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Analysis Of Mathematics Academic Competency Test (TKA) Scores Of Students At SMAN 1 Wondama, Teluk Wondama Regency, West Papua: A Descriptive Study And Its Implications For Mathematics Learning

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Abstract

This article presents a descriptive analysis of Mathematics scores on the 2025 Academic Competency Test (Tes Kemampuan Akademik/TKA) for senior high schools (SMA/MA), based on data from 266 participants at SMAN 1 Wondama, Teluk Wondama Regency, West Papua Province. Based on the collective TKA results data, the mean Mathematics score was 32.70 (SD = 9.05) on a 0–100 scale, with a median of 32.90, a minimum score of 5.00, and a maximum score of 54.16. A total of 58.5% of participants fell into the "Low" category, 31.7% into the "Adequate" category, and only 9.8% into the "Good" category; no participants reached the "Excellent" category. These findings are consistent with a number of international studies showing that students in remote regions, areas with low socio-economic status, and Indigenous students in Papua tend to achieve lower mathematics outcomes than students in urban areas or areas with better access to education. This article discusses possible contributing factors based on internationally reputable literature and offers recommendations for more contextual mathematics learning, including the application of a problem-based learning model integrated with 21st-century skills and digital literacy, as an effort to improve students' mathematical literacy in 3T (frontier, outermost, and disadvantaged) regions.

Keywords: TKA Mathematics; learning achievement; West Papua; educational gap; SMAN 1 Wondama

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INTRODUCTION

The Academic Competency Test (Tes Kemampuan Akademik/TKA) is one of the national assessment instruments used to map the academic competency achievement of senior high school (SMA/MA) students in Indonesia, including competencies in Mathematics, Indonesian Language, and English, as well as elective subjects chosen according to students' interests. TKA results provide an objective picture of students' academic readiness and simultaneously serve as evaluation material for educational institutions in designing more targeted learning strategies.

Mathematics achievement among students in the Papua region generally remains a particular concern in both national and international education studies. Various studies show that Indigenous students in West Papua experience a significant mathematics achievement gap compared to non-Papuan students, and that the literacy-numeracy of West Papuan students consistently falls below the national average (Sianturi, Suliantin, & Fitrianti, 2022). Remote geographical conditions, limited educational resources, and socio-economic factors also contribute to this gap, as similarly found in the context of rural education and 3T (frontier, outermost, and disadvantaged) regions across Indonesia more broadly (Kawuryan, Sayuti, Aman, & Dwiningrum, 2021).

Based on these conditions, this article aims to: (1) statistically describe the TKA Mathematics achievement of SMAN 1 Wondama students in 2025; (2) classify students' achievement into predicate categories; and (3) relate these findings to internationally reputable literature on the factors influencing students' mathematics achievement, as a basis for formulating more contextual learning recommendations.

METHOD

The data used in this study were sourced from the 2025 Collective List of Academic Competency Test Results (Daftar Kolektif Hasil Tes Kemampuan Akademik/DKHTKA) for SMA/MA, issued by the West Papua Provincial Education Office for SMAN 1 Wondama, Teluk Wondama Regency (NPSN 60403473). The data cover 266 participants, consisting of scores for three compulsory test subjects (Indonesian Language, Mathematics, and English) and two elective subjects. The analysis in this article focuses specifically on the Mathematics test scores.

Of the 266 participants, one participant (Henok Ayamiseba) had no recorded Mathematics score in the source document and was therefore excluded from the statistical calculations, leaving a total of N = 265 data points analyzed. The analysis was conducted using descriptive quantitative methods, including the mean, median, standard deviation, minimum

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and maximum scores, score frequency distribution, and classification of achievement predicates as listed in the source document (the Excellent, Good, Adequate, and Low categories).

RESULTS AND DATA ANALYSIS

3.1 Descriptive Statistics

A summary of the descriptive statistics for SMAN 1 Wondama students' TKA Mathematics scores is presented in Table 1.

Table 1. Descriptive Statistics of TKA Mathematics Scores

Statistic	Value
Number of students (N)	265
Mean	32.70
Median	32.90
Standard Deviation (SD)	9.05
Minimum Score	5.00
Maximum Score	54.16

The mean Mathematics score of 32.70 is far below the midpoint of the scoring scale (50), and even below the threshold for the "Adequate" category in the TKA categorization system. The standard deviation of 9.05 indicates a score distribution that is relatively concentrated in the low-to-moderate range, with very few students reaching high scores (the maximum score is only 54.16 out of a scale of 100).

3.2 Distribution of Achievement Categories

Based on the predicate categories in the DKHTKA document, the distribution of student achievement is presented in Table 2.

