHARE (SSCS) LEARNING MODEL IMPLEMENTATION ON STUDENTS' COGNITIVE ABILITY

*[1]Ilham Kamaruddin, [2]Irvan, [3]Yoseb Boari, [4]Bayu Purbha Sakti, [5]Yance Manoppo

[1,2]Universitas Negeri Makassar, [3]Universitas Ottow Geissler Papua,
[4]Universitas Widya Dharma Klaten, [5]Universitas Pattimura

Email: *[1]ilham.kamaruddin@unm.ac.id

Abstrak: *Fokus penelitian ini adalah pada hasil belajar kognitif siswa SMA yang kurang memadai pada materi dinamika rotasi dan keseimbangan benda tegar. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh pendekatan pembelajaran search, solve, create, and share (SSCS) terhadap kemampuan kognitif siswa. Sebuah desain penelitian kuasi-eksperimental dengan kelompok kontrol non-ekuivalen digunakan sebagai metodologi penelitian. Teknik sampling bertujuan digunakan untuk mengumpulkan sampel dari 100 siswa. Uji hipotesis yang dilakukan terhadap data posttest dengan menggunakan uji Mann-Whitney pada α= 0,05 menghasilkan penolakan H0 dan penerimaan H1, dengan sig. (2-ekor) nilai 0,00. Pendekatan pembelajaran SSCS memberikan pengaruh yang signifikan terhadap kemampuan kognitif siswa. Kelompok eksperimen menunjukkan kemajuan yang lebih besar dalam hasil belajar kognitif mereka daripada kelompok kontrol. Selanjutnya, siswa yang menerapkan model pembelajaran SSCS ditemukan 72% lebih terlibat dalam studinya.*
Kata kunci: siswa, kognitif, search solve create share, eksperimen

Abstract: The focus of this research is on the inadequate cognitive learning outcomes among high school students in the areas of rotation dynamics and balancing rigid bodies. The aim of this study is to investigate the impact of the search, solve, create, and share (SSCS) learning approach on students' cognitive abilities. A quasi-experimental research design with a non-equivalent control group was used as the research methodology. A purposeful sampling technique was employed to collect samples from 100 students. The hypothesis test conducted on the posttest data using the Mann-Whitney test at α= 0.05 resulted in the rejection of H0 and acceptance of H1, with a sig. (2-tailed) value of 0.00. The SSCS learning approach has a significant impact on students' cognitive abilities. The experimental group demonstrated greater progress in their cognitive learning outcomes than the control group. Furthermore, students who applied the SSCS learning model were found to be 72% more engaged in their studies.
Keywords: students, cognitive, search solve create share, experiment

Introduction

Learning has undergone a radical transition in Indonesia following the COVID-19 pandemic. Distance learning, also referred to as home learning (PJJ), is increasingly required for learning that is typically done in a classroom or at school. PJJ is a way of doing distance learning without having to make direct contact between educators and students. In particular, the activities involved in teaching and learning are expanding in the educational environment over time (Agustin, 2018). The evaluation of students' learning outcomes reveals how these activities were carried out. To be able to assess each student's performance in relation to set standards, assessments of student learning outcomes must consider attitudes, knowledge, and skills competencies in a balanced manner. Knowledge is one of the most important elements of life. Knowledge of the natural world includes three fields of science, namely biology, physics, and chemistry. These three sciences are included in the field of natural sciences.

Physics is a science that studies the nature and phenomena of nature and all the interactions in them, which are proven through logical and systematic observations. In science, especially physics, in general, concept formation is an experimental product (Astuti, 2023). Therefore, the formation of physics concepts is not only formed through information or explanations; the most effective way to form physics concepts is by direct observation of the object. The dynamics of rotation and balance of rigid bodies is one of the abstract physics concepts that must be learned and requires mathematical logic that is simple enough for pupils to understand. Teachers who cover topics like the dynamics of rotation and the equilibrium of rigid bodies usually teach students how to do mathematical calculations but not how to use them in real-world situations (Aliyyah, 2020). In order for students to not get the fundamental idea of rigid body dynamics and balance. Students' observations of the object being studied are frequently not consistent in how well they comprehend events in the dynamics of rotation and balance of rigid bodies (Chica, 2021). For example, in the event of someone driving a car, when the road turns left or right and the direction of the steering wheel rotates to the left or right, the value of the steering wheel rotation corresponds to a clockwise direction; if it is clockwise or to the right, it is positive, and the direction left is negative. The non-uniformity of understanding in this observation will result in students experiencing misconceptions, which affect their understanding of subsequent concepts. If this misconception continues, the achievement of learning objectives will certainly not be maximized, so students' physics learning outcomes will be low (Kamaruddin, 2023).

