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The Influence of Student Development Understanding on Mathematics Education Students' Readiness to Manage Diverse Classrooms

Saraswati Haylian Chiani[1*], Wiwin Putriawati[2], Rahmawati[3]

[1,2,3]Pendidikan Matematika STKIP Paracendekia NW Sumbawa

e-mail: ***saraswatichiani@gmail.com, putriawatiw29@gmail.com, rahmawatistkip@gmail.com**

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Abstract

Notwithstanding the acquisition of developmental theories such as those proposed by Piaget and Vygotsky, numerous pre-service mathematics educators continue to encounter difficulties in translating this understanding into effective management of varied classroom settings. Although previous research has recognized the significance of comprehending student development, there exists a deficiency in quantitative investigations into how this understanding specifically impacts teacher readiness, especially within mathematics education programs. This research seeks to examine the impact of students' comprehension of child development theories on their preparedness to administer heterogeneous classrooms. The study was performed on 28 mathematics education students at STKIP Paracendekia NW Sumbawa who had successfully finished the student development course. A quantitative descriptive methodology utilized a Likert-scale questionnaire. Validity and reliability assessments indicated that all items possessed acceptable validity ($r > 0.301$) and reliability (Cronbach's Alpha > 0.6). Descriptive analysis showed that students' understanding of developmental theory and their preparedness for classroom management were both at a satisfactory level (mean scores varied from 3.2 to 4.0). Pearson correlation analysis revealed a robust and significant association between developmental comprehension and classroom readiness ($r = 0.83$, $p < 0.001$). Simple linear regression analysis demonstrated that 70% of the variance in classroom management readiness was accounted for by an understanding of student development ($R^2 = 0.70$), as expressed by the regression equation $Y = 0.84X + 0.56$. These results emphasize that a grasp of cognitive, social, and emotional development is a crucial factor in the preparedness of pre-service teachers. The research highlights the imperative to enhance the content of developmental psychology within

teacher education curricula to improve pedagogical competence in addressing learner diversity.
Keywords: classroom management, diverse classrooms, mathematics education, pre-service teacher preparedness, and student development understanding

1. Introduction

Good instruction requires teachers who are knowledgeable about their topics as well as ready to handle varied classroom environments. Particularly in the subject of mathematics education, pre-service teachers must be ready to handle students with various academic, social, and emotional characteristics. This readiness calls for the ability to create inclusive, flexible, and reactive learning settings meeting the developmental demands of every pupil. The ability to properly handle diversity and complexity inside educational environments is a major indication of a teacher's professional ability given their increasing variety.

Despite finishing developmental theory classes, many pre-service teachers feel inadequate in their ability to successfully run different classrooms. Notwithstanding their exposure to content related to child development, Darmawan & Irwansyah (2015) found, for instance, that a significant percentage of teacher education students showed deficits in classroom management abilities. Several factors cause this difference including insufficient field experience, an inadequate integration of theory and practice, and an absence of reflective pedagogical methods. This implies that developing the practical readiness required for effective classroom management may not be possible just through theoretical understanding.

Pre-service teachers' grasp of cognitive development theories is among the most important aspects influencing their readiness for classroom management. The ideas Piaget and Vygotsky put forth, for instance, offer important understanding of the fit of learning exercises with pupils' developmental levels. Pre-service teachers can create appropriate teaching methods and meet diverse learning needs by having a thorough knowledge of kids' cognitive, social, and emotional development. Still, many pupils struggle to translate their theoretical understanding into useful and successful classroom activities.

Earlier research have explored the relationship between pedagogical knowledge and readiness for teaching (Maryani & Martaningsih, 2015; Nugraha & Lestari, 2021; Wulandari et al., 2023). The formulation of lesson plans and the design of instruction depend on developmental knowledge, as these studies show. Still, little research has directly examined how knowledge of student development affects preparation for classroom management in mathematics education programs particularly in Eastern Indonesia. Offering contextually appropriate, quantifiable data, this study aims to close the research gap.

The effect of math education students' grasp of theories of child development on their readiness to manage several classrooms is under investigation in this study. The significance of this study lies in its offering of empirical observations on how developmental theory is applied in

pedagogical practice. By emphasizing the incorporation of developmental psychology to supplement pre-service teachers' instructional competence across a range of learning situations, it also provides insightful viewpoints for improving teacher education curricula.

