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# Analysis Of The Needs For A Project-Based Learning (PJBL) Model With Aswaja Characteristics In Mathematics Courses For Elementary School Teacher Education Students

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## Abstract

The needs analysis for implementing Project-Based Learning (PBL) with Aswaja values in mathematics courses at the Primary School Teacher Education (PGSD) Program is essential to assess student and lecturer readiness, challenges, and preferences. This study aims to analyze the need for a PBL model with Aswaja values to enhance students' mathematics learning outcomes at the Islamic University of Makassar. Using a qualitative descriptive approach, the study explores the application of this model in PGSD mathematics courses. Data were collected from students and lecturers through observation, documentation, and questionnaires, then analyzed using qualitative techniques, including coding, analysis, data triangulation, and presentation. The findings indicate a strong need for a PBL model with Aswaja values, as seen in three key aspects: learning model needs, learning challenges, and learning expectations. This study contributes to integrating PBL with Aswaja values systematically, enhancing both mathematical understanding and character development in PGSD students.

**Keywords :** Project-Based Learning Model, Aswaja Values

## Introduction

The mathematics cour se plays a crucial role in preparing prospective elementary school teachers to become competent educators. Mathematics not only teaches numerical skills but also trains logical, analytical, and creative thinking abilities that are essential in the learning process. A strong understanding of mathematical concepts becomes a fundamental asset for prospective teachers to effectively teach these materials to students in ways that are easy to understand and relevant to everyday life. Additionally, this course helps students develop pedagogical skills, such as designing engaging teaching strategies that align with students' needs. With the right approach, mathematics learning can also foster students' confidence in teaching and effectively delivering concepts. Therefore, mastery of basic mathematics not only builds the academic competence of prospective

teachers but also equips them with the ability to educate students holistically, contributing to the creation of an intelligent and high-quality generation.

Students in the Elementary School Teacher Education (PGSD) program often face various challenges in understa nding and applying mathematical concepts. One of the main challenges they encounter is math anxiety, which frequently hinders the learning process and reduces their confidence in teaching mathematics (Akbari et al., 2019). Moreover, limited comprehension of fundamental mathematical concepts, such as arithmetic and geometry, often becomes an obstacle to developing the pedagogical skills needed for effective teaching (Oktaviani et al., 2021). PGSD students also struggle to connect mathematical theory with practical application, requiring them not only to master the material but also to possess the skills to convey these concepts to students in a simple and easily understood manner (Suryani & Novianti, 2020). To address these challenges, it is crucial to integrate more interactive and contextual learning approaches, such as utilizing relevant teaching media and implementing problem-based learning methods that can enhance students' understanding and engagement in mathematics learning (Widiastuti et al., 2022).

The importance of an effective learning model to address the challenges faced by PGSD students in understanding and applying mathematical concepts cannot be underestimated. PGSD students often struggle to connect mathematical concepts with practical teaching in elementary schools. Additionally, many students find it difficult to understand abstract and complex mathematical concepts, which affects their comprehension and ability to teach mathematics effectively to students. Therefore, implementing an appropriate learning model is essential to overcome these challenges and prepare prospective teachers to teach mathematics effectively.

One effective learning model is Project-Based Learning (PjBL) with Aswaja (Ahlussunnah wal Jama'ah) characteristics. This model allows students to engage in real-world projects that utilize mathematical concepts in practical contexts, helping them better understand the relevance of these concepts. Through this approach, students not only memorize theories but also learn to apply them in daily life, enhancing their understanding and skills (Setyawan & Hidayati, 2022).

The PBL model integrated with Aswaja characteristics addresses the challenges faced by PGSD students in understanding and applying mathematical concepts. This model emphasizes not only academic understanding but also character and spiritual development. Project-based learning allows students to actively engage in problem-centered learning processes, helping them connect theory with practice. Furthermore, integrating Aswaja values into learning helps shape students who are intellectually capable and morally upright, promoting cooperation and tolerance.

PBL has great potential to help students overcome challenges in understanding abstract mathematical concepts. In PBL, students not only learn mathematical theories conventionally but also have opportunities to work in groups and apply their knowledge to solve real-world projects. This approach encourages students to be more active in finding solutions and making decisions involving mathematical knowledge, thereby enhancing their problem-solving skills (Setyawan & Hidayati, 2022).

Additionally, integrating Aswaja values into learning can enhance students' moral and ethical values, which are crucial in teacher education. Aswaja values, which emphasize peace, tolerance, and a love for knowledge, shape PGSD students to excel not only in mathematical understanding but also in integrity and social responsibility. Implementing Aswaja values in learning also helps students navigate social and academic challenges in mathematics education, particularly in fostering harmonious collaboration with peers (Haryanto & Susilawati, 2021).

Combining the PBL model with Aswaja characteristics creates a learning approach that effectively enhances mathematical understanding while supporting students' personal development. With this approach, PGSD students are better prepared to become teachers who not only master the subject matter but can also impart noble values essential for the character development of elementary school students.

The character of Ahlussunnah wal Jama'ah (Aswaja) plays a vital role in shaping students' personalities, especially in the context of education. Education that integrates Aswaja values, such as tolerance, unity, and a love for knowledge, is highly relevant in building strong character among future teachers, especially in the PGSD program. These values not only help students appreciate diversity but also strengthen their ability to work effectively in diverse educational environments.

