

**The Effect of Learning Model Variations on Student Concentration in Solving Problems: A Comprehensive Study****Adri Budiwanto^{1✉}, Eddy Marheni², Nurul Ihsan³, Nuridin Widya Pranoto⁴,
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Abstract

Problem solving is a prerequisite for one's survival. A person's inability to solve problems will have a direct impact on his life, including students who are faced with various problems both at school and outside school. Weak problem solving of children can have a negative impact on the decisions taken in dealing with problems so that problems are increasingly tangled and even become one of the causes of student failure and juvenile delinquency. This study aims to see the effect of giving two different learning models based on the level of concentration of students in solving problems. This research is a quasi-experimental research with a treatment design by level 2x2 which concerns two factors. The population in this study was all grade XI students of SMA Negeri 1 Bungo which amounted to 254 students. The sampling technique in this study used a simple random sampling technique. Data was obtained using questionnaires with the instruments used were Grid Concentration test and Problem solving inventory. Data were analyzed using two-track ANOVA at significance level $\alpha=0.05$. The normality test uses the Liliefors test and the Homogeneity Variance test uses the Bartlett test with a significant level of $\alpha=0.05$. The results of the data analysis showed that: (1) Overall, there are differences in problem-solving abilities between discovery and cooperative learning models (Sig. $0.048 < 0.05$) (2) There is an interaction between learning models and concentration in solving problems (Sig. $0.025 < 0.05$) (3) In groups that have high concentration, the discovery learning model is more effective than the cooperative learning model (Sig. $0.003 < 0.020$) (4) In groups that have low concentration, the discovery learning model does not can differ with the cooperative learning model group (Sig. $0.996 > 0.05$).

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INTRODUCTION

Human life is something unique and will never run out to talk about. One of the most interesting topics of conversation in human life is problems. The scope of the problem is very broad, such as student failure in school creates a problem while for a scientist the demand for the latest problem discovery, development and discovery for the future makes it a separate problem that requires a solution (Temel & Nas, 2021). Everyone's life will definitely be faced with their own problems, both personal and social problems, both simple problems to complex problems. Big or small a problem to be able to solve it there is something important, namely a person's ability to solve problems or problem solving.

Everyone's problem solving will be influenced by two factors, namely internal and external factors (Hillman, 2003). These two factors cause students' problem solving not only determined by themselves but can be influenced by others or their environment. According to Hanifa et. al., (2018) Several factors that have the opportunity to influence problem solving abilities are based on external factors, namely: teacher motivation, learning environment, and learning model used. While interest, the level of intelligence and cognitive ability of students become internal factors. Then Simorangkir & Napitupulu (2022) added that concentration is one of the important factors in problem solving that is directly related to the learning model because boring learning models such as the lecture method make students not focus on learning so that concentration will not affect students' problem-solving abilities.

Based on a survey conducted to several Guidance Counseling Teachers in several Senior High Schools in Bungo Regency shows that there are still many student problems in schools including bullying, appearance problems, free sex, problems with lessons, cigarettes and liquor, the majority of which have an impact on mental health and juvenile delinquency. This statement is reinforced that in Bungo Regency from January to April 2023, 15 minors have submitted applications for underage marriage to the Bungo Regency Religious Court (Halim, 2023). Then another case also had a student who attempted suicide by burning his body after an argument with his girlfriend (Sutan AJ, 2019).

While in general in Indonesia itself is currently clearly experiencing a multi-dimensional crisis, one of which is Immoral behaviors include unrestricted genders, fights among students, and racing on the road by students, drug users, li-

quor, gambling, (Marheni, S, et. al., 2020). This phenomenon shows that weak problem solving of children can have an impact on the missteps taken by children in responding to the problems faced by children. The inability to solve many problems causes the problems faced to become more tangled and even many people lose golden opportunities in their lives because this includes students. Success in solving an identical problem is measured by the effectiveness and efficiency of the resulting solution to solve the existing problem.

The urgency of problem-solving ability has become a basic need for everyone. Problem solving is a prerequisite for one's survival (Marzano et. al., 1988). The better his ability to solve problems, the easier it will be to live his life. Problem-solving skills are actually already possessed by everyone instinctively, this is evidenced by babies who cry when they feel hungry, but these skills still need to be trained from an early age by parents as a provision for children in facing every problem they will find. One place to train children's problem solving skills other than at home is in the school (Fitriani et. al., 2022). Children's mental readiness to face problems in the real world can be prepared with students who are accustomed to facing problems in a learning (Cahyani & Setyawati, 2016). Because in real life students will face many problems that are more tangled and unstructured (Marzano et. al., 1988). So that education plays an important role in improving one's skills in problem-solving skills.