2. Methods

The type of research design used in this study is descriptive quantitative research. This design was chosen because it aims to describe the influence of students' understanding of developmental theories on their readiness to manage diverse classrooms. Descriptive quantitative research enables the researcher to objectively illustrate the relationship between variables based on numerical data collected through standardized instruments.

The selection of this method is based on its effectiveness in measuring students' perceptions and readiness through systematically structured questionnaires. As suggested by Sugiyono (2021), the quantitative approach is appropriate for examining relationships between variables using statistical data.

The population in this study consisted of all Mathematics Education students at STKIP Paracendekia NW Sumbawa who had completed the course "Student Development," totaling 28 students. The sample was taken using total sampling, whereby the entire population was included. The inclusion criteria for this study were all students who had attended or completed the relevant course (Etikan, 2020).

Constructed with a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), the instrument used in this study was a structured questionnaire. Three major characteristics were deliberately developed to be evaluated by this device:

a. Grounded in relevant theories of educational psychology, students' understanding of child development covers their knowledge of cognitive, social, and emotional developmental levels.
b. Readiness to manage varied classrooms, demonstrating students' opinions on their ability to apply developmental knowledge in actual classroom situations including a range of student backgrounds and skills.
c. Understanding of student development affects classroom readiness—that is, how far developmental knowledge influences students' preparation—by combining the first two factors.

The instrument contained numerous components for every variable, painstakingly constructed in line with accepted literature and theoretical models. Experts in education and educational psychology examined the questionnaire in order to verify the veracity of the material. The items' clarity, relevance, and representational quality were improved in part as a result of this professional evaluation.

Initially tested on 43 students who had completed the Student Development course in the English Education Program at STKIP Paracendekia NW Sumbawa for empirical verification, the instrument was Pearson product-moment correlation was used to evaluate the validity of

each item, which showed that all things demonstrated adequate validity with correlation coefficients (r) above 0.301.

Internal consistency was evaluated using Cronbach's Alpha for reliability. Reliability ratings for every factor were:

a. Student growth comprehension: 0.786.
b. preparedness to run diverse classrooms: 0.881
c. Effect of developmental comprehension on preparedness: 0.953.

All grades beat the 0.6 minimum threshold, indicating a great level of reliability.

Adherence to the guidelines set out by Taherdoost (2019), who stressed the need of validity and reliability as essential factors for preserving the quality of a quantitative research tool, informed the instrument's design and development. This extensive process made certain the instrument was contextually pertinent to the research objectives in addition to being statistically sound.

This study used descriptive statistical analysis to describe the level of students' understanding of student development and their readiness to manage diverse classrooms. Pearson correlation analysis was employed to examine the relationship between variables X and Y, and simple linear regression analysis was conducted to identify the influence of students' understanding of student development on their readiness.

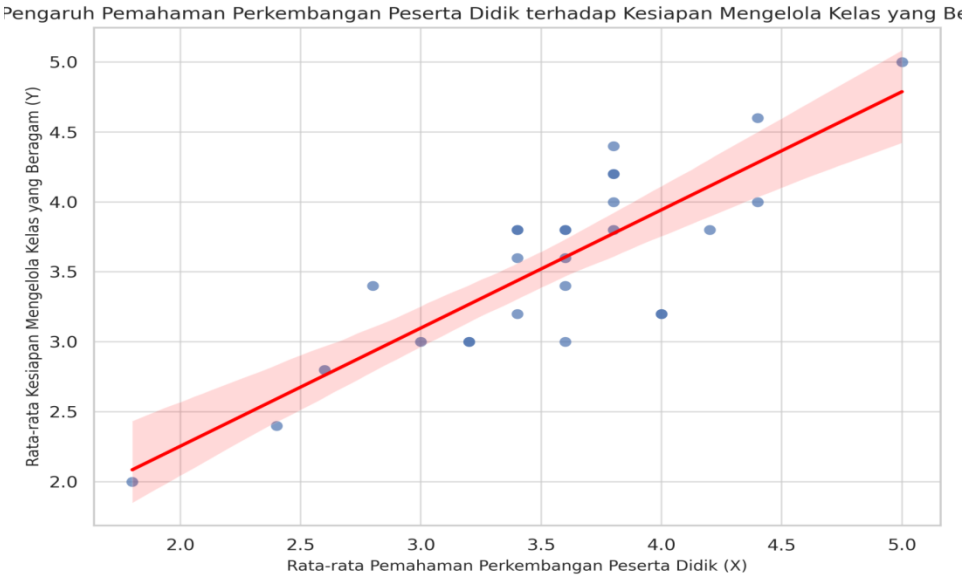
3. Result and Discussion

The descriptive statistical analysis showed that the average scores ranged from 3.2 to 4.0, indicating that the students' understanding and readiness levels were categorized as good. The highest scores were found in the statements related to the importance of understanding development for creating an inclusive and supportive environment (items P14 & P15), while the lowest scores appeared in the statement regarding the ability to adjust teaching methods (item P7).