In the context of mathematics education in PGSD, implementing PBL with Aswaja characteristics can be highly effective. PBL enables students to actively learn through real-world projects, allowing them to apply mathematical concepts in situations relevant to daily life. Through these projects, students can develop problem-solving skills, work collaboratively, and practice applying mathematical concepts in more meaningful and contextual ways. Furthermore, PBL encourages students to be more tolerant, value others' opinions, and learn to work together in overcoming shared challenges—values aligned with Aswaja characteristics, which emphasize unity and tolerance (Al-Amin, 2016; Nasution, 2015).

Aswaja values also teach students to love knowledge as a means of achieving goodness and benefit. By integrating Aswaja characteristics into project-based learning models, PGSD students can learn mathematics holistically and applicatively. Projects conducted within the PBL model not only aim to achieve final results but also serve as a means to foster a love for learning and an appreciation for hard work. This aligns with Wahyuni's (2018) view, which emphasizes that Islamic education based on Aswaja can develop students who are not only academically excellent but also possess strong character.

Furthermore, an Aswaja-based approach in PBL provides opportunities for students to collaborate in diverse teams, manage differences, and maintain ethics in communication. This is highly beneficial for teaching mathematics in elementary schools, where teachers must manage classes with students from diverse backgrounds. The application of Aswaja values, which emphasize social justice, tolerance, and solidarity, as explained by Zuhri and Ahmad (2019), provides a strong moral foundation for addressing challenges in classrooms and society.

Overall, the integration of the Project-Based Learning (PBL) model with Aswaja characteristics provides a learning approach that not only enhances PGSD students'

understanding of mathematical concepts but also shapes their character into noble, tolerant individuals who are prepared to face challenges in the field of education.

A needs analysis for implementing Project-Based Learning (PBL) with Aswaja characteristics in mathematics courses within the Elementary School Teacher Education (PGSD) program is crucial to understanding the readiness, challenges, and preferences of students and lecturers. Project-based learning allows students to learn actively through the application of mathematical concepts in real-life contexts, requiring practical and collaborative skills. Therefore, a thorough needs analysis is necessary to evaluate the extent to which students are prepared to follow the PBL model and identify potential obstacles that may arise during the learning process, such as time constraints, conceptual understanding, or insufficient resources (Rahmawati & Susilawati, 2021). Additionally, understanding students' preferences for specific teaching methods is essential because each individual has a unique learning style. With this information, lecturers can adjust their approach to make it more relevant and engaging for students, thereby optimizing the learning process (Pramiswari, Suwandayani, & Deviana, 2023).

The Aswaja character, which emphasizes values such as tolerance, unity, and appreciation of knowledge, can serve as a strong foundation for managing group dynamics during the implementation of PBL. Integrating these values is important for creating a harmonious and respectful learning atmosphere that facilitates effective teamwork within project groups (Zuhri & Ahmad, 2019). Thus, incorporating Aswaja characteristics into PBL can strengthen the social competencies of students, which are essential for their professional lives as future elementary school teachers. A comprehensive needs analysis not only aids in designing a more effective learning model but also ensures that students master academic material while developing character aligned with national values and moderate religious education.

The urgency of a needs analysis for the Project-Based Learning (PBL) model with Aswaja characteristics in mathematics courses within the PGSD program is high, given the constant demand for innovation in teaching methods in the education sector. PBL is a teaching model that enables students to learn through direct experience, where they are given the opportunity to solve problems or projects related to real-life scenarios. In the context of teacher education, the implementation of PBL provides PGSD students with opportunities to refine the practical skills crucial for teaching mathematics in elementary schools while also developing the social competencies essential in education. However, before applying this model, conducting an in-depth needs analysis is essential. The analysis aims to determine students' readiness to engage with the project-based learning model, identify challenges or obstacles that may arise during the learning process, and understand students' preferences for the teaching methods to be implemented.

By conducting a needs analysis, lecturers can tailor their teaching approach to suit students' comprehension levels, available resources, and diverse learning styles. Additionally, the Aswaja character, which emphasizes values such as unity, tolerance, and moderation in religious practices, needs to be integrated into the learning process. This integration is particularly relevant as it strengthens the ethics and collaboration skills of students in executing project-based learning. PGSD students trained to adopt Aswaja characteristics are expected not only to have strong mathematical skills but also to possess

a positive attitude in managing diversity, fostering tolerance, and collaborating with others. Thus, a comprehensive needs analysis will help design learning that is not only effective in achieving academic goals but also supports character development aligned with contemporary demands and inclusive, value-based education.

Based on the background presented above, the initial research title can be formulated as follows: *The Development of a Project-Based Learning (PBL) Model with Aswaja Characteristics to Improve Mathematics Course Learning Outcomes for PGSD Students at Universitas Islam Makassar.* The research aims to provide an overview of the needs analysis for the Project-Based Learning (PBL) model with Aswaja characteristics to improve mathematics course learning outcomes for PGSD students at Universitas Islam Makassar.

## Research Method

This study employs a qualitative approach with a descriptive method to gain an in-depth understanding of the need for implementing the Project-Based Learning (PBL) model integrated with Aswaja characteristics in mathematics courses within the Elementary School Teacher Education (PGSD) program. The approach aims to provide a clear depiction of students' and lecturers' readiness, challenges encountered, and preferences regarding the application of this teaching method. This study is classified as exploratory research, as it seeks to analyze and explore information related to the implementation of a project-based learning model that aligns with Aswaja characteristics in the context of mathematics education for prospective elementary school teachers.

