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Multiple Intelligence Type Profile of Prospective Physics Teacher Students: Recommendations for Lecture Methods to Create a Superior and Globally Competitive Generation

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Abstract: The type of multiple intelligence possessed by students can be a consideration for lecturers in determining the right lecture method so that it can create effective learning. The effectiveness of learning has an impact on the quality of superior and competitive student competencies. This study aims to analyze the distribution of multiple intelligences of students and relate them to relevant learning methods in the Physics Curriculum Review course in the Physics Education Study Program, University of Mataram. The subjects of the study were 22 class 5C students who took the multiple intelligence test. This study uses a descriptive approach with quantitative data analysis. The study was conducted in August 2024. The instrument used to view the profile of students' multiple intelligence types can be accessed through the online platform "Aku Pintar". The results showed that intrapersonal intelligence had the highest average of 83%, followed by logical-mathematical intelligence (78%), visual-spatial (75%), and verbal-linguistic (73%). Naturalistic and Interpersonal intelligence were 71%, while Kinesthetic intelligence was 70%. Musical intelligence had the lowest average, which was 63%. Based on these findings, the recommended learning methods include Project-Based Learning, Small Group Discussion, Contextual Instruction, and Role-Play to accommodate various types of student intelligence. These methods are integrated with topics such as the history of curriculum development, review of learning models, review of the Independent Curriculum teaching module, and the Pancasila Student Profile Strengthening Project. The conclusion of the study emphasizes the importance of implementing adaptive and varied learning methods in supporting the potential of students' multiple intelligences, in order to prepare them as competent, creative, and innovative prospective teachers. In other words, the application of lecture methods used by lecturers according to the type of multiple intelligences of students will support the formation of a superior and globally competitive generation. It is recommended for lecturers to optimize project-based and collaborative approaches, and for students to actively explore their intelligence potential. This study also provides recommendations to study programs to align the curriculum with student needs and educational developments.

Keywords: Multiple Intelligences; prospective teachers; lecture method.

Introduction

Multiple intelligence is a theory introduced by Howard Gardner that changed the way we view human intelligence. Gardner stated that intelligence is not only limited to intellectual abilities such as logical-mathematical and linguistic, but includes eight types of intelligence, namely linguistic, logical-mathematical, spatial, kinesthetic, musical, interpersonal, intrapersonal, and naturalistic. Each individual has a unique intelligence profile, and the combination of these various intelligences creates a unique potential in each person (Susandi & Marwan, 2020). This theory provides

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an important foundation in the world of education, including at the college level, to understand how students learn and develop their abilities (Hilala et al., 2021).

Prospective physics teacher students have a great responsibility in transferring knowledge and building an understanding of physics to students at the high school level (Hikmawati, Gunawan, et al., 2021). As prospective educators, they need to not only master physics content, but also be able to develop relevant and adaptive learning strategies for the needs of students who have diversity in learning styles and intelligence potential. Therefore, understanding the multiple intelligence profile of prospective physics teacher students is an important step to ensure that the lecture methods applied in college can prepare them optimally (Harianja & Utami, 2023).

However, the reality in the field shows that the learning approach in higher education is often still homogeneous, prioritizing lecture methods that only support certain intelligences, such as logical-mathematical and linguistic. This approach does not accommodate students with multiple intelligences that are more dominant in the visual-spatial, kinesthetic, or even musical aspects. This has the potential to hinder the development of students' full potential in understanding physics concepts and learning them creatively and applicatively (Sibuea et al., 2023).

The multiple intelligence profile of prospective physics teacher students can provide in-depth insights into how they learn and what their main strengths are in the process of understanding and teaching physics in high school. For example, students with dominant logical-mathematical intelligence may find it easier to understand formulas and calculations, while students with spatial intelligence are better at visualizing abstract concepts such as electric fields or waves (Thambu et al., 2021).

In addition, students with strong interpersonal intelligence can be effective learning facilitators in groups, while those with high intrapersonal intelligence are able to manage independent learning well. On the other hand, kinesthetic intelligence can support students' practical skills in physics experiments, which are an important component of physics learning in high school (Hikmawati, Sahidu, et al., 2021). By recognizing this diversity, lecturers can design more appropriate and inclusive teaching methods (Arini & Roesminingsih, 2021).

In the context of high school education, students also have a diversity of learning styles similar to multiple intelligences. Therefore, prospective physics teachers need to be trained to recognize this potential and be able to apply a variety of learning methods according to student needs. If prospective teachers' learning only focuses on a homogeneous approach, they tend to continue this method in the classes they manage later, so that the diversity of high school students' potential cannot be accommodated optimally (Hidayat & Nurjanah, 2022).

