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EXAMINING THE FACTORS PREDICTING MATHEMATICS TEACHERS' ASSESSMENT LITERACY IN BASIC EDUCATION: A DESCRIPTIVE CORRELATIONAL STUDY

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ABSTRACT

This study examined the factors predicting 150 mathematics teachers' assessment literacy in basic education. It was conducted at various schools within Kitaotao District, division of Bukidnon during the school year 2025-2026. A quantitative descriptive–correlational research design was used in this study. This study utilized a survey questionnaire for personal demographic characteristics, professional demographic characteristics and mathematics teachers' assessment literacy. The data gathered were tested using mean, standard deviation, frequency, percentage, and regression analysis. The findings of the study revealed that most of the mathematics teachers who participated were female, aged 31–40 years old, and married. Many of them had already gained 4–10 years of teaching experience, indicating that the respondents were relatively experienced in the teaching profession. In terms of professional characteristics, the majority held teacher I positions, had attended 1–5 assessment-related training, and managed moderate to heavy teaching loads ranging from 5–8 classes. These results suggest that the respondents were actively engaged in classroom instruction and professional development while balancing demanding teaching responsibilities. Despite these responsibilities, the mathematics teachers demonstrated a high level of assessment literacy, with particularly strong performance in aligning assessments with learning objectives and using assessment results formatively to improve instruction. They also showed competence in assessment design, setting clear purposes, and communicating results, although these areas may still benefit from further enhancement. Sex, age, civil status, and the number of assessment-related trainings attended significantly predict mathematics teachers' assessment literacy. Conversely, teaching experience, workload, and position were not found to significantly predict assessment literacy.

Keyword: assessment literacy; predictor; mathematics education; descriptive-correlational; multiple regression analysis; professional development

1. INTRODUCTION

The rapid changes occurring in contemporary society continually challenge educational systems to improve the quality of teaching and learning. In this context, assessment has become an essential component of classroom practice because it enables teachers to measure student learning, monitor progress, and evaluate the effectiveness of instructional strategies. In mathematics education, assessment is particularly important as it helps teachers determine learners' conceptual understanding, procedural fluency, and problem-solving abilities. Consequently, mathematics teachers are expected not only to possess strong content knowledge but also to demonstrate adequate assessment literacy to design meaningful assessments, interpret learner performance accurately, and utilize assessment data to improve instruction (Stiggins, 2018).

Assessment literacy plays a critical role in mathematics education because it influences teachers' ability to design valid assessments, interpret learner performance, provide meaningful feedback, and make evidence-based instructional decisions that improve student achievement (Akayuure, 2021; Ashraf & Zolfaghari, 2018; Shmigirilova et al., 2024). It encompasses the knowledge and skills teachers use to develop, interpret, and apply assessments for various educational purposes (Addie et al., 2020; Xu & Brown, 2016). However, the development of assessment literacy may be

predicted by challenges such as excessive workload, limited resources, organizational pressures, and insufficient professional support, which can negatively influence teachers' instructional and assessment practices (Bottiani, 2019).

In mathematics education, where quality instruction is closely associated with the development of students' mathematical competencies, teachers are expected to address complex pedagogical and professional demands effectively (Podkhodova et al., 2020). Despite the recognized importance of assessment literacy, studies examining the factors influencing mathematics teachers' assessment literacy remain limited, particularly in relation to teachers' professional experiences, training opportunities, and contextual conditions (Sahin, 2023). Thus, there remains a need to investigate the factors shaping mathematics teachers' assessment literacy in order to strengthen assessment practices and improve mathematics instruction.

In the Philippine context, the issue of mathematics literacy has become increasingly relevant due to international large-scale assessments such as the Programme for International Student Assessment (PISA). Balagtas (2021) examined the alignment of the Philippine mathematics teacher education curriculum with the 2021 PISA mathematics literacy framework and emphasized the need for teacher preparation programs to produce educators capable of developing mathematically literate learners. This concern highlights the importance of strengthening mathematics teachers' assessment literacy to ensure that classroom assessments align with national and international standards for mathematical learning and performance.