The subjects of this research consist of two groups: 1) Students of the PGSD program who are currently taking mathematics courses. The sample was selected using purposive sampling, considering students with prior experience in learning mathematics. 2) Lecturers teaching mathematics courses in the PGSD program, selected based on their teaching experience and involvement in using project-based learning models.

The data for this research was collected from: 1) Observations of the mathematics course implementation, focusing on the application of teaching methods and Aswaja characteristics. 2) Documentation, including syllabi, semester learning plans (RPS), and teaching materials used in the mathematics course. 3) Questionnaires to measure students' preferences regarding the proposed teaching model and to explore the challenges they face.

Data Collection Techniques include: 1) Semi-Structured Interviews with students and lecturers to obtain their perspectives on the needs, challenges, and readiness for implementing the PBL model with Aswaja characteristics. 2) Classroom Observations to directly observe the learning process, focusing on how PBL is implemented in mathematics teaching and how Aswaja characteristics are integrated into classroom activities. 3) Questionnaires completed by students to evaluate their preferences for the PBL model with Aswaja characteristics and the challenges they experience.

The research instruments include: 1) Interview Guides designed to explore information about the needs for the PBL model, Aswaja characteristics, and challenges faced by students and lecturers in the learning process. 2) Observation Sheets to record classroom activities and interactions between students and lecturers relevant to the implementation of the PBL model and Aswaja characteristics. 3) Questionnaires with open-

ended and closed-ended questions to identify students' preferences and challenges in following project-based learning.

The collected data will be analyzed using qualitative data analysis techniques through the following steps: 1) Coding interview and observation data to identify key themes related to the readiness of students and lecturers, challenges faced, and preferences for the PBL model and Aswaja characteristics. 2) Thematic Analysis to organize and group themes based on similarities in interviews and observations. 3) Data Triangulation to ensure data validity by comparing interview, observation, and questionnaire results. 4) Data Presentation in the form of descriptive narratives describing the needs analysis obtained from the research results. Data validity is ensured through source and technique triangulation and validation via discussions with experts and peers. Reliability is achieved by ensuring consistency in the use of research instruments and data collection procedures.

## Results And Discussion

### A. Results

#### 1. Overview of Student Needs Analysis Results

Needs analysis is a critical initial process in developing the PjBL model with Aswaja characteristics to improve learning outcomes in mathematics courses for PGSD students at Universitas Islam Makassar. This process aims to identify gaps between the actual learning conditions and the ideal conditions expected based on Aswaja values. These values include tasamuh (tolerance), tawassuth (moderation), tawazun (balance), and ta'adul (justice or neutrality), which need to be effectively embedded in learning to contribute to students' character development.

The needs analysis is conducted to assess the extent to which these values have been implemented, identify the needs of students and lecturers for relevant teaching models, and uncover challenges or obstacles encountered during implementation. Data is collected through instruments such as questionnaires, interviews, or focus group discussions involving students, lecturers, and other stakeholders. The results of this needs analysis will serve as an empirical foundation for designing a teaching model that is not only relevant but also capable of meeting multicultural learning needs in higher education.

The following is an overview of the data analysis results from 10 questions related to the development of a project-based learning (PjBL) model with Aswaja characteristics to improve learning outcomes in mathematics courses for PGSD students at Universitas Islam Makassar. This model will be developed into teaching materials, including a model book and a teaching guide. Below are the findings from the student needs analysis:

#### a. Analysis of Students' Needs for the Learning Model

This instrument was designed to explore students' needs and preferences for project-based mathematics learning integrated with Aswaja (Ahlus Sunnah wal Jama'ah) values. Statements regarding the benefits of project-based learning in enhancing mathematical understanding aim to assess the extent to which students recognize the importance of contextual approaches in grasping concepts. Additionally, the instrument identifies

students' needs to connect mathematical theory with practical applications in everyday life, providing a foundation for designing projects relevant to their interests.

Students' interest in integrating Aswaja values, such as tawadhu' (humility), istiqamah (consistency), and gotong-royong (teamwork), is a key aspect explored through this instrument. This aims to foster learning that not only focuses on academic aspects but also holistically shapes students' character. Statements on collaboration in project-based learning are included to examine students' perceptions of the importance of teamwork, which aligns with Aswaja values. Furthermore, integrating Aswaja values into mathematics courses is expected to serve as an effective effort to instill moral values that support character development.

This instrument can be implemented as a questionnaire using a Likert scale to measure the degree of student agreement with the given statements. The data obtained will be used as a basis for designing a project-based learning model that is relevant, effective, and practical while ensuring that Aswaja values are explicitly integrated into the learning process. Consequently, the developed learning approach is expected to enhance students' academic competence while simultaneously shaping their character based on Aswaja values.

**Table 4.1 Learning Model Needs**

| Category | Frequency | Percent |
|---|---|---|
| Need | 3 | 8,1 |
| Really need it | 34 | 91,9 |
| Total | 37 | 100,0 |

Table 4.1 presents the results of the analysis of learning model needs based on respondents' feedback. According to the data, two categories of need were identified: Needed and Highly Needed. Out of 37 respondents, 34 (91.9%) indicated that they Highly Need a suitable learning model, while 3 respondents (8.1%) indicated that they merely Need it.

These findings highlight a significant demand among the majority of students for the development of a relevant, innovative, and student-centered learning model. The high proportion in the Highly Needed category reflects students' awareness of the importance of a learning model that can enhance content comprehension, encourage active engagement in the learning process, and ensure the relevance of education to real-life applications.

