# Training on Problem-Solving Learning Strategies for Special Education Teachers in Teaching Mathematics to People with Dyscalculia in Kab. Garut

Rostina Sundayana[1], Ekasatya Aldila Afriansyah[2]*, Iyam Maryati[3], Nitta Puspitasari[4], Sumia Sumiarelati[5], Nirwan Hadiansyah[6]

[1,2,3,4,5,6] Institut Pendidikan Indonesia Garut,
Jalan Terusan Pahlawan No. 32 Desa Sukagalih Tarogong – Garut, Indonesia
ekasatyafriansyah@institutpendidikan.ac.id

*Abstract*
*Although the implementation of the National Assessment policy has been running for one year, it is suspected that the understanding of teachers, parents and students about the National Assessment is not sufficient. The results of the situation analysis on the understanding of teachers at PLB teachers Kab Garut regarding minimum competency assessments show that (1) teachers' understanding of AN is still low and (2) the ability of teachers to prepare problem solving-based questions is still low. The solution agreed upon with partners is to optimize learning by training and assisting teachers in developing problem solving questions. The target audience is 16 teachers at Guru PLB Kab Garut. The method of implementing the activity is the participatory rural appraisal model, the technology transfer model, and training. The results of the activity show that there has been an increase in teachers' understanding of the problem solving questions with an average score of 76. A total of 62.5% of the training teachers have also succeeded in developing their own problem solving questions in accordance with the guidelines.*

*Keyword: PLB teachers; problem-solving question; Garut*

**Abstrak**
Walaupun pemberlakuan kebijakan Asesmen Nasional telah berjalan satu tahun namun disinyalir pemahaman guru, orang tua dan siswa tentang Asesmen Nasional belumlah memadai. Hasil analisis situasi terhadap pemahaman guru-guru di Guru PLB Kab Garut tentang asesmen komptensi minimum menunjukkan bahwa (1) Pemahaman guru-guru tentang AN masih rendah dan (2) Kemampuan guru dalam menyusun soal-soal berbasis pemecahan soal masih rendah. Solusi yang disepakati bersama mitra adalah mengoptimalkan pembelajaran dengan melatih dan mendampingi guru-guru mengembangkan soal pemecahan masalah. Khalayak sasarannya adalah 16 orang guru di Guru PLB Kab Garut.

Metode pelaksanaan kegiatan, yaitu model participatory rural appraisal, model technology transfer, dan pelatihan. Hasil pelaksanaan kegiatan menunjukkan bahwa telah terjadi peningkatan pemahaman guru tentang soal pemecahan masalah dengan rata-rata skor 76. Sejumlah 62,5% guru-guru peserta pelatihan juga sudah berhasil mengembangkan sendiri soal pemecahan masalah yang sesuai dengan pedoman.

**Kata Kunci:** Guru PLB; pemecahan masalah; Garut.

## I. INTRODUCTION

The implementation of the Ministry of Education and Culture's policies outlined in Ministerial Decree No. 17 of 2021, specifically regarding National Assessment (AN), is one of the key policies to realize the transformation of education management in Indonesia. It is hoped that this policy will be a strategic step in catching up with the lagging behind the achievements of Indonesian students compared to other countries in the world, as the results of international studies such as PISA and TIMSS always place the achievements of Indonesian students at the bottom [1, 2]. AN was first administered in 2021; only thirty individuals were sampled per school, rather than all pupils taking the test. The Assessment and Learning Center (Pusmenjar) of the Ministry of Education and Culture of the Republic of Indonesia administers AN [3].

The National Assessment is an attempt to comprehensively capture the quality of the learning processes and outcomes of primary and secondary education units throughout Indonesia [4, 5]. The National Examination (UN) is a means of evaluating students' performance [6, 7] after attending a certain level of education, and its implementation coincides with the removal of the policy regarding it. However, it cannot be said that AN replaces UN because the two have different goals. It is claimed that despite the National Assessment policy's one-year implementation, teachers', parents', and students' understanding of AN is still insufficient [8]. Teachers' comprehension of AN merits our attention as a group because they are the driving force behind educational success and work closely with students to implement the curriculum in the classroom [9, 10].

The Minimum Competency Assessment (question solving), Character Survey, and Learning Environment Survey are the three components that make up the National Assessment (AN). Question solving is a type of assessment that gauges students' minimum abilities [11, 12], which are the most fundamental skills that students at a particular level need to possess, such as reading literacy and numeracy [13, 14, 15]. Problem solving gauges students' ability to think or reason [16] when they read texts (literacy) and solve problems that require mathematical knowledge (numeracy).