According to the findings of observations, students' cognitive competence in the dynamics of rotation and balance of rigid bodies is 39.42%, which is poor and suggests that they have a limited knowledge of the concepts covered in the course. According to earlier study, although the idea in this application is challenging to calculate, it is frequently encountered in daily life as a result of the dynamics of rotation and balance of stiff bodies (Kamaruddin I. T., 2022). Other causes are also due to the current conditions of online learning, in terms of limited learning time, too many assignments for students, and a lack of educators applying appropriate learning models (Ichsan, 2023). The teaching methods, such lectures, are overly repetitive, and individual learning is not done in groups, which prevents interaction between students and other people. Additionally, the teacher uses a question-and-answer format; some students are able to respond, while others are unable to; some students pay attention to the teacher's explanations, while the others choose to disregard the homework. A learning process like this can be said to be ineffective (Maliki, 2020).

The learning process tends to be centred on educators (teacher-oriented) and not the other way around, namely student-centred, so that students become bored with the learning process. Depending on the learning method that educators convey to pupils, an educational aim may be successful or unsuccessful. One of the tasks of educators is to design and carry out learning activities (Nugroho, 2023). In designing learning, educators can choose a learning model that can be adapted to learning materials and then applied to the learning process (Parinussa, 2023). The subject matter, the students' level of cognitive development, and the facilities or resources that are available must all be taken into account when adopting a learning model in order to meet the learning objectives that have been specified. It is essential to improve the learning process in light of these circumstances and conditions (Pizzini, 1991). The exploration, resolve, generate, and distribute (ERGD) educational approach is a similar framework that can grant learners a say in the educational process, enhance learner responsibility for their learning, provide learners with opportunities to ponder, and inspire learners to exchange concepts. In 1988, Pizzini initially presented this concept of learning. This learning approach comprises four stages: search, which seeks to find problems; solve, which seeks to plan problem solving; create, which seeks to create problem solving; and share, which seeks to communicate the completeness that has been attained (Pizzini, 1991).

The research that will be carried out is different from previous research. The SSCS model, which involves searching, solving, creating, and sharing, has been previously employed in research to improve learning outcomes and student engagement in high school environmental studies. Its impact on students' pre-existing mathematical knowledge has also been studied, with the GeoGebra 4.4 software being utilized to implement the SSCS strategy and enhance mathematical reasoning skills. In addition, the SSCS paradigm has been adopted in a constructivist mathematics learning approach to enhance students' understanding of limit functions in XI natural science materials. Furthermore, the efficacy of the SSCS problem-solving method has been demonstrated in the context of the earthquake theme in an integrated science textbook. This learning technique has the benefit of allowing pupils to improve their skills while they are learning. Learning that involves students physically and mentally through experimental activities or discussions will provide real experiences for students, and their skills will eventually be honed because they are actually dealing with real objects and not abstract ones (Rakhmi, 2018).

The study of education has grown over time, especially the activities involved in teaching and learning. When students' learning outcomes are assessed, the process of these actions can be shown. Assessment of student learning outcomes involves attitudes, knowledge, and skills competencies that are carried out in a balanced manner so that they can be utilized to establish each student's relative standing versus predetermined standards (Rustam, 2019). In science, especially physics, in general, concept formation is an experimental product. Therefore, the formation of physics concepts is not only formed through information or explanations; the most effective way to form physics concepts is by direct observation of the object. The achievement or lack thereof of an academic objective relies on the instructional approach presented to pupils by instructors. One of the duties of instructors is to conceive and execute educational tasks. When creating educational tasks, instructors have the option to select a teaching model that can be adjusted to the educational materials and subsequently put into practice in the learning process. One of the components of an educational paradigm that enables pupils to actively participate in the learning process, improves their responsibility for their learning, offers them opportunities to think, and fosters communication among pupils is the search, solve, create, and share (SSCS) method. Consequently, it is expected that the SSCS model will enhance students' cognitive abilities (Sari, 2020).