This strong demand can be linked to the challenges students face with traditional learning methods, which are often less interactive and lack integration with practical or moral aspects. A potential solution lies in developing a project-based learning model that allows students to learn in a contextual, collaborative, and applicable manner. Furthermore, integrating Aswaja (Ahlus Sunnah wal Jama'ah) values, such as tawadhu' (humility), istiqamah (consistency), and gotong-royong (teamwork), can strengthen students' character formation, ensuring that learning focuses not only on cognitive aspects but also on moral and social dimensions.

This data provides a strong foundation for decision-making in developing a learning model. By addressing the identified needs, developers can design more effective, valid, and practical methods to support improvements in the quality of the learning process. It also represents a strategic step toward creating holistic education that accommodates students' academic and character development needs in a balanced way.

**b. Challenges Faced by Students in Learning**

The instrument for identifying challenges consists of three key statements revealing the difficulties and needs of students in mathematics learning. The current learning media available do not support project-based learning, which hinders students' active participation in the learning process. Project-based learning requires media that facilitate exploration, simulation, and collaboration to help students connect theory with practical applications.

Moreover, students frequently experience difficulties in understanding mathematical concepts due to teaching methods that tend to be ineffective. Overly theoretical approaches that fail to actively involve students or lack relevance to their learning needs are key factors contributing to these difficulties. Students also expressed a need for more guidance or practical examples relevant to real-life situations to make mathematical concepts easier to understand.

Overall, these findings underscore the urgency of innovating both the media and methods used in mathematics education. Proposed solutions include developing technology-based learning media, adopting project-based approaches, and providing practical guides and applications to create learning experiences that are more contextual, effective, and meaningful.

**Table 4.2 Identification of Learning Challenges**

| Category | Frequency | Percent |
|---|---|---|
| Need | 5 | 13,5 |
| Really need it | 32 | 86,5 |
| Total | 37 | 100,0 |

Table 4.2 shows the results of the needs analysis in addressing the learning obstacles faced by students. This data is divided into two categories: Need and Very Need. Out of the total 37 respondents, 32 (86.5%) stated that they Very Need solutions to overcome learning obstacles, while 5 (13.5%) stated they only Need them.

This result reflects that the majority of students feel they have an urgent need for strategies, media, or teaching approaches that can help them overcome various obstacles they face. The high percentage in the Very Need category indicates the urgency of addressing learning barriers such as difficulty in understanding the material, lack of practical applications, or methods that are less relevant to their needs.

This data also shows that the learning obstacles experienced by students are significant and require serious attention from instructors or curriculum developers. These findings can serve as a foundation for designing more supportive, innovative learning models that meet students' needs, such as project-based learning, the use of interactive

media, or the integration of certain values to improve effectiveness and student engagement in the learning process.

The high need among students to overcome learning obstacles indicates a gap between the teaching methods currently implemented and the students' learning needs. These obstacles likely include difficulty in understanding the material, lack of supporting learning media, less interactive methods, or limited practical applications in learning. Therefore, strategic steps are needed to address these issues, such as developing innovative learning models that are more contextual, interactive, and relevant to students' needs.

This conclusion also emphasizes the importance of strengthening the role of instructors and institutions in creating a supportive learning environment. Proposed solutions may include the use of technology-based learning media, the application of project-based learning approaches, or the integration of certain values that support character development while enhancing understanding of the material. Thus, the development of adaptive and effective learning becomes an urgent need to improve the quality of student learning outcomes.

**c. Analysis of Student Expectations in Learning**

The instrument developed based on these two statements aims to explore student expectations regarding the application of project-based learning and the integration of Aswaja values in mathematics courses. The first statement reveals the students' hope for the consistent implementation of project-based learning in mathematics lectures. Students desire an approach that allows them to understand mathematical concepts through direct experience and real-world problem-solving. Project-based learning can enhance student engagement actively, as well as develop critical thinking, collaboration, and creativity skills. Therefore, consistency in its implementation is crucial to ensure the continuity of the benefits that students can gain.
The second statement reflects the students' desire to better understand the connection between mathematical concepts and Aswaja values (Ahlus Sunnah wal Jama'ah) in the learning process. Students hope that mathematics education will not only focus on academic aspects but also integrate values such as tawadhu' (humility), istiqamah (consistency), and gotong-royong (cooperation), which can help strengthen character formation and make learning more meaningful spiritually and morally. The integration of these values can provide a new dimension in mathematics learning that not only advances intellectual aspects but also shapes students with character aligned with Islamic teachings. By using this instrument, mathematics teaching can be more relevant to students' needs, both academically and in character development, through the implementation of project-based learning that also contains important moral values.

**2. Overview of the Needs Analysis for the Teaching Model**

This instrument aims to identify various aspects related to the development of a Project-Based Learning (PjBL) model based on Aswaja values (Ahlussunnah wal Jama'ah) in the mathematics courses at PGSD. By exploring the needs, obstacles, and expectations of instructors, this instrument provides a comprehensive overview of the necessary elements to design a relevant and effective teaching model.

In the needs section, this instrument explores the extent to which instructors view the relevance of PjBL in mathematics education and their need for guidance, training, and teaching resources integrated with Aswaja values. This section is essential to ensure that the developed model aligns with the expectations and practical needs of instructors in the field.