Recent studies considered personal factors like sex, age, civil status, and teaching experience as probable predictors of assessment literacy, while position, number of assessment training, and workload as professional factors (Muhson et al., 2025). Given these considerations, it becomes important to investigate the factors that influence mathematics teachers' assessment literacy in basic education. Understanding how demographic and professional variables shape teachers' assessment competencies may provide valuable insights for designing professional development programs, strengthening teacher education curricula, and enhancing assessment practices in mathematics classrooms. Thus, this study aims to examine the factors predicting mathematics teachers' assessment literacy in basic education.

2. METHODS

2.1 Research Design

This study employed a quantitative descriptive–correlational research design to examine the factors that predict mathematics teachers' assessment literacy in basic education. The descriptive component was used to determine the levels of assessment literacy and its related variables, while the correlational component was utilized to analyze the statistical relationships between the identified predictor variables (e.g., sex age, civil status, number of trainings attended, teaching experience, workload and teaching position) and teachers' assessment literacy.

2.1 Research Locale

This study was conducted in the public elementary, integrated, and secondary schools within Kitaotao I, Kitaotao II, and Kitaotao III districts in the division of Bukidnon during the mid-year semestral break of school year 2025–2026. The researcher selected these districts because of their accessibility and suitability for the efficient administration of survey questionnaires and data gathering procedures.

The municipality of Kitaotao is situated in the southern part of Bukidnon province. Specifically, Kitaotao I District consists of sixteen (16) schools, Kitaotao II District has twenty (20) schools, and Kitaotao III District comprises twelve (12) schools.

In terms of professional development, teachers within the districts regularly participate in seminars, training, and workshops related to curriculum implementation, pedagogy, and learning assessment. The participating schools in this study utilize the standardized curriculum guides and learning materials prescribed by the Department of Education, thereby ensuring uniformity of competencies and learning standards across grade levels and subject areas.

3. RESULTS AND DISCUSSIONS

Table 1

Personal Demographic Characteristics of Mathematics Teachers

Variable	Category	f	%
Sex	Male	56	37.3
	Female	94	62.7
Age	21–30 years	44	29.3
	31–40 years	62	41.3
	41–50 years	25	16.7
	51 and above	19	12.7
Civil Status	Single	41	27.3
	Married	109	72.7
Teaching Experience	1–3 years	31	20.7
	4–10 years	62	41.3
	11–20 years	37	24.7
	21+ years	20	13.3

The results indicate that the majority of mathematics teachers were female, married, and in the mid-stage of their teaching careers. Specifically, 94 or 62.7% of the respondents were female, while 56 or 37.3% were male. In terms of age, most of the teachers belonged to the 31–40 age bracket, comprising 62 respondents or 41.3%, whereas only 19 teachers or 12.7% belonged to the 51 years old and above category. With regard to civil status, 109 teachers or 72.7% were married, while 41 teachers or 27.3% were single.

In terms of teaching experience, the majority of the respondents, comprising 62 teachers or 41.3%, had 4–10 years of teaching experience, while only 20 teachers or 13.3% had 21 years or more of teaching experience.

Table 2

Professional Demographic Characteristics of Mathematics Teachers

Variable	Category	f	%
Position	Teacher I	110	73.3
	Teacher II	13	8.7
	Teacher III	22	14.7
	Master Teacher	5	3.3
Number of Trainings Attended in Assessment	1-5 trainings	85	56.7
	6–10 trainings	50	33.3
	11 or more	15	10.0
Workload	3 - 4 teaching load	5	3.3
	5 – 6 teaching load	75	50.0
	7 – 8 teaching load	70	46.7

The results reveal that the majority of the mathematics teachers were occupying teacher I positions, with 110 respondents or 73.3% belonging to this rank, while only 5 respondents or 3.3% were classified as master teachers. This finding indicates that entry-level teaching positions dominate the teaching workforce within the identified districts. Master teachers' presence, though limited, may contribute positively to strengthening assessment practices within their respective institutions through coaching, peer support, and professional collaboration.

In terms of assessment-related professional development, most mathematics teachers, comprising 85 respondents or 56.7%, attended only 1–5 assessment-related training, whereas only 15 respondents or 10% attended 11 or more training. This may imply that while opportunities

for professional development exist, teachers' exposure to specialized and sustained training on assessment literacy remains relatively limited. Consequently, Zeleke (2022) noted that there is a need for intensive assessment training to narrow performance gaps among teachers and enhance consistency in teaching quality and assessment practices across schools.