Method

For this investigation, a quasi-experimental research design was utilized, which is also known as quasi-experimental research. The investigation will employ a non-equivalent control group design. The objective was to evaluate the impact of the search, solve, create, and share (SSCS) approach on students' understanding of rotational dynamics and rigid body balancing. The experimental and control groups were deliberately chosen and not randomly assigned. Pre-tests were given to both groups to establish their fundamental understanding of rotation dynamics and rigid body balancing. Only the experimental group was taught using the SSCS method, while the control group received traditional instruction. The study involved 180 11th-grade students. The samples were selected from two different classes based on the pre-test results of the control and experimental groups. The prospective sampling technique was utilized in this investigation. In this investigation, data was collected utilizing both test instruments and non-test equipment. Conduct research after conducting instrument tests. The data collected using research equipment was processed and analysed with the goal of answering research questions and testing research hypotheses. However, before conducting a hypothesis test, it must first conduct statistical precursor tests, such as normality and homogeneity tests, and then proceed with hypothesis testing and data analysis using student answer observation sheets. The non-test data in this assessment is in the form of a response questionnaire given to the experimental class after they received therapy in the form of the SSCS model. Non-test data is processed using Microsoft Excel. The Likert scale is used to calculate questionnaire results.

Findings and Discussion

After analysing the pre-test learning results of both the experimental and control groups, it was determined that the experimental group only attained a total of 5 marks from a possible 100, whereas the control group received a minimum of 15 marks. The highest mark achieved by the experimental group was 80, while the control group achieved a maximum of 75. The average mark for the experimental group was 37.03, and the control group had an average of 40.27. The median increase for the control group was 40, compared to 35 for the experimental group. The mean increase for the experimental and control groups were 30 and 40, respectively. The experimental group had a standard deviation of 18.83, and the control group had a standard deviation of 15.54. In contrast, the experimental group achieved an average mark of 80 for the two courses, while the control group received a minimum mark of 50. The experimental group obtained a maximum mark of 100, whereas the control group achieved a maximum of 90. The average mark for the experimental group was 90.41, and the control group had an average mark of 72.57. The median increase for the experimental group was 90, and the control group had an increase of 70. The mode increases for the experimental and control groups were 90 and 70, respectively. The standard deviation was 5.32 for the experimental group and 7.96 for the control group.

Based on statistical calculations, the mean pre-test score of the experimental group was lower than that of the control group, as demonstrated by the centring score and data distribution of the 20 pre-test - post-test score components. The control group had an average score of 40.27, whereas the experimental group had an average score of 37.03. However, when comparing the mean post-test scores of the two groups, the experimental group performed better than the control group, with an average score of 90.41 compared to 72.57 for the control group. These findings suggest that both groups showed improvement after the intervention.

The SSCS model was employed by the experimental group, resulting in an improvement of 53.38 in their scores, while the control group's scores improved by 32.3 using the traditional learning approach. In summary, the experimental group demonstrated greater improvement in learning outcomes than the control group. Additionally, the experimental group had a 48% representation of the cognitive domain at the C1 level, with 32% and 34% at the C2 and C3 levels, respectively. The control group, on the other hand, had 52% of the cognitive domains present at the C1 level, in contrast to 36% at the C2 and C3 levels. The cognitive abilities of both groups were comparable, and they started with the same knowledge. In the experimental class, the cognitive domain constituted 86% of the C1 level, 97% of the C2 level, and 91% of the C3 level. In the control class, the cognitive domain accounted for 75%, 65%, and 73% of the C1, C2, and C3 levels, respectively. A comparison of the percentages between the control and experimental classes shows that the experimental class has a higher cognitive ability than the control class.