The learning obstacles section aims to identify the barriers instructors face when applying the teaching model, such as limitations in facilities and infrastructure, lecture time constraints, and students' difficulties in understanding the material. This information will help in designing realistic solutions that are in line with the current conditions.

The learning expectations section is designed to understand instructors' expectations regarding the outcomes of implementing the Aswaja-based PjBL model. These expectations can serve as a reference in developing a model that not only enhances student learning outcomes but also shapes character in line with the Islamic values upheld by the institution.

Overall, this instrument will provide empirical data that can be used to create a practical Aswaja-based PjBL teaching model that supports the needs of instructors and can overcome field challenges, resulting in a significant improvement in student learning outcomes

**a. Analysis of Instructor Needs for the Teaching Model**

The Project-Based Learning (PjBL) model is considered relevant to implement in PGSD mathematics courses because it encourages active student involvement in the learning process. This approach not only focuses on completing projects but also provides space for students to develop critical thinking and collaborative skills. Additionally, the integration of Aswaja values (Ahlussunnah wal Jama'ah) in this teaching model is seen as beneficial for shaping student character, such as fostering attitudes of tolerance, cooperation, and moderation, which are crucial to supporting an Islamic value-based education. However, for effective implementation, instructors require structured guidance or a teaching model to ensure that the Aswaja-based PjBL is successfully applied. Moreover, specialized training for instructors regarding the application of the PjBL model is needed to make the learning process more directed and optimal. Overall, this project-based learning model has significant potential to enhance student engagement and learning outcomes, particularly if supported by adequate resources and training.

Table 4.5 **Instructor Expectations and Needs for the Teaching Model**

| Category | Frequency | Percent |
|---|---|---|
| Need | 6 | 40,0 |
| Really need it | 9 | 60,0 |
| Total | 15 | 100,0 |

Table 4.5 shows data regarding the instructors' expectations for the teaching model's needs. Out of the total 15 respondents, 6 (40.0%) stated that they "need" a teaching model, while the majority, 9 (60.0%), stated that they "very much need" a teaching model. This indicates that all instructors (100.0%) agree on the importance of having a relevant and structured teaching model to support their teaching process.

This data indicates that the need for the development of a teaching model is not only significant but also urgent for most instructors. The expected teaching model should be

able to address the challenges faced in teaching while improving the effectiveness and efficiency of the teaching and learning process, particularly in the application of methods such as Project-Based Learning (PjBL) integrated with Aswaja values.

**b. Analysis of Instructors' Obstacles in Teaching**

The instrument used to evaluate the implementation of Project-Based Learning (PjBL) in mathematics education is designed to identify both supporting and inhibiting factors. One aspect that needs to be analyzed is the availability of facilities and infrastructure. To assess this, a questionnaire or checklist can be used to determine whether facilities such as classrooms, supporting technology, teaching aids, and learning resources are adequate. An example item in the questionnaire could be, "Are the available facilities adequate to support project-based learning?" with a rating scale from very inadequate to very adequate.

Additionally, to evaluate students' difficulties in understanding mathematics concepts, questionnaires, interviews, or diagnostic tests can be used. This instrument aims to assess how well the current teaching methods support students' understanding of mathematical concepts. For example, a question in the questionnaire might be, "How often do you experience difficulty in understanding mathematics concepts during the lessons?" with a rating scale from very often to never. This data could also be supplemented with interviews to further explore the causes of these difficulties.

Another aspect to evaluate is the available lecture time. To measure whether the available lecture time is sufficient to support the implementation of PjBL, a questionnaire could include items like, "In your opinion, is the available lecture time sufficient for implementing project-based learning?" with a rating scale from very insufficient to very sufficient. By using a combination of quantitative and qualitative instruments, the data obtained is expected to provide a valid and reliable overview of the barriers and opportunities for implementing PjBL in mathematics education.

Table 4.6 **Results of Instructors' Obstacles in Teaching**

| Category | Frequency | Percent |
|---|---|---|
| Need | 5 | 33,3 |
| Really need it | 10 | 66,7 |
| Total | 15 | 100,0 |

The data in Table 4.6 shows the results of the analysis of instructors' obstacles in teaching based on their needs for supporting factors in the implementation of learning, which were evaluated using a questionnaire instrument. According to the table, 33.3% of instructors stated that they "Need" improvements in facilities, time, or methods to support project-based learning, while 66.7% of instructors stated that they "Very Much Need" such improvements. With a total of 15 respondents, all instructors (100%) indicated the need for further improvement or support.

This result reflects that the majority of instructors feel that the implementation of project-based learning (such as PjBL) still faces significant obstacles, including issues with facilities, time allocation, and students' ability to understand the material. The instrument

used, such as the questionnaire with a need scale (Need to Very Much Need), has helped identify the level of need among instructors to support the effectiveness of learning.

These findings emphasize that in order to optimize the implementation of PjBL, more attention is needed to provide adequate facilities, arrange suitable time allocation, and develop teaching methods that are easier for students to understand. This data can serve as a foundation for relevant parties, such as educational institutions, to provide more concrete support to instructors in overcoming these obstacles.