Based on a survey conducted to several sports teachers in several high schools in Bungo Regency stated that in following the appeal of the Ministry of Education and Culture where The learning process must be engaging, inspiring, enjoyable, and demanding in order to encourage students to actively engage. It also has to leave enough room for initiative, creativity, and independence so that students may modify their abilities, interests, and physical and mental growth. The two most popular teaching methods employed by students today are discovery learning and sharing knowledge.

The exploratory method of teaching is discovering conditions students to be able to find the desired general principles independently (Petrus Ly, 2021). The system of educational discovery in physical education learning can develop creative thinking skills, improve learning outcomes, increase interest in learning, and improve skills (Ginanjari et. al., 2022). While cooperative learning has the characteristics of learning in groups (Slavin, 2010). This learning model in physical

education can increase learning achievement, increase cooperation, improve social skills and increase physical activity (Rahman, 2021). Both of these learning models clearly provide many benefits based on the discussion above. Teachers are expected to teach based on models that match student characteristics (Marheni et. al., 2022). But so far there has been no research comparing between discovery learning and cooperative learning models to problem solving through Physical Education learning.

Based on the discussion above, there is still a lot to consider, especially the level of concentration of students. The ability of students to provide good concentration is one of the important factors in problem solving skills (Tambychik & Meerah, 2010). The varying level of student concentration will make students have differences in solving problems. So that in solving problems, concentration is clearly a factor that will influence humans in making decisions in solving problems.

METHODS

The methodology utilized in this study is experimental research. The dependent variable is the capacity to solve problems, and the independent variables are a learning model (discovery learning and cooperative learning). Gender is also a moderator variable. Additionally, this study is a quasi-experimental research using a level-based therapy plan 2x2 which concerns two factors. The following is the design in the study will be sharpened in the **Table 1**.

Table 1. 2x2 Factorial Research Design

Concentration	Learning Model	
	Discovery Learning (A1)	Cooperative Learning (A2)
Tall (B1)	A1B1	A1B2
Low (B2)	A2B1	A2B2

Information:

- A1 = Discovery learning model group
- A2 = Cooperative learning model group
- B1 = High concentration group
- B2 = Low concentration group
- A1B1 = High concentration problem solving ability of students who obtain learning using discovery learning models
- A2B1 = High concentration problem solving ability of students who obtain learning using the cooperative learning model
- A1B2 = Problem solving ability of low concentration students who obtain learning using

discovery learning models

A2B2 = Problem solving ability of low concentration students who obtain learning using the cooperative learning model

The population in this study was grade XI students at Sekolah Menengah Atas Negeri 1 Bungo which amounted to 369 people. The limitations of the study make researchers will only use two classes to be a research sample. The sampling technique in this study used a simple random sampling technique. The total initial sample of the study amounted to 55 students from two classes with 28 students from class 11A and 29 students from class D, then ranked from 27% who had high and low concentrations. So that the total sample of this study finally amounted to 32 Shiva.

This research instrument is a questionnaire / questionnaire, an instrument for problem solving skills using the Problem Solving Inventory (PSI) instrument by Heppner & Petersen (1982) consisting of 6 (Strongly Agree; Quite Agree; Slightly Agree; Slightly Disagree; Strongly Disagree) 35-item Likert type format. The 2x2 Analysis of Variance (ANAVA) method was used to examine the study data before the Tukey Test. The normality test using the Liliefors test and the homogeneity variance test using the Bartlett test with a threshold are first checked before the data is processed using the ANAVA approach significant level of $\alpha=0.05$.

RESULTS AND DISCUSSION

Based on the results of this study, the ability to solve problems is the result of measurements of all research objects. Based on the experimental research design conducted, there are several groups of data that are described separately. The following is presented a description of concentration data and data on students' problem-solving skills:

Concentration

From the results of measurements made on a sample of grade 11 A and 11 D students of SMA Negeri 1 Bungo can be seen in the **Table 2**. Based on the calculations in the **Table 2** above, it can be seen that none of the students (0%) had a concentration in interval class 21 and above, 7 students (12.3%) had concentration in interval class 16-20, 24 students (42.1%) had concentration in interval class 11-15, 20 students (35.1%) had concentration in interval class 6-10, 6 students (10.5%) had concentration in interval class 5 and below.

