

Exploring Pre-Service Teachers' Difficulties in developing ICT-Based Learning and Instructional Media within the Merdeka Curriculum

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Abstract

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INTRODUCTION

The rapid advancement of digital technology in the 21st century has fundamentally reshaped the educational landscape, demanding that modern educators possess high digital literacy. In response to these global shifts, Indonesia introduced the Merdeka Curriculum (*Kurikulum Merdeka*), which emphasizes student-centered learning, flexibility, and the seamless integration of technology in classrooms. Within this framework, teachers are no longer just information deliverers but facilitators who must design engaging, innovative, and context-aware learning experiences. Consequently, the ability to develop Information and Communication Technology (ICT)-based learning and instructional media has shifted from being an optional skill to an absolute necessity for contemporary educators.

As the backbone of future education, pre-service teachers (undergraduate education students) are expected to master these technological competencies before entering real classrooms. During their university preparation, these student teachers are trained to design comprehensive lesson plans—historically known as *Rencana Pelaksanaan Pembelajaran* (RPP) and now adapted into *Modul Ajar* under the Merdeka Curriculum. This process of creating lesson plans serves as a critical bridge where theoretical pedagogical knowledge meets practical technological application. It is during this formative stage that pre-service teachers must demonstrate their capability to select, design, and embed appropriate ICT media that align with the specific learning objectives of the new curriculum.

However, transitioning from traditional teaching paradigms to the tech-integrated requirements of the Merdeka Curriculum is rarely seamless. Many pre-service teachers face a significant gap between their personal daily technology use and its professional application for instructional purposes. While they may be digitally literate in a social context, translating that literacy into effective educational tools requires complex Technological Pedagogical Content Knowledge (TPACK). When tasked with formulating *Modul Ajar*, these students often struggle to find the right

balance between the curriculum's flexible nature and the technical demands of creating interactive, structured ICT media. They frequently encounter deficiencies in specialized technical knowledge and face hurdles in digital content adaptation.

Existing literature has extensively discussed the general implementation of the Merdeka Curriculum and the broad challenges teachers face regarding school infrastructure. However, empirical research that focuses specifically on the internal and technical difficulties experienced by pre-service teachers—particularly during their initial attempts at embedding ICT media into their *Modul Ajar*—remains limited. Understanding their specific hurdles is crucial, as these students represent the firsthand gauge of how well teacher education programs are adapting to current national curriculum reforms.

Therefore, this study aims to explore and quantify the specific difficulties encountered by pre-service teachers in developing ICT-based learning and instructional media within the Merdeka Curriculum framework. To ensure a structured investigation, this study utilizes a questionnaire method inspired by and adapted from the established **TPACK framework by Schmidt et al. (2009)** as well as **ICT integration barrier profiles investigated by Tondeur et al. (2021)**. By focusing on education students who have firsthand experience in designing *Modul Ajar* integrated with technology, this research seeks to uncover the nuanced pedagogical, technical, and cognitive obstacles they face. The insights gained from this quantitative inquiry are expected to provide valuable feedback for teacher training institutions to refine their curricula and better equip future educators for the digital demands of Indonesian schools.

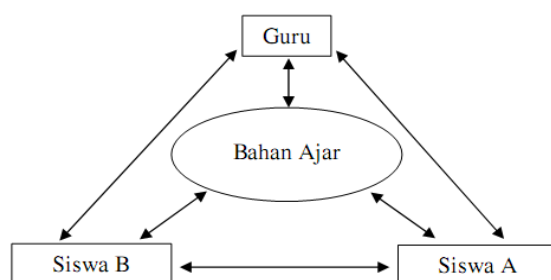


Figure 1. learning activity in Guided Discovery Learning

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METHOD

This research **will apply** a descriptive quantitative method with a survey design to investigate the difficulties faced by pre-service teachers. This approach **attempts** to systematically describe, measure, and profile the students' specific pedagogical, technical, and cognitive obstacles regarding the use of ICT-based learning and instructional media. By employing this design, the study **focuses** on gathering objective data from a targeted group to map out the current realities of adapting teacher preparation into the newly implemented Merdeka Curriculum framework.

The research **will take place** in the context of higher education in Indonesia, specifically within the Faculty of Teacher Training and Education at [Nama Universitas Kamu]. The program emphasizes the integration of Technological Pedagogical Content Knowledge (TPACK) as part of its modern curriculum, making it a highly relevant site for investigating student teachers' development. The population and sample of this research **will consist of** [Jumlah target, misal: 60] pre-service teachers in the academic year 2025/2026 who have completed their teaching practicum program (*Pengenalan Lapangan Persekolahan / PLP*) and possess direct experience in designing *Modul Ajar*. To get the data, this study **will apply** a closed-ended questionnaire as the primary instrument. The questionnaire **will consist of** 20 items and comprise five options each, in the form of a Likert Scale ranging from strongly agree to strongly disagree, adapted from Schmidt et al. (2009) and Tondeur et al. (2021).

In this study, the researcher **will distribute** the digital questionnaire to all selected participants via Google Forms over a two-week period. To gain supporting qualitative data that the researcher cannot get through the questionnaire alone, a semi-structured follow-up interview **will also be conducted** with five selected respondents. According to Heigham and Croker (2009), interviews can provide important insights into respondents' deeper experiences, beliefs, and personal motivations. Regarding research integrity, all participants **will be fully informed** about the purpose of the study, and their written consent **will be obtained** before data collection. The research procedures **will carefully follow** institutional ethical guidelines to ensure complete anonymity and no harm to the participants.

Data from the questionnaires **will be analyzed** using descriptive statistics to calculate frequencies, percentages, mean scores, and standard deviations. This numerical data treatment **will be applied** to identify and rank the most critical dimensions of difficulty experienced by the pre-service teachers. In addition, the qualitative responses from the follow-up interviews **will be transcribed**, coded, and thematically analyzed to capture students' deeper perceptions of their technological barriers. To justify the analysis rigor, a mean score interpretation template **will be applied** to classify the level of difficulties into low, moderate, or high categories.

RESULTS AND DISCUSSION

Results

The Results should include the rationale or design of the experiments as well as the results of the experiments. Results can be presented in figures, tables, and text. The Results should include the rationale or design of the experiments as well as the results of the experiments. Results can be presented in figures, tables, and text. The Results should include the rationale or design of the experiments as well as the results of the experiments. Results can be presented in figures, tables, and text.

Table 1. Number of Students Based Early Mathematical Ability

PAM	Experiments	Control
High	11	12
Medium	53	44

Low	9	10
Total	73	66

Discussion

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CONCLUSION

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ACKNOWLEDGMENTS

Place Acknowledgments, including information on the source of any financial support received for the work being published. Place Acknowledgments, including information on the source of any financial support received for the work being published.

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Kwon, J. W and Kim, S.D. (2014). Characterization of an antibiotic produced by bacillus subtilis JW-1 that suppresses Ralstonia solanacearum. J. Microbiol. Biotechnol. 24(1): 13-18, <http://dx.doi.org/10.4014/jmb.1308.08060>.

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