**c. Instructors' Expectations for the Teaching Model**

The instrument in the third part on learning expectations is designed to identify instructors' expectations regarding the implementation of the project-based learning (PjBL) model and the need for guidance that is relevant to character education values. The first statement, "I hope that the PjBL teaching model can significantly improve student learning outcomes," reflects the instructors' expectation of the effectiveness of PjBL in enhancing student learning outcomes. This instrument can take the form of a Likert scale questionnaire to evaluate the level of instructors' expectations, such as with the question, "How much do you hope the PjBL model can improve student learning outcomes?" The scale choices, ranging from not hopeful at all to very hopeful, allow researchers to understand how confident instructors are in the success of the method. The second statement, "I want to have a guide that integrates mathematics learning and Aswaja character," reflects the instructors' need for teaching materials that not only focus on mastering mathematics content but also integrate Aswaja (Ahlussunnah wal Jama'ah) character values. The instrument to evaluate this need could take the form of a Likert scale questionnaire or interviews to explore the elements that are expected in such a guide. For example, a questionnaire might ask, "How important is an integrated guide between mathematics learning and Aswaja character for you?" or interviews with open-ended questions like, "What elements do you think should be included in a guide for mathematics learning integrated with Aswaja character values?" Through this instrument, the data collected provides insights into the expectations and needs of instructors to improve the quality of learning. This information can serve as a basis for program developers to design appropriate interventions or guides, making project-based learning more effective and relevant to the context of character education.

Table 4.7 **Results of Instructors' Expectations for the Teaching Model**

| Category | Frequency | Percent |
|---|---|---|
| Need | 6 | 40,0 |
| Really need it | 9 | 60,0 |
| Total | 15 | 100,0 |

Table 4.7 shows the results of the analysis of instructors' expectations regarding the need to enhance learning effectiveness through the Project-Based Learning (PjBL) model and an integrated guide between mathematics learning and Aswaja character. According to the table, 40.0% of instructors stated that they "Need" it, while 60.0% stated that they "Very Much Need" it. With a total of 15 respondents, this result indicates that all instructors (100%) expect their needs for the development of a relevant teaching model and guide to

be met. This result aligns with the instrument used, which is a questionnaire with a need scale, such as "How much do you need a PjBL teaching model that can improve student learning outcomes?" and "How important is an integrated guide between mathematics learning and Aswaja character for you?" The Likert scale used makes it easier for instructors to express the level of their needs, from Need to Very Much Need.

From the data, it is clear that the majority of instructors (60%) very much need interventions in the form of developing a PjBL teaching model and an integrated learning guide. This finding highlights the importance of efforts to meet these needs, particularly in providing practical guides that not only support improving learning outcomes but also integrate character education values. This data can serve as a foundation for educational institutions to take strategic steps in supporting instructors' expectations to make learning more effective and relevant.

## B. Discussion

Needs analysis is a process carried out to identify the needs of learners so that educators can meet those needs. Through the right steps, issues related to learning needs can be fulfilled. The results of the needs analysis for the development of a PjBL model with Aswaja character to improve the learning outcomes of mathematics courses for PGSD students at the university were obtained through observation, questionnaire distribution, and interviews with students and instructors. The results revealed that students' mathematical abilities are still very low. This impacts their very limited interest in writing, as evidenced by the types of writing produced, which are still categorized as low.

The gap between expectations and the current reality needs to be addressed by developing a Project-Based Learning (PjBL) model with Aswaja character to improve mathematics course learning outcomes for PGSD students. This model was chosen because it has several advantages compared to other models, considering model development theory, Albert Bandura’s social learning theory, and the characteristics of students who are already in the formal operational stage according to Piaget's cognitive theory, where they are capable of abstract thinking (Santosa et al., 2022).
The analysis stage includes learning objective analysis, which consists of semester learning plans, textbooks, and learning process analysis, which includes the analysis of student and instructor needs.

### 1. Analysis of the Semester Learning Plan

The Mathematics course in the Primary School Teacher Education Program (PGSD) is designed to provide students with an in-depth understanding of the fundamental mathematics concepts relevant to teaching at the primary school level. Various important topics such as arithmetic, geometry, algebra, statistics, and mathematical logic are taught using an applied and contextual approach (Ananda & Wandini, 2022). In addition to mastering the material, students are also trained to develop pedagogical skills in designing, implementing, and evaluating innovative, creative, and student-centered mathematics lessons (Faisal & Aslamiah, 2023). This course aims to enhance critical thinking skills, numeracy literacy, and problem-solving, while encouraging the use of educational

technology and learning media to create an interactive and meaningful learning experience (Santosa et al., 2022).

Through this course, PGSD students are prepared to become competent educators who can teach mathematics effectively, engagingly, and according to the characteristics of primary school students. They are taught how to present abstract mathematical concepts in simple, clear, and relevant ways to students' daily lives, thus building a strong foundation in mathematics while fostering an interest in learning (Susanto Ahmad, 2013). Problem-based learning, project-based learning, and educational games are the main methods used to improve students' understanding and engagement.

Students are also involved in various hands-on activities such as teaching simulations, classroom observations, and action research to connect theory with real-world practice. This aims to develop reflective skills on the learning process while enhancing its quality. In addition, character education values such as patience, honesty, and responsibility are integrated into the mathematics learning process to instill positive attitudes in students.

With this comprehensive competence, the Mathematics course in PGSD plays an important role in shaping graduates who are professional, creative, adaptive, and ready to face various challenges in creating high-quality mathematics learning at the primary school level.