Table 2. Student Concentration Data

Interval Class	Frequency	Percentage (%)	Category
21 – Over	0	0.0	Excellent
16 – 20	7	12.3	Good
11 – 15	24	42.1	Enough
6 – 10	20	35.1	Less
5 – Down	6	10.5	Very Lacking
Total	57	100	

Student Problem Solving Inventory Test Data

Based on the results of the Problem Solving Inventory test, students in groups of 32 people scored the highest 193 and the lowest 137. With an average of 158.47 and a standard deviation of 14.34. More details can be seen in the following frequency distribution **Table 3**.

Table 3. Data Distribution Problem Solving Student Inventory

Interval Class	Frequency	Percentage (%)	Category
179 – 193	4	12.50	Excellent
166 – 178	5	15.63	Good
153 – 165	10	31.25	Enough
140 – 152	12	37.50	Less
127 – 139	1	3.13	Very Lacking
Total	32	100	

It is evident from the computations in the table that as many as 2 students (6.25%) have problem-solving skills in the interval class 127-140. 14 students (43.75%) had problem-solving skills in interval classes 141-154, 8 students (25%) had problem-solving skills in interval classes 155-168, 6 students (18.75%) had problem-solving skills in interval classes 169-182, 2 students (6.25%) had problem-solving skills in interval classes 183-196.

Normality Test

That all data groups tested for normality with Liliefors and Shapiro-Wilk tests give Sig. values that are greater than those with L table values of 0.05. Thus it was concluded that all data groups in this study were normally distributed.

Homogeneity Test

That the homogeneity test result with the test criteria is H_0 Sig. $0.083 > 0.05$ which means homogeneous variance with significance $\alpha = 0.05$. Thus it can be concluded that all four groups of data are Homogeneous.

Test the hypothesis

Hypothesis testing using a two-track Analysis of Variance (ANOVA). Furthermore, if

there is an interaction between the Discovery learning model, the Cooperative learning model and student Concentration. The purpose of the two-track Analysis of Variance (ANOVA) is to determine how the independent variable affects experimental results and to determine the effect of interactions from treatment.

Based on the calculation results presented in the two-track ANAVA table above, it can be concluded that "there is a value of Sig. $0.048 > 0.05$, so it can be concluded that "there are differences in students' problem-solving abilities based on the learning model given" and obtained a value of Sig. $0.025 < 0.05$, so it can be concluded that "there is a significant interaction between the learning model and concentration on students' problem-solving abilities".

With the proof of the research hypothesis that states that there is a significant interaction between the learning model and concentration on students' problem-solving abilities, further tests are carried out (Tukey Test).

The hypothesis of Following is an analysis of the Analysis of Variance (ANOVA) and Tukey test results: a) According to the first study hypothesis, there are variations in the overall effects of the cooperative and discovery learning models on students' problem-solving skills, b) The second research hypothesis states that there is an interaction between the learning model and concentration on students' problem-solving abilities, The hypothesis tested accepted sig < 0.05 . This means that students' problem-solving skills are determined by the interaction between the learning model used and the concentration of samples that follow the learning process, c) The third research hypothesis states that on average the discovery learning model with high concentration is more effective than the cooperative learning model with high concentration on students' problem-solving abilities. The hypothesis is accepted, because the results of the tukey test sig. $0.009 < 0.005$, and d) The fourth research hypothesis states that on average the discovery learning model with low concentration is more effective than the cooperative learning model with low concentration on students' problem-solving skills. The hypothesis was rejected because of the test results of Tukey sig. $0.996 > 0.05$.

The influence of discovery and cooperative learning models on students' problem-solving skills

The first hypothesis test's findings revealed that there were substantial disparities between the two learning models' average problem-solving capacities for cooperative and discovery learning. Thus, it can be argued that these two learning mo-

dels can affect students' problem-solving skills.

The advantages of these two learning models that make students learn actively greatly determine the success of the learning objectives given to students (Svinicki, 1998), as stated by (Marheni et. al., 2022) that Discovery learning exposes students to questions and situations in such a way that students are able to discover the concepts in question on their own. This supports the condition when students face a problem where students must be able to analyze and find their own solutions to the problems they find. Discovery learning conditions that make students independent individually make students able to solve problems in their own way (Novita sari & Nur Muhammad, 2021). Students become more creative and have confidence in decisions about problems they encounter.