Table 2. Distribution of TKA Mathematics Achievement Categories

Category	Predicate Range	Number of Students	Percentage
Good	≥ 45 (indicative)	26	9.8%
Adequate	30–45 (indicative)	84	31.7%
Low	< 30 (indicative)	155	58.5%
Total		**265**	**100%**

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The data in Table 2 show that the majority of students (58.5%) fall into the “Low” category, and not a single student reached the “Excellent” category on the Mathematics test. This condition contrasts with the results on the Indonesian Language test, where the source document shows a considerable proportion of students in the “Excellent” category, indicating that the achievement gap is specific to the mathematics domain rather than simply reflecting students’ overall academic ability.

3.3 Distribution of Score Spread

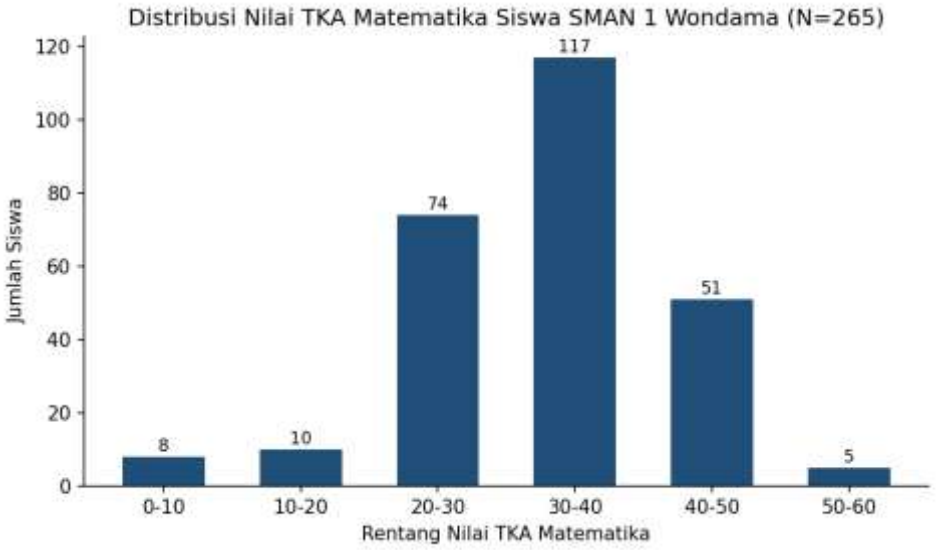


Figure 1. Distribution of TKA Mathematics scores of SMAN 1 Wondama students (N=265)

Figure 1 shows that the score distribution is concentrated in the 20–50 range, with the peak of the distribution in the 30–40 range (117 students). Only five students (1.9%) scored in the 50–60 range, and no students scored above 60. The distribution pattern is right-skewed, with a small number of students obtaining very low scores (0–10, 8 students), which likely reflects the administrative minimum score (5.00) assigned to participants with extremely low achievement.

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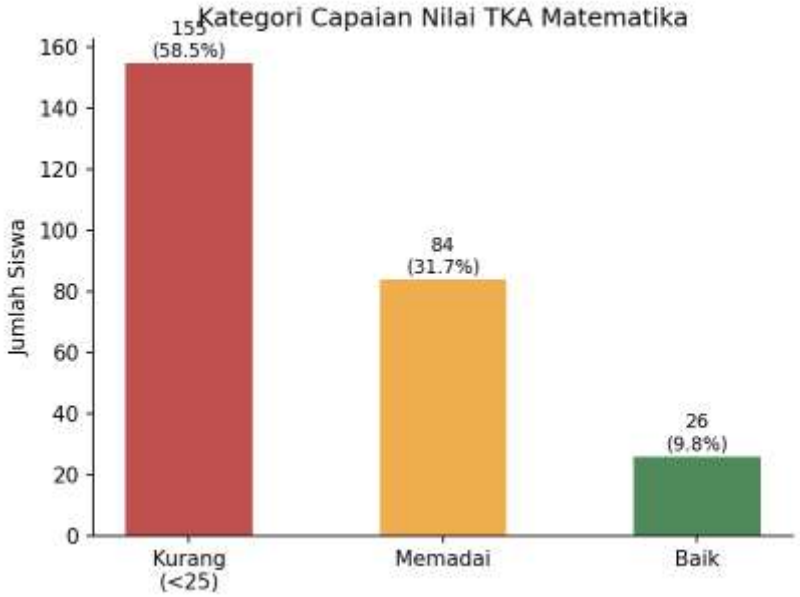


Figure 2. Comparison of the number of students by TKA Mathematics achievement category

DISCUSSION

The low average Mathematics achievement of SMAN 1 Wondama students is in line with the findings of various internationally reputable studies on the factors influencing students' mathematics achievement. Wang, Perry, Malpique, and Ide (2023), through a systematic review of 156 articles published in journals indexed in the Q1 Scimago Journal Rank, identified that family socio-economic status (SES) is consistently positively associated with mathematics achievement on the Programme for International Student Assessment (PISA), while factors such as student absenteeism rates, grade-repetition rates, and teacher shortages are negatively associated. Regions such as Teluk Wondama Regency, which is classified as a 3T area, generally face challenges across all of these factors simultaneously.