Research on the multiple intelligence profile of prospective physics teacher students has not been widely conducted, even though this information is very important in designing curriculum and lecture methods. This study can provide an in-depth picture of the dominant tendencies in student intelligence and how this affects the way they understand physics concepts. In addition, the results of this study can be used to provide recommendations for the development of more innovative learning strategies in higher education (Wilson, 2018).

Higher education institutions have a responsibility to equip prospective teacher students with pedagogical and professional skills that are in accordance with the challenges of the times. In the era of 21st century learning, flexibility in learning approaches is needed to produce graduates who are able to face the diversity of student potential. Therefore, understanding the multiple intelligence profile of prospective physics teacher students is a strategic step to create effective, relevant, and highly competitive learning (Yavich & Rotnitsky, 2020).

This article aims to examine the profile of eight types of multiple intelligence of prospective physics teacher students as a basis for providing recommendations for appropriate lecture methods. With a data-based approach and comprehensive analysis, this study is expected to be able to provide a real contribution to the development of physics learning at the higher education level (Ahdan et al., 2019; Bordei, 2017).

Through a deep understanding of the multiple intelligence profiles of prospective physics teacher students, universities can design more inclusive curricula, foster students' confidence in teaching, and ultimately improve the quality of physics education in high schools. Thus, this article not only provides a theoretical overview but also offers practical solutions to improve the quality of education for prospective physics teachers as a whole (Ansyu & Karundeng, 2023; Astuti, 2022).

Method

The type of research used in this study is a case study. This study aims to describe the profile of multiple intelligence types possessed by class 5C students in the Odd Semester of 2024 who are taking the Physics Curriculum Review course at the Physics Education Study Program, Faculty of Teacher Training and Education, University of Mataram. The number of

research subjects is 22 students. The subjects of this study are class 5C students who are registered for the Physics Curriculum Review course. The selection of subjects is based on the suitability of the lecture context with the research topic, as well as the ease of data collection because all subjects are in one organized class (Creswell, 2012).

The instrument used in this study is the Multiple Intelligences Test which is accessed through the online platform "Aku Pintar" at the link https://akupintar.id/tes-kemampuan. This test consists of 64 questions covering eight dimensions of multiple intelligences according to the theory developed by Howard Gardner, namely:

1. Kinesthetic
2. Interpersonal
3. Verbal/Linguistic
4. Logical/Mathematical
5. Naturalist
6. Intrapersonal
7. Visual/Spatial
8. Musical

This test aims to identify the dominant multiple intelligence tendencies in each student based on the scores obtained from each dimension. Research Procedure; 1. Preparation: Contacting students to provide information about the purpose and procedures of the study; Providing guidance to students on how to access and fill out the Multiple Intelligences Test through the "Aku Pintar" platform. 2. Data Collection: The test is carried out at the beginning of the lecture, precisely in August 2024; Students are asked to fill out the test online at the agreed time. 3. Data Processing: The test results obtained from the "Aku Pintar" platform are extracted and analyzed to identify the multiple intelligence profile of each student; The scores of each intelligence dimension are processed to determine the most dominant type of intelligence and the distribution of multiple intelligences in the class.

The data obtained were analyzed descriptively quantitatively. The scores of each intelligence dimension are summarized in tables and diagrams to show the distribution of students' multiple intelligences. The results of the analysis are explained narratively to describe the dominant intelligence tendencies in the research subjects. This study was limited to class 5C students who took the Physics Curriculum Review course in the odd semester of 2024, so the results cannot be generalized to the population of prospective physics teacher students as a whole. In addition, the instrument used was an online test that depended on the validity and reliability of the "Aku Pintar" platform. The results of this study are expected to provide an overview of the multiple intelligence profile of prospective physics teacher students and become the basis for providing recommendations for appropriate lecture methods to improve the effectiveness of learning in higher education.

Result and Discussion

An example of a screenshot of the results of a student's Multiple Intelligence Test is shown in Figure 1.

