IMPLEMENTATION OF PROBLEM-BASED LEARNING IN SEARCH AND RESCUE (SAR) EDUCATION AND TRAINING: A NARRATIVE STUDY AT BASARNAS

Euis Nurmiati[1], Sugeng Bayu Wahyono[2], Muhammad Risal Rhomadan[3]

Yogyakarta State University, Indonesia

E-mail: euisnurmiati.2022@student.uny.ac.id[1], sugeng_bw@uny.ac.id[2],

muhammadrisal.2022@student.uny.ac.id[3]

ABSTRACT

The purpose of this study is to conduct an in-depth examination of the implementation of the problem-based learning (PBL) process through SAR (Search and Rescue education and training) experienced by Basarnas Yogyakarta members. The PBL model, which is relevant to the needs of SAR personnel, helps them face emergency situations and prepares them through realistic and learner-centered education. This research used a qualitative method with a narrative approach. The subjects of this study are 10 SAR personnel. Data were collected using observation techniques, in-depth interviews, documentation, and triangulation. The data analysis technique follows the qualitative descriptive analysis model of Matthew B. Miles, A. Michael Huberman, & Johnny Saldana, which includes data condensation, data presentation, and conclusion drawing. The findings indicate that the learning process using the PBL model through SAR training is oriented toward student-centered learning. The extensive opportunities provided by the PBL model offer direct experience that aligns with the goals of SAR training, fostering the development of problem-solving skills, teamwork, motivation, and independent learning among SAR personnel. The results of this study are expected to make a significant contribution to SAR education literature, offer practical recommendations for developing more effective and responsive SAR training curricula, and provide practical guidelines for other training institutions. The results of this research can be a basis for developing SAR training policies and curricula that are more problem-solving oriented. Basarnas may consider adopting PBL as the main approach in SAR education and training across their units.

Keywords: education and training, problem-based learning, search and rescue.

Introduction

The learning process in the modern era demands innovation and the implementation of effective models to develop learners' critical thinking, communication skills, and problem-solving abilities (Sholihah & Lastariwati, 2020). In this educational context, it is crucial to ensure that the learning models used can enhance skills and knowledge relevant to real-world challenges (Hashim & Samsudin, 2020). Improving the skills and knowledge in the learning process of Search and Rescue (SAR) personnel is vital given the complexity and high frequency of various natural disasters and accidents (Wu et al., 2024). Innovative and effective learning models are needed to ensure that SAR personnel can respond to emergency

situations quickly and efficiently in the workplace (Li, 2023). One model considered capable of meeting these needs is problem-based learning (PBL) (Simanjuntak et al., 2021). Problem-based learning focuses on solving real problems (vlac, Simanjuntak), which are relevant to daily life and work, making it highly suitable for SAR education and training. The education and training activities conducted will gain substantial experience from the learning process (Cahyono, 2021). Formulating training objectives that are well-oriented toward the working world will optimize the implementation of such training (Prawiradilga & Chaeruman 2018:60).

Previous research has shown that the application of the PBL model leads to improvements in teamwork, presentation, and critical thinking skills (Marcinauskas et al., 2024); (Moust et al., 2005), (Schmidt, 2019); (Pasha, 2016) across various educational fields. However, research specifically exploring the application of PBL in the context of SAR education and training is still very limited. A study by (Loyens et al., 2020) indicated that the use of the PBL model has a greater impact compared to other models. Based on this, further research is needed to explore how PBL can be adapted and effectively applied in SAR education and training.

Problem-based learning (PBL) deeply involves learners in their educational process (Dolmans et al., 2005). This model shift aligns with the constructivist approach to teaching, which emphasizes learner-centered learning and prioritizes the learner (Dagar & Yadav, 2016); (Fadillah et al., 2022). In this model, learners actively build their knowledge and understanding with the help of facilitators (Boye), connecting what they learn to real-world problems (Boye & Agyei, 2023), making it highly relevant for Basarnas personnel's training. Their thinking development is largely through social interaction, as Vygotsky viewed knowledge acquisition as an interaction involving various ideas between learners and facilitators (Boye & Agyei, 2023); (Dagar & Yadav, 2016). In line with this, Basarnas Yogyakarta members engage facilitators in interactions during the learning process using a learner-centered instructional approach, thereby enhancing problem-solving skills (Boye & Agyei, 2023)

At Basarnas Yogyakarta, the implementation of the PBL model is expected to improve the critical, analytical, and problem-solving abilities of SAR personnel. Therefore, this research aims to deeply examine the implementation of PBL at Basarnas Yogyakarta in the learning process of SAR education and training. This study is expected to provide new insights into how PBL can be used to enhance the competencies of SAR personnel in dealing with emergency situations. Additionally, this research aims to offer practical recommendations for developing a more effective and responsive SAR training curriculum.