Regarding teaching workload, the findings show that the majority of mathematics teachers handled heavy teaching assignments, with 75 respondents or 50% managing 5–6 classes, while only 5 respondents or 3.3% handled 1–3 classes. This reflects the demanding nature of the teaching profession, especially in public schools where teachers manage multiple instructional responsibilities simultaneously. Heavy teaching loads require teachers to devote substantial time to lesson preparation, classroom instruction, assessment checking, record keeping, and other ancillary tasks. Such demands may create challenges in balancing instructional responsibilities with professional development activities.

Table 3

Assessment Literacy Levels of Mathematics Teachers

Dimension	Mean	SD	Interpretation
Alignment	4.42	0.51	Very High
Formative Use	4.24	0.54	Very High
Setting Clear Purpose	4.20	0.59	High
Assessment Design	4.10	0.60	High
Communicating Results	3.80	0.65	High
Overall	**4.15**	**0.47**	**High**

Legend: 1.00–1.80 (Very Low), 1.81–2.60 (Low), 2.61–3.40 (Moderate), 3.41–4.20 (High), 4.21–5.00 (Very High)

The findings reveal that mathematics teachers demonstrated a generally high level of assessment literacy, as reflected by the overall mean score of 4.15 with a standard deviation of 0.47, interpreted as *high*. This result suggests that the respondents possess substantial knowledge, understanding, and application of classroom assessment practices necessary for effective mathematics instruction. The findings further imply that mathematics teachers are generally capable of utilizing assessment strategies that support curriculum implementation, monitor student progress, and guide instructional decision-making. The relatively low standard deviation also indicates consistency in the responses of the teachers, suggesting a shared understanding and practice of assessment literacy across the participating schools.

Among the five dimensions, *alignment* obtained the highest mean score of 4.42 with a standard deviation of 0.51 and was interpreted as *very high*. The respondents strongly agreed that assessments should be aligned with the written and taught curriculum. This indicates that mathematics teachers highly recognize the importance of ensuring congruence between learning competencies, instructional delivery, and classroom assessment practices. Such findings suggest that teachers understand the role of alignment in promoting fairness, validity, and meaningful evaluation of student learning. In mathematics education, alignment is particularly important because competencies are hierarchical and sequential in nature. Teachers who effectively align assessments with curricular standards are more likely to measure intended learning outcomes accurately and ensure that students acquire the expected mathematical competencies.

The *very high* rating in *alignment* may also reflect the influence of curriculum standards and outcomes-based education frameworks implemented by the Department of Education. Teachers may have become more conscious of aligning classroom assessments with most essential learning competencies (MELCs), performance standards, and learning objectives due to continuous curriculum reforms and professional development activities.

However, the comparatively lower agreement on the statement regarding consistency between classroom grades and both formative and summative assessment scores may suggest that some teachers still encounter challenges in integrating multiple sources of assessment evidence into a coherent grading system. This may indicate the need for additional training on balanced assessment systems and grading practices. Malabo (2024) supports that teachers' assessment literacy influences their ability to align assessments with learning objectives and use assessment data effectively. Napanoy and Peckley (2020) stated that teachers' assessment literacy is essential in aligning assessments with curriculum

goals and accurately interpreting student performance.

Formative use obtained a mean score of 4.24 with a standard deviation of 0.54 and was likewise interpreted as *very high*. The findings indicate that mathematics teachers highly value formative assessment practices and recognize the importance of using assessment to support learning rather than merely evaluating performance. The respondents strongly agreed that rubrics help students understand expectations and guide their performance in completing tasks and assignments. This suggests that teachers appreciate the role of formative assessment tools in clarifying learning goals, improving learner engagement, and promoting self-regulated learning.

The *very high* rating in *formative use* further implies that teachers recognize assessment as an ongoing instructional process rather than a purely summative activity. Mathematics teachers appear to utilize assessment feedback to monitor student understanding, identify misconceptions, and adjust instruction accordingly. This finding is particularly important in mathematics education, where formative assessment can help teachers identify gaps in conceptual understanding and provide timely intervention before misconceptions become deeply rooted. The findings support the observations of Bellido-García et al. (2026) identified formative assessment as a strong predictor of students' metacognitive skills in mathematics learning.