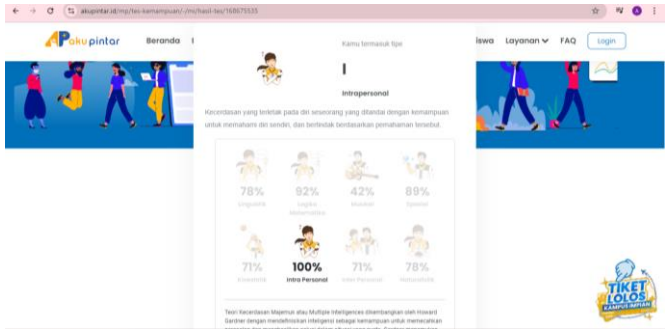

Figure 1. An example of a screenshot of the results of a student's Multiple Intelligence Test

Data on the eight types of multiple intelligences of students in the Physics Curriculum Review course can be seen in Figure 2.

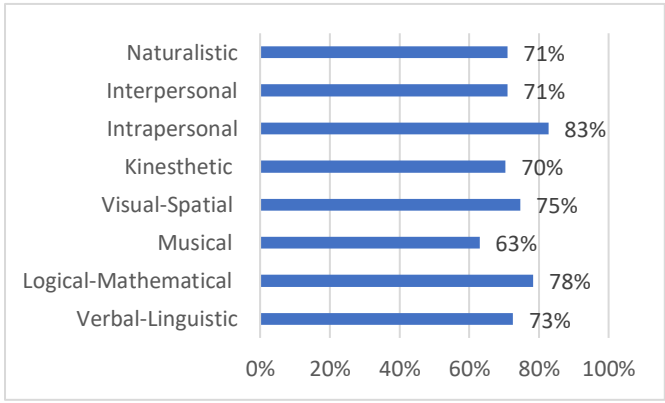

Figure 2. Data on the eight types of multiple intelligences of students

The results of multiple intelligence tests on 22 students of class 5C of the Physics Education Study Program, University of Mataram, show variations in the distribution of intelligence that can be used as a reference for designing learning in the Physics Curriculum Review course. Verbal-linguistic intelligence, with an average of 73%, shows students' ability to understand and express ideas textually and verbally. Learning methods such as Small Group Discussion (SGD) and Case-Based Learning (CBL) can be used to support learning topics such as the History of Curriculum Development in Indonesia and the Reasons for Curriculum Changes (Bohari, 2020; Nababan & Sagala, 2023; Usu & Adi, 2021). Students can be encouraged to discuss relevant curriculum policies in small groups or analyze cases of curriculum

implementation in various eras (Darmayani, 2023; Vahlepi et al., 2021).

Logical-mathematical intelligence with an average of 78% shows that students have good analytical skills. This is relevant for in-depth analysis-based learning on topics such as Learning Model Review and Assessment Review. Discovery Learning (DL) and Problem-Based Learning (PBL) methods can be used to encourage students to explore scientific-based learning models or design assessments that are in accordance with the basic competencies of the curriculum (Apriyani et al., 2020). Students can be trained to identify the most effective learning models based on existing theoretical frameworks and relate them to the demands of the Merdeka curriculum (Istidah et al., 2022; Mokoginta, 2023).

The results for musical intelligence (63%) show that although relatively lower, students can still be empowered through creative learning. In topics such as Review of Teaching Modules in the Merdeka Curriculum, the Role-Play and Simulations (RPS) method can be used to help students understand the structure of the teaching module (Hikmawati & Suastra, 2021). Simulations can include the role of a teacher who utilizes musical elements to motivate students in theme-based learning (Herchenröther et al., 2021).

Visual-spatial intelligence, which averages 75%, is very suitable for learning that requires visual representation. Students can be involved in learning using Contextual Instruction (CI) or Project-Based Learning (PjBL) on topics such as Review of Lesson Plans in the 2013 Curriculum (Hikmawati & Suastra, 2022). They can create visual designs of lesson plans or model the syntax structure of scientific-based learning in the form of diagrams. This kind of project will make it easier for students to understand the effective learning flow according to the demands of the curriculum (Erdi & Padwa, 2021; Sakti et al., 2021; Wahyuni & Fitriana, 2021; Zakiah & Fajriadi, 2020).

Kinesthetic intelligence (70%) shows students' ability to learn through physical activity. On topics such as Review of the Pancasila Student Profile Strengthening Project, methods such as Role-Play and Simulations (RPS) are very suitable. Students can be involved in simulations of implementing P5 projects, such as demonstrations of cultural or environmental-based activities that are relevant to the P5 theme. This activity not only develops students' understanding of P5 but also trains their skills in applying it in classroom learning (Korochentseva et al., 2020).

