

## Examining the Interrelationships Among Cognitive, Affective, and Spiritual Competencies and Problem-Solving Abilities of Primary School Educators in Gorontalo Regency: A Quantitative Analysis

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**Abstract:** This study investigates the relationship between cognitive, affective, and spiritual competencies and problem-solving abilities among elementary school teachers in Gorontalo Regency, Indonesia. Despite the critical role teachers play in developing students' problem-solving abilities, many educators continue to face challenges in addressing learning problems innovatively and adaptively. While existing research predominantly examines multiple intelligences in relation to student outcomes, limited attention has been directed toward understanding how teachers' own cognitive, affective, and spiritual capacities influence their professional problem-solving skills. This quantitative study employed a cross-sectional survey design involving all 192 elementary school teachers in Tabongo District. Data were collected using a validated Likert-scale questionnaire (Cronbach's Alpha > 0.6) and analyzed through descriptive statistics, normality testing (Kolmogorov-Smirnov), linearity assessment, multicollinearity diagnostics, and multiple linear regression (IBM SPSS Statistics v.26). Findings reveal significant positive correlations between problem-solving competencies and cognitive competencies ( $r = 0.382, p < .05$ ), affective competencies ( $r = 0.489, p < .05$ ), and spiritual competencies ( $r = 0.434, p < .05$ ). Collectively, these three dimensions account for 34.6% of explained variance in problem-solving competencies ( $R = 0.587, R^2 = 0.346, p < .05$ ). These results underscore the need for holistic teacher development frameworks that systematically integrate cognitive, affective, and spiritual dimensions through targeted professional training interventions. However, the study's cross-sectional design and regional specificity limit broader generalizability. Future research should adopt longitudinal designs and include diverse geographical contexts to validate and extend these findings, thereby informing scalable, evidence-based policies for enhancing teacher competencies and educational quality.

**Keywords:** Cognitive competencies, affective competencies, spiritual competencies, problem solving, elementary school teachers

### 1. Introduction

Elementary education establishes the foundation for developing strong, adaptable, and character-driven human resources. Teachers serve as key agents of change by not only imparting knowledge but also fostering students' critical thinking and problem-solving abilities. Consequently, elementary school teachers require cognitive, affective, and spiritual competencies. Problem-solving is recognized as a vital skill for educators. Gagné (1985) defines problem-solving as the capacity to utilize and adapt knowledge in novel situations, while Bransford and Stein (1984) describe it as a systematic process involving problem identification, solution generation, selection of the optimal solution, and evaluation of outcomes. In the school context, problem-solving encompasses strategic decision-making, classroom conflict management, adapting teaching methods to student needs, and responsiveness to social changes (Rahmawati et al., 2024). Despite its importance, many elementary school teachers continue to encounter difficulties in addressing learning challenges innovatively and thoughtfully, indicating a persistent deficiency in problem-solving skills (Affandi, 2023). Accordingly, this study explicitly seeks to answer the following research questions: (1) How do cognitive competencies relate to the teachers' problem-solving skills? (2) What is the relationship between affective competencies and teachers' problem-solving abilities? (3) In what ways do spiritual competencies contribute to teachers' problem-solving skills? (4) How do these three dimensions simultaneously influence the problem-solving skills?

Local evidence from Gorontalo Regency supports the significance of emotional intelligence in teaching effectiveness. Wanhandrik Tahalu (2012) found that elementary school teachers in Bilato District demonstrate strong affective competencies, enabling them to manage classroom conflicts effectively through emotion regulation, perspective-taking, and fostering supportive learning environments. Teachers with heightened emotional intelligence exhibit greater adaptability, sustain positive interpersonal relationships, and demonstrate enhanced collaborative problem-solving when addressing instructional challenges, suggesting that affective competencies constitute a critical dimension of teacher professionalism in the region.

Gardner's (1983) theory of Multiple Intelligences provides a comprehensive framework for understanding human intelligence, extending beyond logic and language to encompass various types that can be developed concurrently. This study emphasizes three forms of intelligence most relevant to teachers' problem-solving: cognitive, affective, and spiritual competencies. Crow & Crow (1984) define intelligence as the general capacity to think and adapt to new problems. Goleman (1999) characterizes emotional intelligence as the ability to recognize, understand, and manage emotions, as well as to build healthy relationships. Zohar & Marshall (2007) define spiritual intelligence as the capacity to find meaning in life, act in accordance with moral values, and demonstrate wisdom. The integration of these three competencies enables teachers to cultivate a reflective mindset, empathy, and a solution-oriented approach to classroom challenges.