In 2021, Garut District Special Education Teachers will be among the schools implementing ANBK. Based on their first experience as implementing ANBK, some of the teachers involved already had an idea of what AN is like, but this understanding was incomplete. This is in contrast to the form and context of instruments in problem solving, which are very diverse. What is the understanding of the teachers, especially when it comes to problem solving? To obtain an overview of the teachers' understanding, an interview was conducted with the Head of the Garut Regency PLB Teacher. However, with respect to a deeper understanding regarding the scope, indicators, and level of thinking ability that will be measured, especially in problem solving, it seems to teachers that there is still uncertainty. Additionally, schools and teachers have not yet developed strategic steps as implications of this policy for classroom learning. Some teachers in their schools are already familiar with the general information about what problem solving is, when it should be done, and how to do it.

It is feared that dyscalculia people who are not trained with problem-solving instruments will find it difficult to answer questions on the problem-solving instruments [17, 18]. Teachers are accustomed to creating test instruments that are focused on material mastery [19]. This instrument, however, does not support preparing dyscalculia people to face problem solving [20, 21]. Help is required for teachers to become more proficient in creating problem solving instruments because the instrument is geared toward contextual daily life problems, which calls for higher order thinking (HOT) abilities [22, 23, 24].

## II.  METHOD

The sixteen PLB teachers in the Garut Regency are the target audience for this activity. In order to address the issues raised, a problem solving framework has been developed, as illustrated in Figure 1. The participatory rural appraisal model [25, 26] is used to identify issues that community groups face, and the Technology Transfer (TT) model is used to ensure that community groups or partners understand the fundamentals of applying technology, particularly with regard to creating questions based on problem solving.

If at least 50% of participants are able to construct questions based on problem solving and there is an increase in comprehension of the national assessment with an average post-test score of at least 70, then this activity is considered effective.
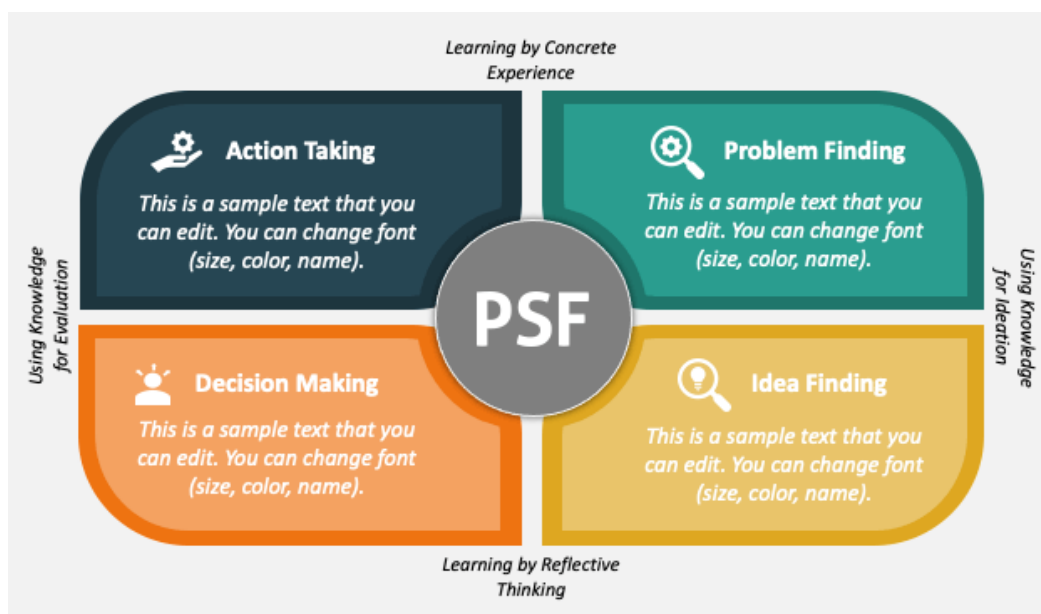


Figure 1. Problem Solving Framework

## III.  RESULTS AND DISCUSSION

On September 3, 2022, 16 Special Education Teachers in the Garut District participated in the implementation of the Community Service activity "Minimum Competency Assessment Based Question Development Training for Special Education Teachers in Garut District." The activity was conducted offline in the Garut Regency PLB Teacher Meeting Room. Overall, the activities went smoothly and successfully met the intended activity success indicators.

Under the guidance of Dr. Rostina Sundayana, M.Pd., the resource person, the activity started with a series of questions and answers aimed at exploring the challenges that the Garut District Special Education teachers faced in their efforts to improve student literacy and numeracy. After that, material bearing the title National Assessment and Implications of problem solving in learning was presented. This presentation covers a number of topics, such as: (1) Understanding the different kinds of literacy and numeracy questions and how to solve

them; (2) Examining literacy and numeracy questions and how to solve them from examples at each level; (3) Examining the outcomes of question-solving in order to plan lessons at the school; and (4) The Principal and School Management Team's role in organizing and coordinating problem-solving activities (question-solving, School Character and Climate Survey).