**2. Analysis of the Textbook**

The results of the learning needs analysis provide important information that was used to review the textbooks that have been used by instructors. The collected information was then enriched to elaborate on each material requirement that will be used in the development of the PjBL model with Aswaja character to improve mathematics learning outcomes for PGSD students. The novelty in the model textbook lies in the addition of more specific materials, detailed explanations, and examples that are relevant to the type of content presented. Additionally, each syntax in the model includes special materials and treatment to enhance students' mathematical understanding through tasks ranging from simple to complex. Furthermore, the textbook includes an assessment aspect that allows both readers and students to understand the aspects and criteria for evaluation. This guide is designed to assist instructors in planning, implementing, and evaluating learning that is not only academically focused but also aims to develop students' character, such as being polite, honest, and responsible (Suhardi, 2012). Education at the student level should not overlook the importance of character development, often referred to as character education.

**3. Analysis of the Process and Model Book**

The needs analysis in the learning process is conducted by identifying the needs of both the lecturers and students. One approach to this is the application of the Student-Centered Learning method. This approach is aimed at increasing awareness of the importance of developing an understanding of mathematics learning that is integrated with the character values that every student must possess. The development of the PjBL learning model based on Aswaja character, in a planned, systematic, and measurable way, becomes a solution to address various problems students face in mathematics learning, while also improving the mathematics course outcomes for PGSD students.

The PjBL learning model based on Aswaja character, designed with a systematic syntax in each stage of learning, provides opportunities for lecturers to explain the basic principles of mathematics teaching. Additionally, this model allows lecturers to guide students in obtaining new information, insights, and knowledge related to the material being taught. This approach not only focuses on mastering concepts but also supports the development of cognitive, affective, and psychomotor aspects of students. Thus, students not only gain a deep understanding of the material but also internalize relevant character values, such as responsibility, cooperation, and honesty, in their learning process. This makes the learning experience more holistic and meaningful, both academically and in terms of character development.

The initial stage in the Aswaja character-based PjBL learning model starts with a "Driving Question," which is designed to build interactive discussions, train critical thinking skills, and strengthen students' understanding of mathematics. The lecturer asks questions such as, "How can concrete media help primary school students better understand the concept of fractions?" to encourage students to think openly and appreciate each other's opinions, reflecting the value of tasamuh (tolerance). In this discussion, students are encouraged to explore the use of teaching aids, such as fraction blocks or pie charts, to visualize abstract concepts in mathematics learning. Next, the lecturer guides students to think moderately (tawassuth) by asking questions that prompt them to analyze different approaches to learning media, such as images, physical manipulatives, or digital applications. Students respond by thinking logically, considering the advantages and disadvantages of each approach, while avoiding extreme views.

The lecturer also instills the value of tawazun (balance) by encouraging students to maintain a balance between the right to speak and the obligation to listen during the discussion. For instance, students may share their experiences using math manipulatives in primary schools while listening to and giving constructive feedback to their peers. This discussion is also directed toward understanding the concept of balance in mathematics, such as in equations, which emphasizes the importance of equality on both sides. Finally, the learning process becomes interactive, instilling the value of ta'adul (justice), where both the lecturer and students complement each other through active, in-depth, and collaborative discussions. In this process, students understand the importance of fairness in division or distribution, such as in the context of fraction division problems or resource allocation in applied mathematics. Thus, this stage not only strengthens students' mathematical understanding but also instills relevant character values, creating a more holistic and meaningful learning experience.

The second stage in the Aswaja character-based PjBL learning model is "Design a Plan for the Project," where the lecturer and students collaboratively design the structured steps of the project. The lecturer starts by outlining the project steps, including task distribution, tools used, and project goals, while integrating the value of tasamuh (tolerance) in the process. This project design involves students in designing interactive mathematics learning media, such as visual aids or digital applications, while considering each student's abilities. Students are trained to work in teams with an attitude of mutual respect, accepting ideas from group members, and discussing solutions collaboratively. During this process, students also practice applying mathematical concepts such as data grouping or organizing logical steps to create effective learning media.

Furthermore, the lecturer directs the planning activities, taking into account a balanced time allocation between discussion, research, and reflection, reflecting the value of tawassuth (moderation). In practice, students are encouraged to create a project schedule with flexibility adjusted to the situation and conditions. For example, students may design interactive media teaching concepts such as fraction operations, geometric measurement, or graphs, while researching to ensure the accuracy of the material and engaging design. This project also emphasizes the importance of reflection on the results achieved, so students can evaluate the strengths and weaknesses of the media they developed and improve them as needed.

This stage also instills the values of tawazun (balance) and ta'adul (justice). The lecturer ensures that the division of tasks is done fairly based on individual abilities, paying attention to students' input in designing interactive media. Students are encouraged to participate in activities according to their expertise, such as visual design, data collection, or content creation. In this project implementation, students apply mathematical concepts, for instance, through proportion calculations in media design or using equations to create interactive simulations. The value of justice is reflected in the fair distribution of tasks, so that each team member contributes optimally, creating high-quality results while fostering a sense of shared responsibility. This phase ensures that learning is not only academically effective but also integrates character values in every process.

The third stage in the Aswaja character-based PjBL learning model is "Create a Schedule," which aims to develop an inclusive and well-planned project schedule. The lecturer and students collaborate to arrange a balanced schedule between academic learning and students' personal needs, reflecting the value of tasamuh (tolerance). This process begins with a survey or group discussion, where students provide input on their free time, personal activities, and academic obligations. The schedule that is developed also considers the integration of mathematical concepts, such as using bar charts or tables to analyze students' time preferences. In this way, students not only learn to respect others' needs but also understand how data can be used to support fair decision-making in scheduling.