The dimension on *setting clear purpose* obtained a mean score of 4.20 with a standard deviation of 0.59 and was interpreted as *high*. This finding indicates that mathematics teachers generally understand the importance of establishing clear objectives and purposes before conducting assessments. Teachers agreed that assessments should measure student progress and guide future instruction and that assessments should be integrated systematically into classroom instruction over time. Such results suggest that teachers recognize assessment as an intentional and purposeful process that informs teaching and learning decisions.

The findings further imply that teachers understand the importance of communicating assessment objectives and using assessment results to improve instruction. Clear assessment purposes help ensure the validity and relevance of assessment activities, allowing teachers to gather meaningful information regarding students' learning progress. Nevertheless, some respondents still expressed concerns regarding informing students about assessment coverage, indicating that a few teachers may perceive that revealing assessment content beforehand could associate the objectivity of student performance. This may reflect lingering traditional beliefs about assessment practices where unpredictability is associated with rigor. The findings support Shmigirilova et al. (2024), who emphasized that establishing a clear purpose for assessment is an essential component of teacher competence because it determines the appropriateness and usefulness of assessment data.

Assessment design obtained a mean score of 4.10 with a standard deviation of 0.60 and was interpreted as *high*. This indicates that mathematics teachers generally possess competence in designing classroom assessments and recognize the importance of collaborative assessment development. Most respondents agreed that collaborative assessment construction improves the quality of assessment tools. This finding suggests that teachers value peer collaboration and professional sharing in developing effective, valid, and reliable assessment instruments.

Among the five dimensions, *communicating results* obtained the lowest mean score of 3.80 with a standard deviation of 0.65, although it was still interpreted as *high*. This result suggests that while mathematics teachers generally recognize the importance of communicating assessment outcomes, this area may still require further strengthening compared to other assessment literacy dimensions. Teachers strongly agreed that students should be informed about how assessment results will be used, indicating their appreciation of transparency and accountability in assessment practices. Bishop (2024) stated that teachers who received sustained professional support became more effective in aligning assessments with learning objectives and communicating results to students.

Effective communication of assessment results helps learners understand their strengths, weaknesses, and areas for improvement, thereby promoting learner engagement and responsibility. However, the comparatively lower rating in this

dimension may imply that some teachers still encounter challenges in providing timely, detailed, and constructive feedback to students. Communicating assessment results effectively requires interpersonal communication skills, clarity in feedback delivery, and the ability to translate assessment data into meaningful information that learners and parents can understand.

Table 4

Factors Predicting Assessment Literacy of Mathematics Teachers

Factors		Coefficients	Standard Error	t	p
Sex	Male	reference			
	Female	-0.161	0.080	-2.020	.045
Age	21-30	reference			
	31-40	-0.236	0.108	-2.178	.031
	41-50	-0.036	0.154	-0.232	.817
	51 and above	-0.400	0.235	-1.704	.091
Civil Status	Single	reference			
	Married	0.235	0.097	2.417	.017
Teaching Experience	1-3	reference			
	4-10	-0.034	0.112	-0.299	.765
	11-20	-0.231	0.155	-1.489	.139
	21 and above	0.180	0.229	0.787	.433
Position	Teacher I	reference			
	Teacher II	-0.001	0.136	-0.009	.993
	Teacher III	0.166	0.118	1.405	.162
	Master Teacher	0.335	0.223	1.503	.135
Number of Assessment Trainings Attended	1-5	reference			
	6-10	0.197	0.083	2.367	.019
	11 and above	0.111	0.125	0.886	.377
Workload	3 - 4	reference			
	5 - 6	0.179	0.219	0.817	.415
	7 - 8	0.331	0.218	1.518	.131

Note: $F(15,134) = 2.349, p = .005$*;* $R = .456$ *and* $R^2 = .208$

Table 4 presents the results of the regression analysis examining which factors significantly predict mathematics teachers' assessment literacy. The regression analysis examined whether demographic and professional variables such as age, civil status, teaching experience, number of training attended, workload, position, and sex significantly predict teachers' assessment literacy.