A narrative examination of PBL implementation at Basarnas Yogyakarta is anticipated to make a significant contribution to the SAR education literature and provide practical guidance for other training institutions. The results of this study are also expected to serve as a reference for innovative and effective learning models for non-formal education, which can enhance the preparedness and responsiveness of SAR personnel in facing various emergency situations.

IMPLEMENTATION OF PROBLEM-BASED LEARNING IN SAR EDUCATION AND TRAINING: A NARRATIVE STUDY AT BASARNAS

Research Method

This research used qualitative research. Qualitative research is used to explore and understand the meanings derived from a number of groups or individuals with social issues (Cresswell, 2013). This study uses a narrative approach, involving the systematic study of stories that allows readers to apply findings to broader issues and solve practical problems (Gall et al., 2014). Thus, the story or collection of stories from one or more research participants can be considered as a case (gall). The research was conducted at Basarnas Yogyakarta. The sources of data for this study consist of two types: primary data sources with 10 SAR personnel who have participated in SAR training, which is considered an adequate sample (Cresswell, 2007), and secondary data sources obtained through photos of the education and training process and other documents to strengthen the research sources. The instrument and data collection techniques in this study used qualitative data collection instruments, namely the researcher himself. The qualitative researcher acts as a human instrument (Kuantitatif, 2016). Data collection techniques include observation, interviews, documents, and triangulation. Data analysis used the interactive model of qualitative descriptive data analysis proposed by (Huberman, 2014), which involves data analysis after data collection, followed by data condensation, data display, and conclusion drawing or data verification.

Result and Discussion

Research Result Description

This research was conducted at Basarnas Yogyakarta, a non-ministerial government institution actively engaged in education and training (diklat) in the field of Search and Rescue (SAR). The learning process through SAR training is implemented using the Problem-Based Learning (PBL) model, which is examined in-depth through semi-structured interviews. The interviews were conducted with informants criteria, namely Basarnas members that had undergone through SAR education and training, then the researcher collected documents such as photos, curricula, lesson plans, and other supporting documents. Furthermore, the researcher then integrated all the collected data and tested the data credibility using the triangulation technique (Kuantitatif, 2016).

Data analysis was conducted after data collection. During the data condensation stage, the researcher summarized the narratives from the informants, and then separated and classified the data regarding the implementation of the PBL learning process. In the data presentation stage, the researcher displayed the classified data in text form to obtain a comprehensive overview of the learning process of Basarnas members. Following this, conclusions were drawn by verifying and seeking meaning from the presented data, which was then presented in the narrative text about the PBL learning implementation process.

The researcher then identified several key themes based on the research findings, which are:

a. Problem-Solving Skills

SAR education and training participants showed significant improvement in problem-solving skills. This aligns with KT's statement: "..focusing the training on real-life

situations that we might face in the field. We were often given problem-based scenarios that we had to solve as a team, such as natural disaster simulations or complex rescue operations."

The problem-based learning model emphasizes real-world problems and active learning, helping SAR personnel develop critical thinking and practical problem-solving abilities encountered during their education and training.

b. Teamwork

The PBL model, which often involves cooperative activities and collaborative tasks, enhances teamwork among SAR personnel. RW mentioned: "...we learned to support each other and communicate well because the success of the solution depends on teamwork."

SAR personnel experienced improved communication and teamwork skills, which are vital in SAR missions where coordination and collective effort are crucial.

c. Motivation

The use of the PBL model makes learning more active, positively impacting the learning motivation of SAR personnel and their understanding of SAR concepts. SIS expressed: "..PBL made the training more interesting and relevant. We felt more motivated because the situations we faced in the training were very realistic and challenging."

SAR personnel found the education and training more relevant and engaging, positively affecting their learning outcomes and knowledge retention through hands-on experience.

d. Learning Independence

PBL emphasizes that SAR personnel take responsibility for their own learning process so that the learning independence of SAR personnel is self-established. This learner-centered approach helps develop proactive and initiative attitudes essential in SAR operations. This aligns with AR's statement: "..we were often given problems that we had to solve on our own. We learned to plan, evaluate, and adjust our strategies based on the feedback we received. This helped us become more proactive and initiative in every task we faced."

Learning independence instills a sense of responsibility in SAR personnel to plan and evaluate their learning, leading to optimal outcomes in mastering emergency situations effectively.