The initial assessment for statistical analysis indicated that the homogeneity of variance between the pre-test data of the two groups was satisfied, but the pre-test score data was not normally distributed for both control and experimental groups. However, the post-test score data for both control and experimental groups followed a normal distribution, but the variances were not equal. Two hypothesis tests were conducted in this study, which included the pre-test and post-test hypotheses for both control and experimental groups. The results of the preliminary test were employed to assess the hypothesis for both data sets using the Mann-Whitney test, which is a non-parametric statistical test, and SPSS 23 software. The findings of the hypothesis testing for both pre- and post-test showed an asymptotic value. The sig. (2-tailed) value of 0.422 for the pre-test data suggested that there was no significant difference in the typical learning outcomes of students in the control and experimental classes, thereby rejecting the H1 hypothesis. However, the H1 conclusion was confirmed, indicating that there was a difference between the average learning outcomes of students taking the experimental and control courses. The Asymp. Sig. (2-tailed) value of 0.000 for the post-test data was statistically significant.

Cognitive abilities were assessed in this study using multiple-choice learning outcomes assessments. The 20-item test has a reliability score of 0.74 (good), which means that it can be used to test the test instrument. The educational results were assessed twice, both prior to and after treatment, by means of pre-test and post-test evaluations. Despite their initial proficiency in fundamental abilities, both the experimental and control groups were assessed before and after the intervention. The educational outcomes of both groups were substandard, as demonstrated by the mean pre-test grades of 37.03 for the experimental group and 40.27 for the control group, which were less than half of the total score of 100. To enhance the physics educational outcomes of the students, the experimental group was given treatment utilizing the Search, Solve, Create, and Share (SSCS) approach, while the control group followed the traditional educational model. The efficacy of the treatment was assessed in order to determine its influence.

After receiving treatment, the academic performance of students in both classrooms showed an improvement. The results of the post-test, which had identical questions to the pre-test, indicate the degree of progress made by the students after the intervention. The results of the follow-up assessment revealed that the educational achievements of the experimental group had risen by 0.83 (considered high), whereas the control group only had an increase of 0.52 (considered medium). As far as academic performance is concerned, the experimental group surpassed the control group in both classrooms. These findings lead to the conclusion that the students in the experimental group who employed the Search, Solve, Create, and Share (SSCS) strategy exhibited superior cognitive learning abilities compared to their peers in the control group. Numerous factors contributed to the experimental class's learning outcomes considerably improving. The first aspect that influences the enhancement of student learning outcomes is practicing learning that places greater emphasis on applying an experiment that can represent physical phenomena in everyday life, such as during the moment of inertia experiment by tugging the paper placed under the bottle. The paper is immediately withdrawn so that the bottle does not fall but maintains its inertia. Furthermore, the survey results indicate that 70% of pupils who apply the Search, Solve, Create, and Share (SSCS) approach do it on account of their comprehension of the concept of inflexible body mechanics, encompassing rotation and balance.

The second element is that students are interested in engaging in the learning process since they can engage with other students while learning physics. The results obtained from the survey administered among the pupils reveal that a majority of 84% of them prefer the traditional learning method for physics as opposed to the Search, Solve, Create, and Share (SSCS) learning method. This corroborates with previous investigations that suggest that students are more actively involved in their learning when they use the Search, Solve, Create, and Share (SSCS) model instead of teacher-oriented instruction. The Search, Solve, Create, and Share (SSCS) technique is applied in 86% of academic achievements at the C1 cognitive domain level, 97% at the C2 cognitive domain level, and 91% at the C3 cognitive domain level. The highest level of cognitive worth is C2. Because students in this SSCS model are given the opportunity to have direct experience in the learning process, the ability to understand (C2) is higher than other cognitive elements. While the lowest aspect is C1, this is because students explore more in experiments carried out in groups, so the ability to remember is still low.

The outcomes of the hypothesis test indicated a significant (two-tailed) post-test result of less than the significance level of 0.05. This indicates that the H0 is disproved and the H1 is validated. It can be logically deduced that there is a variance in the mean cognitive abilities of pupils in the experimental and control sets as a consequence. Additionally, the SSCS strategy has an influence on the cognitive aptitudes of pupils as they progress in their comprehension of the mechanics of stiff body rotation and equilibrium. Prior research, including that of Widiyaningrum and Wijayanti, supports the findings of this study and suggests that the SSCS model can significantly enhance students' emotional abilities. Although the SSCS methodology was employed in this study, it has some significant drawbacks, such as the fact that it takes a considerable amount of time to learn.