To illustrate the application of these competencies in the Gorontalo classroom context, consider the following examples. Cognitive intelligence manifests when teachers employ logic and analytical skills to deconstruct complex mathematical concepts, enabling students to master foundational principles before progressing to advanced applications; for instance, utilizing local market trading scenarios to elucidate arithmetic operations. Affective competencies are demonstrated when teachers recognize students' frustration during collaborative activities, respond empathetically by validating their emotions, and cultivate supportive peer dynamics that reinforce empathetic pedagogical practices. Spiritual competencies emerge when teachers integrate indigenous cultural narratives into instructional content, prompting students to critically examine moral principles and ethical values, thereby fostering connections between academic learning, community identity, and personal development while nurturing respect for cultural heritage and ethical reasoning.

Despite widespread recognition of Multiple Intelligences theory in Indonesian education, its integration into teacher development remains inadequate. Sudarma et al. (2022) reported that most elementary teachers in Buleleng Regency have not adopted Multiple Intelligence-based instructional strategies due to insufficient training and limited understanding, with many continuing to rely on traditional, lecture-based methods that fail to address diverse learner and educator intelligences. Similarly, Siti Sundari et al. (2022) observed that teachers' inability to identify their dominant intelligence types results in inflexible problem-solving approaches in classroom contexts. While existing research identifies training deficits as primary causes, systemic factors—including rigid institutional curricula and inadequate policy frameworks—remain underexamined, indicating a need for structural analysis of barriers constraining effective implementation of Multiple Intelligences frameworks in teacher professional development.

In Gorontalo Regency, teacher training programs have not systematically integrated Multiple Intelligences frameworks, contributing to persistent challenges in pedagogical adaptability and instructional innovation. According to the Gorontalo Provincial Education Office (2023), many elementary teachers have not participated in professional development programs addressing cognitive, affective, and spiritual competencies. This gap is particularly concerning given that effective teaching requires not only academic proficiency but also emotional resilience and ethical grounding to navigate diverse classroom situations. With limited empirical research examining how Multiple Intelligences influence elementary school teachers' problem-solving abilities in resource-constrained contexts, this study addresses a critical knowledge gap with direct implications for teacher professional development in the region.

Empirical evidence supports the positive influence of integrating intellectual, emotional, and spiritual competencies on teachers' problem-solving capabilities. Teachers with heightened self-awareness of their cognitive and affective strengths demonstrate greater capacity to respond reflectively and adaptively to pedagogical challenges (Nurhikmah, 2023). Hayati (2020) found that spiritual intelligence facilitates meaning-making in

challenging contexts, thereby enhancing professional motivation and resilience. Furthermore, creative problem-solving approaches grounded in Multiple Intelligences theory have been shown to cultivate critical thinking and adaptive instructional strategies necessary for addressing complex educational demands (Rulyansah et al., 2022). This multidimensional framework enables educators to integrate analytical reasoning, empathetic understanding, and ethical principles in pedagogical decision-making, addressing contemporary requirements for character development, collaborative competence, and higher-order cognitive skills in educational practice (Rahayu et al., 2023). Despite this growing body of evidence, comprehensive professional development frameworks that systematically integrate these three intelligence domains remain scarce, particularly in resource-constrained regions such as Gorontalo Regency. Addressing this gap is essential for advancing teacher professionalism and enhancing problem-solving competencies in elementary education, which this study seeks to accomplish by examining the interrelationships between Multiple Intelligences and teachers' problem-solving skills in this specific regional context.