16 teachers participated in the training activity with great enthusiasm and were very active in practicing to develop problem solving softfiles, specifically literacy and numeracy questions. All participants understood the rationale behind the policy change to a question-and-answer format for the National Examination, as well as how to report the results, what questions solvers look like, and how to construct questions that solve problems. The training was conducted using the question and answer method and direct practice in creating problem-solving type questions in groups. After each group member presents, the resource person asks the other groups to respond and receives confirmation at the end.

The following outcomes of a post-test with 20 multiple-choice questions that was conducted to gauge comprehension of the training material were attained.

Table 1. Post Test Results

| Participant | Score/Category | Participant | Score/Category |
|---|---|---|---|
| 1 | 85 (Complete) | 9 | 80 (Complete) |
| 2 | 75 (Complete) | 10 | 85 (Complete) |
| 3 | 60 (Not Completed) | 11 | 75 (Complete) |
| 4 | 85 (Complete) | 12 | 75 (Complete) |
| 5 | 65 (Not Completed) | 13 | 60 (Not Completed) |
| 6 | 80 (Complete) | 14 | 65 (Not Completed) |
| 7 | 95 (Complete) | 15 | 80 (Complete) |
| 8 | 70 (Complete) | 16 | 95 (Complete) |
| Total Score | | 1230 | |
| Average | | 76,875 | |
| Completion Percentage | | 75% | |

Table 1 shows that, out of the 16 participants, 12 of them received a post-test score of at least 70, indicating that the completion level was at 75% and that the average post-test score was at 76.875. Consequently, the first success indicator for Pk Mini has been attained.

Following the activity, participants were given the task of independently creating solving questions for both literacy and numeracy. The assignment examination revealed that up to 12 participants had successfully completed the task of creating problem-solving questions in accordance with the guidelines; this indicates that the second PkM indicator has also been met, with an achievement percentage of 75%. The obstacles faced in carrying out activities are related to limited internet network connections so that problem solving simulations from the ministry portal cannot be carried out smoothly [27, 28]. At the end of the activity, participants were asked to provide feedback on the implementation of the activity, and they really appreciated this activity because a forum like this is really needed considering that the school will soon be solving the questions in mid-September, so the school can better understand the aims and objectives of solving the questions and their implications in learning.

## IV. CONCLUSIONS AND RECOMMENDATIONS

A total of 76.875% of the special education teachers who participated in the training were successful in creating their own problem solving questions in compliance with the guidelines. These findings and the discussion that follows lead to the conclusion that through training activities, teachers have succeeded in increasing understanding of problem solving development with an average score for mastery of the material of 75%.

## V. REFERENCES

[1] Wu, M. (2009). A comparison of PISA and TIMSS 2003 achievement results in mathematics. Prospects, 39, 33-46.

[2] Kartianom, K., & Retnawati, H. (2018). Why are their mathematical learning achievements different? Re-analysis TIMSS 2015 data in Indonesia, Japan and Turkey. International Journal on New Trends in Education and Their Implications, 9(2), 33-46.

[3] Rifai, I., & Rombot, O. (2023). Basic Education in Indonesia. In International Handbook on Education in South East Asia (pp. 1-29). Singapore: Springer Nature Singapore.

[4] Ayuningtyas, V. E. H., & Setyarini, M. (2023). Teachers' Perception of the Minimum Competency Assessment Instrument (AKM) based on Lynk. id to measure Students' Scientific Literacy on Solar System Material. Jurnal Penelitian Pendidikan IPA, 9(11), 9883-9892.

[5] Sutoyo, S., Sanjaya, I., & Supardi, Z. A. I. (2023, April). Improving the competence of chemistry teachers in developing the minimum competency assessment (MCA). In AIP Conference Proceedings (Vol. 2619, No. 1). AIP Publishing.

[6] Mengash, H. A. (2020). Using data mining techniques to predict student performance to support decision making in university admission systems. Ieee Access, 8, 55462-55470.

[7] Oguguo, B. C., Nannim, F. A., Agah, J. J., Ugwuanyi, C. S., Ene, C. U., & Nzeadibe, A. C. (2021). Effect of learning management system on Student's performance in educational measurement and evaluation. Education and Information Technologies, 26, 1471-1483.

[8] Wyse, D., & Bradbury, A. (2022). Reading wars or reading reconciliation? A critical examination of robust research evidence, curriculum policy and teachers' practices for teaching phonics and reading. Review of education, 10(1), e3314.