The overall regression model was statistically significant, $F(15,134) = 2.349, p = .005$, indicating that the combined predictors significantly explain variations in assessment literacy among teachers. The model yielded an $R = .456$ and $R^2 = .208$, suggesting that approximately 20.8% of the variance in assessment literacy can be explained by the identified demographic and professional variables. However, the adjusted $R^2 = .120$ indicates that while the predictors contribute meaningfully, a substantial portion of assessment

literacy may still be influenced by other unmeasured factors such as institutional support, assessment culture, professional learning communities, pedagogical beliefs, and access to assessment resources.

The findings reveal that age significantly predicts assessment literacy. Specifically, respondents under age category 31-40 showed significantly lower assessment literacy scores compared to the reference age category ($B = -0.236, p = .031$). This suggests that teachers in this age group may possess less developed competencies in designing, interpreting, and utilizing assessment practices.

Civil status also emerged as a significant positive predictor of assessment literacy ($B = 0.235, p = .017$). Teachers belonging to married civil status demonstrated significantly higher assessment literacy than the reference group. While civil status itself does not directly determine assessment competence, the finding may reflect differences in professional stability, emotional maturity, time management, or life experiences that influence professional practice.

One of the strongest practical findings in the study is the significant association of the number of trainings attended on assessment literacy. Teachers with 6 to 10 number of assessment training attended exhibited significantly higher assessment literacy scores ($B = 0.197, p = .019$). This finding strongly supports the importance of sustained professional development in enhancing teachers' assessment competencies. Darling-Hammond (2022) emphasized that high-quality professional development significantly improves teachers' instructional and assessment competencies, particularly when training is sustained, collaborative, and directly connected to classroom application.

Sex was likewise found to significantly predict assessment literacy ($B = -0.161, p = .045$). The negative coefficient suggests that female teachers were associated with slightly lower assessment literacy scores compared with male teachers. Muhson et al. (2025) also found that sex is a significant predictor of assessment literacy. This finding may reflect variations in professional opportunities, role expectations, access to training, or teaching assignments that indirectly shape assessment competencies. In teaching practice, differences may emerge in terms of pedagogical approaches, engagement with assessment innovations, or participation in professional learning opportunities.

On the other hand, teaching experience, workload, and position did not significantly predict assessment literacy. This finding is particularly important in educational practice because it suggests that years of service alone do not automatically translate into strong assessment competencies. Teachers may accumulate experience in classroom instruction without necessarily developing sophisticated assessment practices unless supported by targeted training and reflective professional learning. Similarly, holding higher positions or managing heavier workloads may not guarantee stronger assessment literacy if professional development opportunities and institutional support systems are lacking. These findings imply that assessment literacy is more strongly shaped by intentional capacity-building efforts rather than by tenure or rank alone.

4. CONCLUSIONS

Based on the findings of the study, the following conclusions were formulated.

1. Mathematics teachers possess strong understanding in assessment design, alignment. formative use, setting a clear purpose and communicating results.

2. Participation in assessment sex, age, civil status and number of training attended appears to strengthen teachers' competencies in designing, implementing, and interpreting classroom assessments. Conversely, teaching experience, teaching position, or workload alone do not automatically develop strong assessment competencies. Assessment literacy is more strongly enhanced through targeted professional development and continuous capacity-building initiatives rather than through tenure or positional advancement alone.

5. RECOMMENDATIONS

Based on the findings and conclusions drawn from the study, the following recommendations are proposed:

1. Mathematics teachers may continue enhancing their assessment literacy, particularly in improving communication of assessment results and feedback to students.

2. Mathematics learners are encouraged to actively participate in classroom assessment activities and use assessment feedback as a guide for improving their learning performance.

3. School leaders and administrators may strengthen and sustain professional development initiatives focused on assessment literacy among mathematics teachers. They may provide continuous, relevant, and context-responsive training programs, workshops, seminars, and mentoring activities that enhance teachers' competencies in assessment design, formative assessment practices, data interpretation, feedback mechanisms, and the communication of assessment results.

4. Future studies may explore other variables not included in this research, such as school support, access to resources, and the use of artificial intelligence in assessment. Qualitative studies may also be conducted to gain deeper insights into teachers' assessment practices.

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