Overall, the implementation of PBL in SAR training at Basarnas can produce SAR personnel who are more prepared, responsive, and competent in facing various challenges in search and rescue operations. However, the specific results of this PBL model implementation will depend on the quality of the curriculum, facilitators, and the evaluation of the involvement of all parties in the learning process.

Conclusion

The learning process using the Problem Based Learning (PBL) model through SAR education and training which is oriented towards student-centered learning. The extensive opportunities provided by the PBL model offer direct experiences that align with the learning objectives of SAR training, resulting in improved problem-solving skills, teamwork,

motivation, and independent learning for SAR personnel. Despite facing challenges in the learning process, this approach helps SAR personnel hone technical skills and knowledge relevant to complex and real emergency situations. The results of this study are expected to make a significant contribution to the SAR education literature, provide more effective and responsive SAR training, and offer practical guidance for other training institutions.

Bibliography

Boye, E. S., & Agyei, D. D. (2023). Effectiveness of problem-based learning strategy in improving teaching and learning of mathematics for pre-service teachers in Ghana. *Social Sciences & Humanities Open*, 7(1), 100453.

Cahyono, B. T. (2021). The effectiveness of the implementation of education and training for prospective school principals at the East Java Provincial Education Quality Assurance Institute. *Educational: Journal of Educational Sciences*, 3(6), 5183–5191.

Cresswell, J. (2013). *Qualitative inquiry & research design: Choosing among five approaches.*

Dagar, V., & Yadav, A. (2016). Constructivism: A paradigm for teaching and learning. *Arts and Social Sciences Journal*, 7(4), 1–4.

Dolmans, D. H. J. M., De Grave, W., Wolfhagen, I. H. A. P., & Van der Vleuten, C. P. M. (2005). Problem-based learning: Future challenges for educational practice and research. *Medical Education*, 39(7), 732–741.

Fadillah, Z. I., Kamil, A. B., & Wachyudi, K. (2022). Exploring Students' Reading Ability in An Extensive Reading Class Through Constructivism of Narrative Text. *JIIP-Scientific Journal of Educational Sciences*, 5(11), 4656–4661.

Gall, M. D., Gall, J. P., & Borg, W. R. (2014). Applying educational research: How to read, do, and use research to solve problems of practice. *(No Title).*

Hashim, I., & Samsudin, S. (2020). Practices of problem-based learning (PBL) in teaching Islamic studies in Malaysian public universities. *International Journal of Innovation, Creativity and Change*, 11(10), 117–129.

Huberman, A. (2014). *Qualitative data analysis a methods sourcebook*.

Quantitative, P. P. (2016). Qualitative and R&D Kunatitatif Research Methods. *Alfabeta, Bandung*.

Li, L. (2023). Critical thinking from the ground up: teachers' conceptions and practice in EFL classrooms. *Teachers and Teaching*, 29(6), 571–593.

Loyens, S. M. M., Wijnia, L., Van der Sluijs-Duker, I., & Rikers, R. M. J. P. (2020). Problem-based learning. In *Oxford Research Encyclopedia of Education*.

Marcinauskas, L., Iljinas, A., Čyvienė, J., & Stankus, V. (2024). Problem-based learning versus traditional learning in physics education for engineering program students. *Education Sciences*, 14(2), 154.

Moust, J. H. C., Berkel, H. J. M. Van, & Schmidt, H. G. (2005). Signs of erosion: Reflections on three decades of problem-based learning at Maastricht University. *Higher Education*, 50, 665–683.

Pasha, S. (2016). Promoting Prospective Teachers' Constructive Investigation Skill using Activity Based Learning. *Journal of Educational Sciences & Research*, 3(1).

Schmidt, H. G. (2019). *Introduction to Problem-based Learning: A guide for students*.

Sholihah, T. M., & Lastariwati, B. (2020). Problem based learning to increase competence of critical thinking and problem solving. *Journal of Education and Learning (EduLearn), 14*(1), 148–154.

Simanjuntak, M. P., Hutahaean, J., Marpaung, N., & Ramadhani, D. (2021). Effectiveness of Problem-Based Learning Combined with Computer Simulation on Students' Problem-Solving and Creative Thinking Skills. *International Journal of Instruction*, *14*(3), 519–534.

Wu, J., Cheng, L., Chu, S., & Song, Y. (2024). An autonomous coverage path planning algorithm for maritime search and rescue of persons-in-water based on deep reinforcement learning. *Ocean Engineering*, *291*, 116403.