Meanwhile, the Pearson correlation test was conducted to examine the relationship between variable X and variable Y, namely students' understanding of child development and the readiness of mathematics education students to manage diverse classrooms. The results showed a correlation coefficient ($r = 0.83$) with a p-value of 6.37×10^{-8}, indicating a very strong and statistically significant relationship between understanding child development and readiness to manage diverse classrooms.

Furthermore, to analyze the influence of understanding child development (X) on readiness to manage diverse classrooms (Y), a simple linear regression analysis was performed, yielding the following results:

Figure 1.
Scatter plot showing the relationship between students' understanding of child development (X) and their readiness to manage diverse classrooms (Y), with the regression line indicating a positive linear association.



The regression equation is:

$Y=0.84*X+0.56.$

The coefficient of determination (R^2) is approximately 0.70 ($R^2 = 0.8342 \approx 0.696$)

p-value is 6.37×10^{-8} (significant result).

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As a conclusion, student in partial determination reacquired competences in preparing to manage diverse classrooms, with about 70% [$R^2 = 0.8342 \approx 0.696$] mathematics education students demonstrating this.

In the following, the intended goals were (1) To measure students' comprehension of student development, (2) to measure readiness to teach with students, and (3) to analyze the level at which students understand student development theories and how prepared they are to teach their own peers.

These results illustrate that the fourth and fifth main variables both attained an average range of 3.2 to 4.0, implying students have a decent grasp of theories on student development and the dynamic processes that accompany their use in the classroom. The first and second aims of the study were met by providing a descriptive picture of students' understanding and readiness.

A Pearson correlation test was performed to meet the third objective: r=0.83, r = 0.83, r=0.83 at $p < 6.37 \times 10-8$ 6. This result shows a high and extremely significant association between students' concept of student development and their capability to deal with heterogeneous classes for students. This indicates a very strong relationship, meaning students with a stronger conceptual knowledge of cognitive, social and emotional development are more ready to design and create appropriate learning environments across diverse classrooms.

The findings of this study theoretically back the idea that improving the pedagogical ability of pre-service teachers depends on understanding student development—particularly its cognitive, social, and emotional components. The findings of this study confirm accepted models like the Pedagogical Content Knowledge (PCK) model and Vygotsky's Zone of Proximal Development (ZPD), which emphasize the need of coordinating educational techniques with students' developmental phases. The significant effect (R = 0.70) found in this research lends empirical evidence for the theory that developmental knowledge is not only supplemental but also vital for classroom readiness.

This work highlights the need of teacher education programs to stress the application of developmental theory using experiential learning in practice. Using approaches like case-based learning, scheduled microteaching, and field-oriented internships, theoretical understanding and practical application can be readily combined in the classroom. This means that in courses on developmental psychology and classroom management, teachers and curriculum developers should add more reflective and practical parts.

Such results are consistent with Nugraha and Lestari (2021), as they have argued the pedagogical-competence prospective teacher, especially in changing learning strategy according to student characteristics, is enhanced when understanding of student development ia higher. Also, Wulandari, Firmansyah & Kurniawati (2023) identified a significant association between in-depth understanding of developmental theories such as Piaget and Vygostky, and the quality of inclusive and adaptive learning planning and its implementation in classroom that combine students of different needs and stages. Research by Ananda and Fitriani (2023) also identified that student readiness to manage heterogeneous classrooms is influenced by two main factors: self-efficacy and pedagogical knowledge gained during coursework, including understanding student development. This indicates that a strong theoretical foundation fosters both confidence and practical readiness to face real classroom challenges. Theoretically, these results align with Vygotsky's concept of the Zone of Proximal Development (ZPD), which emphasizes the importance of educator interventions tailored to students' developmental stages to optimize learning. Students who grasp this principle are better able to design learning activities that are challenging yet within students' capabilities.