## 2. Method

This quantitative study employed a cross-sectional survey design to examine the relationships between cognitive, affective, and spiritual competencies and problem-solving abilities among elementary school teachers in Tabongo District, Gorontalo Regency. The study population comprised all 192 elementary school teachers in the district. Given the accessible population size, a census approach was adopted, with all teachers invited to participate, thereby eliminating sampling error and enhancing representativeness. The study examined three independent variables—cognitive competencies ( $X_1$ ), affective competencies ( $X_2$ ), and spiritual competencies ( $X_3$ )—and one dependent variable, problem-solving competencies ( $Y$ ). Cognitive competencies were operationalized through indicators of logical thinking, adaptability to new situations, and conceptual understanding. Affective competencies encompassed emotion recognition, emotion management, empathy, and social skills. Spiritual competencies included awareness of moral values, wisdom, and meaning-making capacity. Problem-solving competencies were measured through abilities to identify problems, generate alternative solutions, select optimal solutions, and evaluate outcomes. These operational definitions were derived from Gardner's (1983) Multiple Intelligences theory and Gagné's (1985) problem-solving framework.

Data were collected using a structured questionnaire with 5-point Likert scales (1 = strongly disagree; 5 = strongly agree), comprising 20–25 items per variable. The instrument was developed based on established theoretical frameworks and pilot-tested with 30 elementary school teachers outside the study sample. Validity was assessed using Pearson product-moment correlation ( $r_{count} > r_{table}$  at  $\alpha = .05$ ), and reliability was confirmed through Cronbach's Alpha coefficients exceeding 0.6 for all scales. Data analysis proceeded in several stages. Descriptive statistics (means, medians, standard deviations) characterized the sample and variable distributions. Assumption testing included normality assessment (Kolmogorov-Smirnov test,  $p > .05$ ), linearity testing ( $p < .05$ ), and multicollinearity diagnostics (variance inflation factor  $< 10$ ). Hypotheses were tested using simple linear regression to examine bivariate relationships and multiple linear regression to assess simultaneous effects of the three competency dimensions on problem-solving abilities. All analyses were conducted using IBM SPSS Statistics version 26, with statistical significance set at  $\alpha = .05$ . Ethical approval was obtained, and all participants provided informed consent. Data confidentiality was maintained throughout the study, conducted during the 2023–2024 academic year.

## 3. Results

This study involved all 192 elementary school teachers from Tabongo District, Gorontalo Regency. Descriptive statistics revealed that teachers demonstrated high levels across all measured variables: cognitive competencies ( $M = 90.2\%$ , categorized as very good), affective competencies ( $M = 89.5\%$ , good), spiritual competencies ( $M = 87.9\%$ , good), and problem-solving competencies ( $M = 88.7\%$ , good). Prior to hypothesis testing, statistical assumptions were verified. Normality testing using the Kolmogorov-Smirnov test confirmed that residuals for all regression models were normally distributed ( $p > .05$  for all models). Linearity tests indicated significant linear relationships between each independent variable and the dependent variable ( $p < .05$ ). Multicollinearity diagnostics revealed no problematic collinearity among predictors, with variance inflation factors (VIF) well below the threshold of 10 (VIF  $X_1 = 1.23$ ,  $X_2 = 1.45$ ,  $X_3 = 1.34$ ). These results confirmed that all assumptions for multiple linear regression were satisfied.

Simple linear regression analyses were conducted to examine the bivariate relationships between each competency dimension and problem-solving abilities (see Table 1). Cognitive competencies demonstrated a significant positive relationship with problem-solving competencies ( $r = 0.382, p < .001$ ), accounting for 14.6% of the variance ( $R^2 = 0.146, F = 32.41$ ). Affective competencies showed the strongest bivariate association ( $r = 0.489, p < .001$ ), explaining 23.9% of the variance in problem-solving competencies ( $R^2 = 0.239, F = 59.86$ ). Spiritual competencies also exhibited a significant positive relationship ( $r = 0.434, p < .001$ ), accounting for 18.8% of the variance ( $R^2 = 0.188, F = 44.19$ ). Multiple linear regression analysis revealed that the three competency dimensions collectively explained 34.6% of the variance in teachers' problem-solving competencies ( $R = 0.587, R^2 = 0.346, F = 33.27, p < .001$ ). The regression equation  $Y = 20.882 + 0.196X_1 + 0.293X_2 + 0.260X_3$  indicates that all three predictors contributed uniquely to problem-solving competencies when controlling for the others. Affective competencies demonstrated the largest standardized coefficient, followed by spiritual competencies and cognitive competencies, suggesting differential contributions of these dimensions in the multivariate model.