The role of socio-economic status is further reinforced by Eriksson, Lindvall, Helenius, and Ryve (2021), who analyzed data from nearly 600,000 students across 77 countries participating in PISA 2018. That study found that the number of books at home and parents' highest occupational status were the most consistent SES predictors of academic achievement, including in mathematics, compared with other SES components. A similar finding was reported by Shala and Grajcevci (2018) in a study of Kosovo's performance on PISA 2015, which showed that parental education and the availability of learning resources at home contributed significantly to students' mathematics performance.

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More specifically in the Papuan context, Sianturi, Suliantin, and Fitrianti (2022) found that the mathematics achievement gap between Indigenous West Papuan students and non-Papuan students is a longstanding issue, with the numeracy achievement of West Papuan students consistently falling below the national average. The study also noted that mathematics learning approaches that insufficiently connect to local environmental and cultural contexts further hinder Indigenous students' understanding of formal mathematical concepts. The findings at SMAN 1 Wondama, with 58.5% of students in the "Low" category and none reaching the "Excellent" category, reinforce this picture of the achievement gap at the school level.

In addition to socio-economic and cultural factors, teacher quality and availability are also important determinants. Kawuryan, Sayuti, Aman, and Dwiningrum (2021), in a study published in the International Journal of Instruction, found that the teacher-quality gap between urban and rural schools in Indonesia contributes significantly to the academic achievement gap among students, including in exact-science subjects such as Mathematics. Schools in remote areas such as Teluk Wondama Regency generally face challenges in the equitable distribution of quality teachers and access to sustained professional development.

Students' affective dimensions are also relevant to consider. Thien and Ong (2015), in an analysis of PISA 2012 data from Malaysian and Singaporean students, found that mathematics self-efficacy and mathematics anxiety have a significant influence on mathematics achievement, alongside socio-economic status. The low average score and the concentration of students in the "Low" category at SMAN 1 Wondama raise the possibility that affective factors, such as students' low confidence in their own mathematical ability, also play a role and warrant further investigation through qualitative studies or student attitude surveys.

Regarding learning strategies that could be applied to address this low achievement, several studies on the application of the Problem Based Learning (PBL) model are worth considering. Syamsinar, Rahman, and Dassa (2023) developed a problem-based learning model integrated with 21st-century skills and found that the model was effective in increasing students' active engagement in solving mathematical problems collaboratively and critically. Similarly, Syamsinar and Asfyra (2026) found that a Problem Based Learning model enriched with the 4C approach (Communication, Collaboration, Critical Thinking, and Creativity) had a significant effect on improving students' mathematical literacy. The low TKA Mathematics achievement of SMAN 1 Wondama students, particularly the large proportion of students in the "Low" category, indicates the need to strengthen mathematical literacy through a more participatory and contextual problem-based learning model, as developed in these studies.

Beyond strengthening the learning model, digital literacy is also relevant to consider,

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given that mathematics learning resources are increasingly accessed online. Syamsinar, Sa'diyyah, and Mulyana (2026) found that digital literacy influences the critical thinking ability of mathematics education students in evaluating digital information, indicating the importance of strengthening digital literacy from the secondary school level so that students are able to use online mathematics learning resources critically and responsibly, particularly for students in 3T regions where access to conventional learning resources is relatively limited.

Conclusions and Recommendations

The results of the analysis show that the TKA Mathematics achievement of SMAN 1 Wondama students in 2025 is classified as low, with a mean score of 32.70 out of a scale of 100 and the majority of students (58.5%) falling into the "Low" category. No students reached the "Excellent" category, and only 9.8% reached the "Good" category. These findings are in line with internationally reputable studies showing that socio-economic status, teacher quality and distribution, the cultural and geographical context of 3T regions, and students' affective factors are important determinants of mathematics achievement.

Based on these findings, several recommendations are proposed: (1) the need to strengthen contextual mathematics learning that integrates local wisdom and the West Papuan environment, as suggested by studies on Indigenous mathematics education; (2) the application of a Problem Based Learning model integrated with 21st-century skills and the 4C approach to improve students' mathematical literacy, as proven effective in the studies by Syamsinar, Rahman, and Dassa (2023) and Syamsinar and Asfyra (2026); (3) improving the equitable distribution and professional development of mathematics teachers in 3T regions; (4) strengthening students' digital literacy from the secondary school level so that they are able to critically use online mathematics learning resources, referring to the findings of Syamsinar, Sa'diyyah, and Mulyana (2026); (5) strengthening remedial programs and intensive mentoring for the dominant group of students in the "Low" category; and (6) further qualitative studies to explore students' affective and socio-economic factors in greater depth in order to formulate more targeted learning interventions.

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