[9] Sølvik, R. M., & Glenna, A. E. (2022). Teachers' potential to promote students' deeper learning in whole-class teaching: An observation study in Norwegian classrooms. Journal of Educational Change, 23(3), 343-369.

[10] Akib, E., Imran, M. E., Mahtari, S., Mahmud, M. R., Prawiyogy, A. G., Supriatna, I., & Ikhsan, M. H. (2020). Study on implementation of integrated curriculum in Indonesia. IJORER: International Journal of Recent Educational Research, 1(1), 39-57.

[11] Widana, I. W. (2020, July). The effect of digital literacy on the ability of teachers to develop HOTS-based assessment. In Journal of Physics: Conference Series (Vol. 1503, No. 1, p. 012045). IOP Publishing.

[12] Öztürk, M., Akkan, Y., & Kaplan, A. (2020). Reading comprehension, Mathematics self-efficacy perception, and Mathematics attitude as correlates of students' non-routine Mathematics problem-solving skills in Turkey. *International Journal of Mathematical Education in Science and Technology*, *51*(7), 1042-1058.

[13] Gal, I., Grotlüschen, A., Tout, D., & Kaiser, G. (2020). Numeracy, adult education, and vulnerable adults: a critical view of a neglected field. *Zdm*, *52*, 377-394.

[14]    Koyuncu, İ., & Fırat, T. (2020). Investigating reading literacy in PISA 2018 assessment. International Electronic Journal of Elementary Education, 13(2), 263-275.

[15]    Rakhmawati, Y., & Mustadi, A. (2022). The circumstances of literacy numeracy skill: Between notion and fact from elementary school students. Jurnal Prima Edukasia, 10(1), 9-18.

[16]    Ying, C. L., Osman, S., Kurniati, D., Masykuri, E. S., Kumar, J. A., & Hanri, C. (2020). Difficulties that Students Face when Learning Algebraic Problem-Solving. Universal Journal of Educational Research, 8(11), 5405-5413.

[17]    Chinn, S. (2020). More trouble with maths: A complete manual to identifying and diagnosing mathematical difficulties. Routledge.

[18]    Abdulsahib, R. H. (2021). Learning Difficulties In Mathematics And Its Relationship To Cognitive Failures Among Middle School Students. Ilkogretim Online, 20(6), 2291-2325.

[19]    Suchyadi, Y., & Suharyati, H. (2021). The Use Of Multimedia As An Effort To Improve The Understanding Ability Of Basic School Teachers 'Creative Thinking In The Era 'Freedom Of Learning,'. Merdeka Belajar, 42-53.

[20]    Suri, S., Tirkey, A., Delphy, J., & Aurelia, S. (2020). Detection and behavioral analysis of preschoolers with dyscalculia. Human Behaviour Analysis Using Intelligent Systems, 45-67.

[21]    Rulyansah, A. (2023). Reconnecting Learning: An Educational Alternative For Dyscalculia Children In Elementary School. Elementary School: Jurnal Pendidikan dan Pembelajaran ke-SD-an, 10(1), 1-15.

[22]    Ulum, A. R., Hidayah, N., & Yanti, Y. (2021). Development of assessment hots (higher order thinking skills) based on troubleshooting for class v sd/mi. JMIE (Journal of Madrasah Ibtidaiyah Education), 5(1), 15-29.

[23]    Setyarini, S., Salim, H., & Purnawarman, P. (2023, August). Higher-Order Thinking Skills (HOTS)-based literacy media: An innovative learning strategy to promote the secondary students' social awareness. In Forum for Linguistic Studies (Vol. 5, No. 2, p. 1706).

[24]    Ghanizadeh, A., Al-Hoorie, A. H., & Jahedizadeh, S. (2020). Higher order thinking skills (pp. 1-51). Springer International Publishing.

[25]    Chege, S. M., & Wang, D. (2020). The impact of technology transfer on agribusiness performance in Kenya. Technology analysis & strategic management, 32(3), 332-348.

[26]    Shmeleva, N., Gamidullaeva, L., Tolstykh, T., & Lazarenko, D. (2021). Challenges and opportunities for technology transfer networks in the context of open innovation: Russian experience. Journal of Open Innovation: Technology, Market, and Complexity, 7(3), 197.

[27]    Aloi, G., Fortino, G., Gravina, R., Pace, P., & Savaglio, C. (2020). Simulation-driven platform for Edge-based AAL systems. IEEE Journal on Selected Areas in Communications, 39(2), 446-462.

[28]    Zhang, X., Gao, X., Yi, H., & Li, Z. (2021). Design of an intelligent virtual classroom platform for ideological and political education based on the mobile terminal APP mode of the Internet of things. Mathematical Problems in Engineering, 2021, 1-12.