**Table 1. Summary of Regression Coefficients, Correlation Coefficients (r), and Coefficients of Determination (R<sup>2</sup>) for the Influence of Intellectual, Emotional, and Spiritual Intelligence on Teachers' Problem-Solving Skills**

Independent variable	Regression coefficient (b)	Correlation coefficient (r)	Coefficient of determination (R <sup>2</sup> )	F value	Sig. (p)
Intellectual intelligence	0.382	0.382	0.146	32.41	<0.001
Emotional intelligence	0.476	0.489	0.239	59.86	<0.001
Spiritual intelligence	0.402	0.434	0.188	44.19	<0.001
Simultaneous regression (multiple)	0.196 (X1), 0.293 (X2), 0.260 (X3)	R=0.587	0.346	33.27	<0.001

Note: All p-value are significant at the  $\alpha = 0.05$  level. The dependent variable is teachers' problem-solving skills.

#### 4. Discussion

##### The Influence of Cognitive Competencies on Elementary School Teachers' Problem-Solving Skills

The results indicate that cognitive intelligence has a significant positive relationship with teachers' problem-solving competencies ( $r = 0.382, R^2 = 0.146, F = 32.41, p < .001$ ), explaining 14.6% of the variance. This finding aligns with Neisser et al. (1996), who demonstrated that intellectual competencies are strongly associated with analytical thinking and adaptive reasoning capabilities. Teachers with higher cognitive intelligence demonstrate enhanced abilities to analyze complex classroom situations, adapt instructional methods to diverse student needs, and apply logical problem-solving strategies when addressing pedagogical challenges. These intellectual competencies enable teachers to deconstruct learning problems systematically, evaluate multiple solution pathways, and implement evidence-based instructional decisions.

The practical significance of this finding is evident in classroom contexts where teachers must navigate diverse learning needs, curriculum demands, and unexpected instructional challenges. Teachers who possess strong logical reasoning and conceptual understanding are better equipped to identify the root causes of learning difficulties, design differentiated instructional approaches, and evaluate the effectiveness of their pedagogical interventions. This cognitive flexibility is particularly crucial in elementary education, where teachers encounter heterogeneous student populations with varying developmental levels, learning styles, and academic backgrounds. However, the moderate effect size ( $R^2 = 0.146$ ) suggests that intellectual competencies alone do not fully account for problem-solving abilities, indicating the importance of other factors such as affective and spiritual dimensions.

These findings have important implications for teacher professional development in Gorontalo Regency and

similar contexts. Pre-service and in-service training programs should incorporate explicit instruction in analytical thinking, pedagogical reasoning, and evidence-based decision-making to strengthen teachers' cognitive competencies. Workshops focusing on case-based learning, critical analysis of instructional scenarios, and collaborative problem-solving could enhance teachers' intellectual skills in authentic educational contexts.

### **The Influence of Affective Competencies on Elementary School Teachers' Problem-Solving Skills**

The results indicate that emotional intelligence demonstrates the strongest bivariate relationship with problem-solving competencies among the three dimensions ( $r = 0.489$ ,  $R^2 = 0.239$ ,  $F = 59.86$ ,  $p < .001$ ), explaining 23.9% of the variance. This finding underscores the critical role of affective competencies in teachers' professional problem-solving capabilities. Teachers with higher emotional intelligence demonstrate enhanced abilities to recognize and manage their own emotions, empathize with students' affective states, navigate interpersonal conflicts constructively, and maintain composure under pedagogical stress. These affective competencies are particularly salient in elementary education contexts, where teachers must simultaneously manage diverse student behaviors, respond to emotional needs, facilitate social interactions, and maintain positive classroom climates.

The ability to regulate emotions enables teachers to approach problems calmly and reflectively rather than reactively, leading to more thoughtful and effective solutions. Furthermore, empathy allows teachers to understand problems from multiple perspectives—including students', parents', and colleagues'—thereby generating more comprehensive and contextually appropriate solutions. This finding aligns with Goleman's (1999) framework of emotional intelligence, which emphasizes emotion recognition, emotion management, empathy, and social skills as foundational for professional effectiveness. The relatively large effect size ( $R^2 = 0.239$ ) compared to cognitive competencies ( $R^2 = 0.146$ ) suggests that affective competencies may be particularly consequential for problem-solving in the interpersonal, dynamic context of elementary classrooms.