Intrapersonal intelligence has the highest average (83%), indicating that students have good self-reflection and independence skills. In topics such as Review of Teaching Modules in the Independent Curriculum, the Self-Directed Learning (SDL) method can be applied. Students can be directed to independently study the teaching module and identify the advantages and disadvantages of the module, then present the results of their analysis (Lemmetty & Collin, 2020). This approach not only improves student understanding but also trains them to become critical independent learners (Erbil, 2020).

Interpersonal intelligence (71%) shows students' ability to work together. The Collaborative Learning (CbL) method is very suitable to support learning in topics such as Assessment Review and Lesson Plan Review in the 2013 Curriculum. Students can work in groups to evaluate assessment tools and lesson plans based on the applicable curriculum (Ansari & Khan, 2020; Zahroh et al., 2023). Through collaborative work, they can share ideas, correct deficiencies, and produce better learning tools (Suendarti & Virgana, 2022; Sukmayanti & Aliyyah, 2023).

Naturalist intelligence with an average of 71% shows students' potential in linking learning to natural phenomena. The Contextual Instruction (CI) method is very suitable for topics such as the Pancasila Student Profile Strengthening Project Review (P5), especially themes related to the environment. Students can be involved in projects that integrate physics concepts with environmental issues, such as creating simple experiments on renewable energy or measuring water quality that is linked to the Pancasila student profile (Budiman et al., 2020; Study & Weda, 2024).

Overall, the results of the multiple intelligence test provide guidance for designing adaptive and relevant learning in the Physics Curriculum Review course. This approach supports students to develop their potential to the maximum and is relevant to the challenges of implementing the curriculum in schools. The combination of methods such as PjBL, CBL, and CI allows students to learn collaboratively, analytically, and contextually, in accordance with the demands of an innovative and adaptive physics curriculum (Hidayati & Evy Wisudariani, 2023; Hikmawati et al., 2024).

This approach is also in line with the vision of the physics education study program, namely to develop physics education based on contemporary media and learning tools. By understanding the distribution of students' multiple intelligences, lecturers can optimize learning to produce prospective teachers who are not only professionally competent, but also able to implement the curriculum effectively in the classroom.

Conclusion

Based on the results of the multiple intelligence analysis of class 5C students of the Physics Education Study Program, University of Mataram, it can be concluded that each student has diverse intelligence potential. Intrapersonal intelligence is the highest with

an average of 83%, indicating good self-reflection skills. Followed by logical-mathematical intelligence (78%) and visual-spatial intelligence (75%), which are relevant for analysis and visualization-based learning. Verbal-linguistic, kinesthetic, interpersonal, and naturalist intelligence are also in the good category, while musical intelligence is relatively lower compared to other dimensions.

These findings indicate that learning methods in the Physics Curriculum Review course need to be designed in a varied and adaptive way to accommodate various types of intelligence. Approaches such as Small Group Discussion, Project-Based Learning, Self-Directed Learning, and Contextual Instruction can be used to support students' understanding of topics such as the History of Curriculum Development in Indonesia, Assessment Review, Review of the Independent Curriculum Teaching Module, and the Pancasila Student Profile Strengthening Project. By integrating learning methods that are appropriate to the type of student intelligence, learning is not only able to improve students' competence in understanding the curriculum but also prepare them to become prospective teachers who are competent, creative, and adaptive to the challenges of implementing the curriculum in schools.

The suggestions that the author can provide are as follows. For Lecturers: Lecturers are advised to use a varied, project-based, and collaborative learning approach to accommodate the distribution of students' multiple intelligences. Methods such as Project-Based Learning and Contextual Instruction are highly recommended, especially on topics that require the development of learning tools. In addition, simulations or role-plays can be used to improve students' kinesthetic and interpersonal abilities. For Students: Students are advised to actively explore various learning methods that are appropriate to their multiple intelligences. Students with high intrapersonal intelligence, for example, can maximize self-based learning, while those with high visual-spatial intelligence can contribute more in visual design-based activities of learning devices. For Study Programs: The Physics Education Study Program can consider the results of this study to design a curriculum that is more adaptive to student potential. Additional training for lecturers on the implementation of multiple intelligence-based learning methods can also be carried out to improve the quality of learning. For Further Research: Similar research can be expanded to a larger population or to other study programs to obtain more comprehensive data. In addition, the development of multiple intelligence instruments that are more specific to physics education students can be carried out to obtain more accurate and applicable results.

Thus, it is hoped that the findings of this study can be a foundation for improving the quality of learning in the Physics Education Study Program, University of Mataram, in accordance with its vision and mission in producing superior, innovative, and competitive prospective teachers.

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