Additionally, the lecturer considers the differences in students' conditions, including cultural and religious backgrounds, reflecting the value of tawassuth (moderation). Students are invited to discuss important days, such as prayer times or religious activities, so that these can be accommodated in the project schedule. In this context, mathematical concepts such as time division and the use of linear equations are applied to ensure fair time allocation for all participants. For example, students can create a schedule that ensures all team members have enough time to complete their tasks according to their abilities. This process not only helps students understand the importance of balance in life but also instills character values such as responsibility, cooperation, and empathy, so that mathematics and character development work hand in hand in supporting the success of the project.

The fourth stage in the Aswaja character-based PjBL learning model is **Monitor the Students and the Progress of the Project.** In this stage, the lecturer facilitates discussions and provides feedback during the project process while instilling the value of tasamuh (tolerance). Students are encouraged to actively participate, accept feedback with an open attitude, and implement suggested improvements. In the context of mathematics learning,

this process may involve the lecturer providing feedback on the steps used to solve mathematical problems in the project, such as algorithm creation for geometry concept simulations or simple statistical calculations. Students learn that openness to constructive criticism is an important part of the learning process, both in developing character and enhancing mathematical skills.

The lecturer also ensures that students do not approach the project with extreme attitudes, reflecting the value of tawassuth (moderation). Students are asked to present their ideas clearly and accept suggestions to maintain a balance between creativity and realistic implementation. For example, if the project involves creating interactive media for mathematics learning, students must ensure that the media aligns with primary school students' level of understanding, not too complex or too simple. The lecturer helps students understand the importance of this alignment through logical analysis and mathematical modeling that supports the efficiency and effectiveness of the media. In this way, character values and mathematical understanding complement each other, creating a more meaningful and productive learning experience.

The fifth stage in the Aswaja character-based PjBL learning model is **Assess the Outcome**, which focuses on a comprehensive evaluation of the project results by integrating Aswaja values and mathematics learning. The lecturer and students collaboratively agree on the assessment criteria with mutual respect, reflecting the value of tasamuh (tolerance). Students present their project results, explaining the process, strategies, and mathematical approaches used, such as using equations for data analysis or visualizing geometry in teaching media. In this discussion, each student is given space to explain their contributions without interruption, reflecting the importance of tolerance in appreciating individual efforts and ideas.

Next, the assessment is conducted objectively and fairly by considering both the process and the final outcome, reflecting the value of tawassuth (moderation). Students are asked to submit a logbook or project documentation that shows the mathematical steps undertaken, such as using graphs to visualize data or mathematical modeling to solve problems. In mathematics learning, this teaches students the importance of documenting the process systematically, so that the evaluation reflects their entire journey, not just the final result. This process also instills the value that moderation and balance in working are key to success.

The lecturer encourages students to accept feedback and suggestions from peers and lecturers with an open attitude, reflecting the value of tawazun (balance). The feedback received not only focuses on weaknesses but also provides relevant solutions, such as ways to improve the accuracy of mathematical calculations in the project or refine the teaching media design. On the other hand, the lecturer provides neutral assessments and motivates students to reflect on the feedback given, in line with the value of ta'adul (justice). Students are invited to ponder the feedback they received, identify areas that need improvement, such as mastery of certain mathematical concepts or ways to communicate ideas more effectively. Through this reflection, students not only improve their academic competencies but also practice fairness and responsibility in the learning process.

The sixth stage in the Aswaja character-based PjBL learning model is **Evaluate the Experience**, where the lecturer and students together conduct a comprehensive evaluation

of the project experience. In this stage, the lecturer facilitates a reflection discussion with respect for each other's opinions, reflecting the value of tasamuh (tolerance). Students carefully listen to their peers' views and provide polite and constructive responses. In the context of mathematics learning, this reflection might involve discussing the understanding of mathematical concepts used in the project, such as whether the application of algebra or statistics theory was correct in solving the problem, and how this was received by the audience or users of the teaching media. This gives students an opportunity to develop tolerance for differing views, while also enhancing their understanding of the application of mathematics in real-world contexts.

The lecturer invites students to find a middle ground solution for improving the project activities, reflecting the value of tawassuth (moderation). Students discuss in groups to identify problems encountered during the project, such as difficulties in applying more complex mathematical formulas, and find solutions that can be accepted by all parties. This discussion teaches students to maintain a balance between ideal mathematical solutions and limitations in practical implementation, such as time and resources. The lecturer ensures that every student has the opportunity to express their opinions fairly, creating space for all voices within the group. Students actively present their views while still respecting their peers' opinions, reflecting the value of tawazun (balance) in participation.

Finally, in this reflection, the lecturer and students emphasize the importance of balancing individual efforts with group contributions, in accordance with the value of ta'adul (fairness or neutrality). Students are encouraged to evaluate their contributions to the group and provide feedback for improving future projects. In the context of mathematics, this reflection may involve evaluating how mathematics was used in group collaboration, such as applying efficient methods in calculations or using mathematical theory to solve problems together. Students are also encouraged to reflect on how balanced their individual contributions were with the group's efforts, ensuring that all members participated fairly and constructively. Thus, this reflection not only enhances students' academic understanding but also shapes their character in working together fairly and responsibly.

## Conclusion

The analysis results show that both lecturers and students require a PjBL model with Aswaja character to improve students' learning outcomes in mathematics courses, with categories of "needs" and "highly needs," as seen through the indicators: a) the need for a learning model; b) learning constraints; c) learning expectations.

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