This is consistent with previous research by Mohzana (2024) and local evidence from Wanhandrik Tahalu (2012) in Gorontalo Regency, which demonstrated that teachers with strong emotional intelligence manage classroom conflicts more effectively and sustain collaborative problem-solving approaches. The practical implications are significant for teacher professional development. Training programs should incorporate explicit instruction in emotional self-awareness, emotion regulation strategies, empathy development, and interpersonal communication skills. Specific interventions could include reflective practice sessions where teachers analyze their emotional responses to challenging situations, role-play scenarios for practicing conflict resolution, and peer coaching focused on empathetic communication. Given the high-stress nature of teaching in resource-constrained contexts such as Gorontalo Regency, training in affective competencies may be particularly valuable for enhancing teachers' resilience and adaptive capacity.

### **The Influence of Spiritual Competencies on Elementary School Teachers' Problem-Solving Skills**

The results indicate that spiritual intelligence demonstrates a significant positive relationship with problem-solving competencies ( $r = 0.434$ ,  $R^2 = 0.188$ ,  $F = 44.19$ ,  $p < .001$ ), explaining 18.8% of the variance. This finding highlights the importance of meaning-making, ethical awareness, and values-based reasoning in teachers' problem-solving processes. Spiritual competencies, as conceptualized by Zohar and Marshall (2007), encompass the capacity to find meaning in challenges, act in accordance with moral values, and demonstrate wisdom in decision-making. Teachers with higher spiritual intelligence are better equipped to approach pedagogical problems with a sense of purpose and ethical grounding, viewing challenges as opportunities for growth rather than threats. This perspective enables teachers to maintain resilience in the face of professional difficulties, make decisions aligned with educational values, and model ethical reasoning for students.

In elementary education contexts, where teachers serve as moral exemplars and character developers, spiritual competencies play a particularly important role. Teachers must navigate ethical dilemmas related to fairness, equity, student welfare, and professional integrity on a daily basis. Those with strong spiritual intelligence demonstrate enhanced capacity to balance competing demands, prioritize student well-being, and make principled decisions even under pressure. The moderate effect size ( $R^2 = 0.188$ ) suggests that spiritual competencies contribute meaningfully to problem-solving abilities, though to a somewhat lesser extent than affective competencies in this sample.

This finding extends previous research by Ramadhani et al. (2022), which identified spiritual intelligence as a significant predictor of teacher professional competence, and Wariani et al. (2022), who demonstrated positive associations between spiritual intelligence and instructional effectiveness. However, spiritual competencies remain an underexplored and underdeveloped dimension in teacher professional development programs in Indonesia, particularly in Gorontalo Regency. The practical implications suggest that teacher training should incorporate opportunities for ethical reflection, values clarification, and meaning-making related to the teaching profession. Specific interventions could include guided reflective practice on ethical dilemmas in teaching, mindfulness exercises to cultivate present-moment awareness and inner calm, discussions of educational philosophy and purpose, and integration of local cultural and spiritual traditions that emphasize wisdom, compassion, and service. Such approaches could strengthen teachers' sense of professional purpose and ethical grounding, thereby enhancing their capacity to navigate complex problem-solving situations with integrity and resilience.

### **The Simultaneous Influence of Cognitive, Affective, and Spiritual Competencies on Elementary School Teachers' Problem-Solving Skills**

The multiple regression analysis revealed that cognitive, affective, and spiritual competencies collectively explain 34.6% of the variance in teachers' problem-solving abilities ( $R = 0.587$ ,  $R^2 = 0.346$ ,  $F = 33.27$ ,  $p < .001$ ). This substantial combined effect demonstrates that these three competency dimensions function synergistically to support problem-solving capabilities. When examined simultaneously, emotional intelligence demonstrated the largest standardized coefficient, followed by spiritual intelligence and cognitive intelligence, indicating differential contributions to the multivariate model. The finding that the three dimensions collectively explain more than twice the variance of cognitive competencies alone (34.6% vs. 14.6%) underscores the importance of holistic teacher competencies that integrate intellectual, affective, and spiritual capacities.