Meanwhile, in Cooperative learning which shifts the focus of learning to students by making learning in groups so that each student becomes a meaningful participant in learning (Dyson et. al., 2004). This makes students have more empathy and the formation of good social attitudes because in learning each student will influence other students in assessment. This condition trains students in communicating so that in a problem students are able to see from a wider variety of perspectives. The existence of discussions makes students have many views and then be able to conclude and see the best solution available.

This study uses two learning models to improve the ability to solve student problems, namely the cooperative and discovery learning models of education. It is clear from the discussion above that these two learning styles have quite different effects on students' capacity to solve issues. On pupils' ability to solve problems, the discovery learning model outperforms the cooperative learning model skills.

There is an interaction between the discovery learning model, the cooperative learning model and the concentration on students' problem-solving skills

From the results of testing the second hypothesis proves that there is an interaction between the discovery learning model and the cooperative learning model with a concentration on students' problem-solving abilities or in other words the proposed research hypothesis can be proven true.

In the learning model group, the learning model with high concentration and the learning model group with high concentration both have interaction. Thus, it means that there is an in-

fluence of interaction between the learning model and concentration on students' problem-solving abilities. This shows that learning and concentration models together affect problem-solving skills. Good concentration is needed by someone in learning so that they are able to follow learning and achieve learning goals (Fridaram et. al., 2020). Good concentration will make children become more focused in the process to the achievement of learning outcomes. So with these two learning models, researchers want to provide a learning that considers the level of concentration of students to be able to influence students' problem-solving skills.

Group discovery learning models with high category concentration are more effective than cooperative learning models with high category concentration to improve students' problem-solving ability speed

The third hypothesis was tested, and the results indicate that, at large concentrations, the effect on problem-solving abilities provided by the discovery learning model and the cooperative learning model differs. In other words, the suggested study hypothesis is true accepted. In the results of these findings, it can be argued that the discovery learning model group with high concentration is more effective for improving students' problem-solving skills.

Low Motivation Training Intensive Interval Training Methods Are More Effective Than Extensive Interval Methods.

The results of testing the fourth hypothesis showed that overall, the results of the problem-solving ability of group students given the discovery learning model and the cooperative learning model at low concentrations could not be significantly different. Based on the calculations made, it can be seen that given the discovery learning model with low concentration there is no significant difference with the group given the cooperative learning model with low concentration, and the fourth hypothesis is declared not accepted.

CONCLUSION

Based on research findings and discussion of research results, it can be concluded that for students' problem-solving skills, more attention needs to be paid so that students avoid stress that can lead to negative things that will harm students, one of which is juvenile delinquency. The role of the teacher is very necessary because it is a figure who provides education to children in

a structured manner in cognitive, psychomotor and affective aspects so that the selection of the right learning model in accordance with the characteristics of Shiva needs to be considered. The findings of this study are expected for teachers as educators to always pay attention to students by providing learning in accordance with their characteristics and supporting students to improve the ability to solve problems through learning by choosing the learning model that best suits the characteristics and conditions of students.