In Educational Psychology: Theory and Practice Slavin (2018) explains that for teachers to be able to construct instruction that is meaningful and effectual, students' level of psychological development must be taken into consideration. This is essential for prospective teachers; they will need that understanding even before they begin teaching a class full of heterogeneous students with their varying levels of development. Further testing with the simple linear regression test confirmed these results: $\mathbf{Y = 0.84X + 0.56}$, coefficient of determination (R^2)= 0.70, showing that the variability in students' readiness to handle diverse classes (the dependent variable) can be explained by no less than 70 % of how well teachers understand student development. The other 30 % is attributed to other variables like that of field experience, self-efficacy, intrinsic motivational factors and the support for learning in the field.

Information from this point is aligned with the legal competence pedagogical framework laid in Law No. 14 of 2005 and Minister of Instruction Regulation Number 16 of 2007 which states that the comprehension student character are the primary determinants of teacher pedagogical

competence. As a result, the top 20 performing students have more opportunity to practice and improve effective teaching (formally) for individualized factors.

The Results of the current study are in accordance with prior research. Nugraha and Lestari (2021) also found out that students with a sound knowledge of developmental theories of category performed better in designing a specific lesson plan and contextual assessment.Wulandari et al. (2023) added that students proficient in Piaget's and Vygotsky's cognitive development theories are more capable of structuring learning activities that match students' readiness levels (zone of proximal development). Rahmadani, Hidayati, and Fauzan (2020) highlighted that student readiness is heavily influenced by the integration of theoretical knowledge and practical field experience. A solid understanding of student development enables students to translate theory into applicable learning strategies.

Furthermore, Yuliana and Prasetyo (2021) emphasized that the dominant factors affecting students' teaching readiness are pedagogical knowledge and direct interaction experience with student characteristics during microteaching or field practice. This knowledge closely relates to students' deep understanding of student developmental stages. From an educational psychology perspective, Bandura (as cited in Lestari & Anggraeni, 2020) explains that professional self-efficacy is shaped by direct experience and mastery of relevant material. Hence, students with in-depth knowledge of student development not only feel more technically prepared but also possess higher confidence in managing the complexities of diverse classrooms.

These findings also correspond with the *Pedagogical Content Knowledge* (PCK) framework developed by Shulman and adapted in Indonesia by Putri & Supriyadi (2019), which states that optimal teaching readiness occurs when students integrate mastery of subject matter with knowledge of student characteristics, including cognitive and socio-emotional development. Therefore, the 70% coefficient of determination not only demonstrates the strong influence of understanding student development on readiness to manage classrooms but also highlights the importance of integrating theory and practice in teacher education curricula. These findings underscore the need to prioritize enhancing student development understanding within curriculum design and learning processes in teacher education institutions (LPTKs). This study has several drawbacks. First of all, the results' generalizability may be affected by the modest sample size of 28 participants limited to one institution. Second, the study depended on pupils' perspectives and might be subject to prejudices using a self-report questionnaire. Third, the study ignored other factors like instructional experience, mentoring quality, or educational environment, which might also affect readiness for handling varied classrooms.

Consequently, this study provides empirical evidence supporting the integration of developmental theory in Mathematics Education study programs and reinforces the urgency of practice-based learning that bridges theory with real classroom contexts. It is recommended to implement instructional models that are not only conceptual but also practical, such as case-based microteaching and structured field practicum.

Future studies should focus on a wider and more diverse population across different institutions to improve external validity. It is also recommended that mixed-method designs which include quantitative interviews and surveys or qualitative interviews and classroom observations

be used to deepen understanding of how the developmental conceptual understanding is applied in practice. In addition, considering the impact of other contributing factors such as teaching practicum experience, self-efficacy, and collaboration with peers may provide a more rounded understanding of the factors that influence pre-service teachers' readiness to manage the classroom.

4. Conclusion

This research shows that students majoring in mathematics education in STKIP Paracendekia NW Sumbawa understand student development quite well, indicated by average Likert scale scores between 3.2 and 4.0. In addition, her readiness to manage a diverse set of students is classified as good, particularly with regard to her teaching strategy and inclusive pedagogy. The summation of the computation revealed a strong and significant correlation ($r = 0.83$; $p < 0.001$) between understanding student development and readiness to manage a diverse classroom. Furthermore, a simple linear regression analysis demonstrated that students' comprehension of development theory influenced 70% of the variation in classroom readiness ($R^2 = 0.70$). These results confirm previous studies and further underscore the necessity of incorporating developmental theory into the teacher education curriculum in order to better equip pre-service teachers to handle the multifaceted demands of the classroom. This research underscores the critical need to address gaps between theory and practice in teaching and provides essential data to improve the sharpening of teaching competencies through curriculum development.

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