This aligns with Gardner's (1983) Multiple Intelligences framework, which posits that human capabilities are multidimensional and that effective functioning requires integration across cognitive and non-cognitive domains. In the context of elementary teaching, problem-solving demands simultaneous deployment of analytical reasoning (cognitive competencies), interpersonal sensitivity and emotion regulation (affective competencies), and ethical grounding and meaning-making (spiritual competencies). Teachers who possess strengths across all three dimensions are better equipped to navigate the complex, multifaceted challenges inherent in elementary education—from adapting instruction to diverse learners, managing classroom dynamics, collaborating with colleagues and parents, to maintaining professional resilience amid systemic constraints.

These findings are consistent with previous research demonstrating positive effects of Multiple Intelligences-based approaches on educational outcomes. Rulyansah et al. (2022) found that Multiple Intelligences integration contributed significantly to improving problem-solving skills, while Rahayu et al. (2023) demonstrated that holistic teacher competencies aligned with contemporary educational demands for character development, collaboration, and higher-order thinking. The present study extends this literature by providing empirical evidence from the Gorontalo Regency context, demonstrating that the integration of cognitive, affective, and spiritual competencies is consequential for teacher problem-solving abilities in resource-constrained settings.

The practical implications are significant for teacher professional development policy and practice. Rather than focusing narrowly on cognitive or pedagogical skills, teacher training programs should adopt holistic frameworks that systematically address intellectual, emotional, and spiritual competencies. Integrated professional development could include case-based learning that requires simultaneous application of analytical thinking, empathetic communication, and ethical reasoning; reflective practice that encourages teachers to examine their cognitive assumptions, emotional responses, and values orientation; and collaborative problem-solving activities that model the integration of multiple competency dimensions in authentic educational contexts. Such approaches would better prepare teachers for the multifaceted demands of elementary education and support the development of adaptive, resilient, and ethically grounded professional practice.

### **5. Conclusion**

This study examined the relationships between cognitive, affective, and spiritual competencies and problem-

solving abilities among 192 elementary school teachers in Tabongo District, Gorontalo Regency, Indonesia. Simple linear regression analyses revealed that all three competency dimensions demonstrated significant positive relationships with problem-solving abilities. Cognitive competencies explained 14.6% of the variance ( $r = 0.382$ ,  $p < .001$ ), affective competencies explained 23.9% ( $r = 0.489$ ,  $p < .001$ ), and spiritual competencies explained 18.8% ( $r = 0.434$ ,  $p < .001$ ). Notably, affective competencies demonstrated the strongest bivariate relationship, suggesting that emotional intelligence may be particularly consequential for problem-solving in the interpersonal, dynamic context of elementary classrooms. Multiple regression analysis revealed that the three competency dimensions collectively explained 34.6% of the variance in problem-solving abilities ( $R = 0.587$ ,  $R^2 = 0.346$ ,  $p < .001$ ), demonstrating synergistic effects when integrated. These findings underscore the importance of holistic teacher competencies that integrate cognitive, affective, and spiritual capacities for effective pedagogical problem-solving.

The practical implications are significant for teacher professional development policy in Gorontalo Regency and similar resource-constrained contexts. Rather than focusing narrowly on cognitive or pedagogical skills, pre-service and in-service training programs should adopt integrated frameworks that systematically address intellectual, emotional, and spiritual competencies through case-based learning, reflective practice, and collaborative problem-solving activities. Such holistic approaches could better prepare teachers for the multifaceted demands of elementary education and support the development of adaptive, resilient, and ethically grounded professional practice.

However, several limitations should be acknowledged. The cross-sectional design precludes causal inferences about the directionality of relationships between competency dimensions and problem-solving abilities. The regional specificity of the sample (Tabongo District) may limit generalizability to other educational contexts with different demographic, cultural, or resource characteristics. Additionally, reliance on self-report measures may introduce social desirability bias or limited insight into actual classroom behaviors. Future research should employ longitudinal designs to examine developmental trajectories of teacher competencies, expand to diverse geographical and cultural contexts to enhance generalizability, and incorporate observational or performance-based assessments to complement self-report data. Investigating potential moderators such as school climate, administrative support, and community socioeconomic factors could further specify the conditions under which competency dimensions contribute most strongly to effective problem-solving, thereby enriching both theoretical understanding and practical application in teacher professional development.

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