REFERENCES

- Cahyani, H., & Setyawati, R. W. (2016). Pentingnya Peningkatan Kemampuan Pemecahan Masalah Melalui PBL untuk Mempersiapkan Generasi Unggul Menghadapi MEA. *Prosiding Seminar Nasional Matematika*, 151–160.
- Dyson, B., Griffin, L. L., & Hastie, P. (2004). Sport education, tactical games, and cooperative learning: Theoretical and pedagogical considerations. *Quest*, 56(2), 226–240. <https://doi.org/10.1080/00336297.2004.10491823>
- Fitriani, E., Neviyarni, N., Mudjiran, M., & Nirwana, H. (2022). Problematika Layanan Bimbingan dan Konseling di Sekolah. *Naradidik: Journal of Education and Pedagogy*, 1(3), 174–180. <https://doi.org/10.24036/nara.v1i3.69>
- Fridaram, O., Isthari, E., Cicilia, P. G. C., Nuryani, A., & Wibowo, D. H. (2020). Meningkatkan Konsentrasi Belajar Peserta Didik dengan Bimbingan Klasikal Metode Cooperative Learning Tipe Jigsaw. *Magistrorum et Scholarium: Jurnal Pengabdian Masyarakat*, 1(2), 161–170. <https://doi.org/10.24246/jms.v1i22020p161-170>
- Ginanjari, S., Widayawan, D., & Prabowo, E. (2022). Literature Review: Model Discovery Learning pada Pembelajaran Pendidikan Jasmani di Sekolah Menengah Atas. *Jurnal Pendidikan Olahraga*, 11(2), 265–276.
- Halim, R. (2023). 15 Anak Di Bawah Umur di Bungo Ajukan Nikah Dini ke Pengadilan Agama Mura Bungo 15 Anak Di Bawah Umur di Bungo Ajukan Nikah Dini ke Pengadilan Agama Mura Bungo. *Tribun Jambi*.
- Hanifa, N. I., Akbar, B., Abdullah, S., & Susilo. (2018). Analysis of Problem Solving Ability of Class X IPA Students on Environmental Change Material and Its Affecting Factors. *Didaktika Biologi: Jurnal Penelitian Pendidikan Biologi*, 2(2), 121–128.
- Heppner, P. P., & Petersen, C. H. (1982). The Development and Implications of a Personal Problem-Solving Inventory. *Journal Of Counseling Psychology*, 29(1), 66–75. <https://doi.org/10.1037/0022-0167.29.1.66>
- Hillman, W. (2003). Learning How to Learn : Problem Based Learning. *Australian Journal of Teacher Education*, 28(2). <https://doi.org/10.14221/ajte.2003v28n2.1>
- Marheni, E., Purnomo, E., & Jermaina, N. (2022). Sukses Mengajar Pendidikan Jasmani Di Sekolah. *Eureka Media Aksara*.
- Marheni, E., S. A., & Purnomo, E. (2020). Application of Character Building with Physical Education (CBPE). *Suluh Bendang: Jurnal Ilmiah Pengabdian Kepada Masyarakat*, 20(1), 46–53. <https://doi.org/10.24036/sb.0400>
- Marzano, Robert J., Brandt, R. S., Hughes, C. S., Jones, B. F., Presseisen, B. Z., Rankin, S. C., & Suhor, C. (1988). Dimension Of Thinking: A Framework For Curriculum and Instruction. In Association for supervision and curriculum development: Vol. (Issue).
- Novita sari, E., & Nur Muhammad, H. (2021). Pengaruh Model Pembelajaran Discovery Learning Terhadap Hasil Belajar Lompat Jauh Gaya Jongkok. *Jurnal Pendidikan Olahraga Dan Kesehatan*, 9(3).
- Petrus Ly. (2021). Penerapan Model Pembelajaran Discovery Learning oleh Guru PPKn untuk Meningkatkan Hasil Belajar Siswa di MAN I Flores Timur. *Gatranusantara*, 19(1), 62–70.
- Rahman, Z. (2021). Penerapan Model Cooperative Learning Pada Pendidikan Jasmani Terhadap Sikap Kerjasama Dan Aktivitas Siswa. *Prosiding Seminar & Conference Nasional Keolahragaan*.
- Simorangkir, D. S., & Napitupulu, E. (2022). Pengaruh Konsentrasi Belajar terhadap Kemampuan Pemecahan Masalah Matematis Siswa. *Formosa Journal of Science and Technology*, 1(6), 711–722. <https://doi.org/10.55927/fjst.v1i6.1597>
- Slavin, R. E. (2010). Cooperative Learning: teori, riset dan praktik. *Nusa Media*.
- Sutan AJ, M. (2019). Kisah Asmara Mahasiswa dan Mahasiswi di Bungo Berujung Bakar Diri, Tentang dengar “Tolong-tolong.” *Tribun Bungo*.
- Svinicki, M. D. (1998). A theoretical foundation for discovery learning. *The American Journal of Physiology*, 275(6 Pt 2), 4–7. <https://doi.org/10.1152/advances.1998.275.6.s4>
- Tambychik, T., & Meerah, T. S. M. (2010). Students' Difficulties In Mathematics Problem-Solving: What Do They Say? *Procedia - Social and Behavioral Sciences*, 8(5), 142–151. <https://doi.org/10.1016/j.sbspro.2010.12.020>
- Temel, V., & Nas, K. (2021). An Investigation Of The Faculty Of Sport Science In Terms Of Some Variables. *The Journal of International Anatolia Sport Science*, 6(1), 9–19. <https://doi.org/10.5505/jiasscience>