Conclusion

The SSCS approach, which involves searching, solving, creating, and sharing, has a positive impact on the cognitive abilities of students in rigid body dynamics, particularly in rotation and balance. The hypothesis testing results indicate a significant value (2-tailed) of 0.00, which is lower than the 0.05 significance level. As compared to the control group, the experimental group showcased greater enhancement in student learning outcomes. This claim is supported by the fact that the experimental group had a higher N-gain value of 0.83, which is above average, while the control group had an N-gain value of 0.52, which is average. These findings suggest that the experimental group outperformed the control group in enhancing the cognitive domain of learning outcomes. The SSCS paradigm was employed in 86% of learning outcomes at the C1 cognitive domain level, 97% at the C2 level, and 91% at the C3 level. The SSCS model was well-received by students for learning about the dynamics of rotation and balance of rigid bodies. Therefore, it can be concluded that the SSCS learning model could be used as the primary strategy for teaching physics, actively engaging students and improving their understanding of cognitive concepts. The results demonstrate that teaching physics using the SSCS model improved students' cognitive learning outcomes.

References

Agustin, S. d. (2018). The Effect of the Search, Solve, Create and Share (SSCS) Learning Model on Understanding of Mathematical Concepts in terms of Students' Prior Knowledge. *Jurnal Cendikia: Jurnal Pendidikan Matematika, 2, 2*.

Aliyyah, R. R. (2020). The perceptions of primary school teachers of online learning during the COVID-19 pandemic period: A case study in Indonesia. *Journal of Ethnic and Cultural Studies, 2, 7*.

Astuti, E. D. (2023). The Analysis of Relationship Between Quality of Graduates and Education Financing Management in Private Islamic School. *Journal on Education, 5, 3*.

Chica, K. e. (2021). COVID-19 and Higher Education: First-year Students' Expectations toward Distance Learning. *Sustainability, 4, 13*.

Ichsan, I. T. (2023). Efforts to Build Nationalism Values to Vocational High School Students with The implementation of Character Education. *Jurnal Pendidikan dan Kewirausahaan, 11, 2*.

Kamaruddin, I. T. (2022). Konsep Pengembangan Self-Esteem Pada Anak Untuk Membangun Kepercayaan Diri Sejak Dini. *Al-Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah, 6, 3*.

Kamaruddin, I. T. (2023). The efforts to improve children's motoric ability by utilizing the role of traditional games. *Journal on Education, 5, 3*.

Maliki, N. A. (2020). Efforts to Improve Student Learning Achievement on Rigid Body Rotation Material with the Discovery Learning Model in Class XI IPA-3 Students of SMA Negeri 3 Madiun Academic Year 2017/2018. *Jurnal Revolusi Pendidikan (JUREVDIK), 1, 3*.

Nugroho, B. S. (2023). The Role of Academic Fraud as an Intervening Variable in Relationship of Determinant Factors Student Ethical Attitude. *Journal on Education, 5, 3*.

Parinussa, J. D. (2023). Developing Student Emotional Intelligence by Involving the Active Role of Teacher. *Journal on Education, 5, 3*.

Pizzini, E. L. (1991). Student Questioning in the Presence of The Teacher During Problem Solving in Science. *School Science and Mathematics, 8, 9*.

Rakhmi, D. A. (2018). Constructivism Mathematics Learning with Search, Solve, Create and Share (SSCS) Model to Improve Mathematics Disposition and Student Concept Understanding of Limit Function Materials of XI

Natural Science Class. *Unnes Journal of Mathematics Education Research, 1, 7*.

Rustam, N. I. (2019). Effectiveness of Integrated Science Textbook Theme Earthquake using Connected Model SSCS Problem Solving. *In: Journal of Physics: Conference Series*.

Sari, P. Y. (2020). The Effect of the Virtual Laboratory-assisted REACT Model on Conceptual Understanding of Rotational Dynamics and Rigid Body Equilibrium Materials. *Jurnal Riset dan Kajian Pendidikan Fisika, 1, 7*.