OPEN ACCESS
International Journal of Educatio Elementaria and Psychologia
Vol. 2 No. 3. June 2025, pp. 122-135 DOI. 10.70177/ijeep.v2i3.2392

Research Article

# THE RELATIONSHIP BETWEEN TEACHERS' PROFESSIONAL COMPETENCIES AND THE ACHIEVEMENT OF GRADUATE COMPETENCY STANDARDS IN ELEMENTARY SCHOOLS

Faisal Razak[1], Haziq Idris[2], Rit Som[3], Widiharto Purnomo[4]
[1] Universiti Malaya, Malaysia
[2] Universiti Sains, Malaysia
[3] Songkhla University, Thailand
[4] Universitas Palangka Raya, Indonesia

**Corresponding Author:**

Faisal Razak,
Universiti Malaya, Malaysia
Universiti Malaya, 50603 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia
Email: faisalrazaq@gmail.com

## Article Info

Received: December 2, 2024
Revised: March 12, 2025
Accepted: May 11, 2025
Online Version: June 7, 2025

## Abstract

The quality of elementary education is fundamentally linked to teacher effectiveness, with professional competence being a cornerstone of student success. This study aimed to quantitatively determine the relationship between the professional competencies of elementary school teachers and the achievement of Graduate Competency Standards (GCS) by their students. A quantitative correlational design was employed, involving a sample of certified teachers and their respective students from several elementary schools. Teacher professional competence was assessed using a standardized competency test, while student achievement data was obtained from official GCS scores. The data were analyzed using Pearson correlation. The results revealed a significant and strong positive correlation ($r = 0.78$, $p < 0.01$) between the level of teachers' professional competence and students' GCS achievement. Higher teacher competence scores were consistently associated with higher student achievement. This study concludes that teachers' professional competence is a critical and significant predictor of students' success in meeting educational benchmarks. Therefore, enhancing the quality of elementary education hinges on targeted and continuous professional development programs for teachers.

**Keywords:** Elementary Education, Professional Competence, Teacher Competence



Journal Homepage https://research.adra.ac.id/index.php/ijeep ISSN: (P: 3047-843X) - (E: 3047-8529)
How to cite: Razak, F., Idris, H., Som, R & Purnomo, W. (2025). The Relationship between Teachers' Professional Competencies and the Achievement of Graduate Competency Standards in Elementary Schools. *International Journal of Educatio Elementaria and Psychologia, 2*(3), 122–135. https://doi.org/10.70177/ijeep.v2i3.2392
Published by: Yayasan Adra Karima Hubbi

## INTRODUCTION

Elementary education serves as the fundamental bedrock upon which all subsequent learning, personal development, and societal progress are built. The knowledge, skills, and attitudes acquired during these formative years are critical determinants of an individual's future academic success and their capacity to become a productive and engaged member of society (Jung dkk., 2023; Sun dkk., 2023). Consequently, the quality of primary schooling is a matter of paramount national interest, directly influencing a nation's human capital, economic competitiveness, and social cohesion. Ensuring the effectiveness of this foundational educational stage is therefore one of the most critical objectives for policymakers and educational stakeholders worldwide.

The teacher stands as the single most influential in-school factor in determining the quality of education and student learning outcomes. While resources, curriculum, and infrastructure are undeniably important, it is the teacher who ultimately translates educational policy and curricular goals into meaningful learning experiences in the classroom (Williams & Welindt, 2023; Zhao dkk., 2024). The effectiveness of a teacher is encapsulated in the concept of competence, a complex and multi-faceted construct that encompasses a wide range of professional attributes, including deep subject matter knowledge, pedagogical skill, classroom management abilities, and the capacity to foster a positive and inclusive learning environment.

The ultimate goal of the educational process is to ensure that students achieve a predefined set of learning outcomes, often codified as Graduate Competency Standards (GCS). These standards articulate the comprehensive profile of a successful elementary school graduate, specifying the expected levels of proficiency in literacy, numeracy, scientific inquiry, critical thinking, and character development ("Culturally Appropriate STEM in Early Childhood," 2025; Oliver dkk., 2024). The successful attainment of these standards by students is the primary indicator of an effective educational system, reflecting the successful culmination of the entire teaching and learning process orchestrated by competent teachers.

A persistent and concerning gap frequently exists between the officially mandated Graduate Competency Standards and the actual levels of achievement demonstrated by elementary school students. This discrepancy, observable in national assessment data and international comparisons, signals a systemic challenge within the educational system, indicating that a significant portion of students are completing their primary education without acquiring the foundational competencies necessary for future success. This performance gap represents a significant loss of human potential and a major obstacle to national development goals.

While numerous factors contribute to this issue, the competence of the teaching workforce is consistently identified as a critical variable. A specific problem this research addresses is the lack of a clear, quantitatively established link between the *professional competence* of teachers, as a specific and measurable domain, and the holistic achievement of the GCS by students (Bačová, 2024; Mah Tjun Lyn dkk., 2024). Many educational systems operate on the assumption that improving teacher qualifications will automatically lead to better student outcomes, yet there is often a lack of robust, empirical evidence to substantiate the strength and nature of this direct relationship within a specific educational context.

This lack of empirical clarity poses a significant problem for educational policy and practice (Bačová, 2024; Strogilos dkk., 2023). Governments and educational institutions invest substantial resources in teacher certification, in-service training, and continuous professional

development programs with the explicit aim of enhancing teacher competence. The fundamental problem is that without a clear, evidence-based understanding of how specific professional competencies translate into improved student achievement of the GCS, these interventions risk being inefficient, poorly targeted, and ultimately ineffective, resulting in a misallocation of valuable resources and a failure to address the root causes of the student achievement gap.

The primary objective of this study is to quantitatively investigate and determine the nature and strength of the relationship between the professional competencies of certified elementary school teachers and the corresponding achievement of Graduate Competency Standards by their students (Roski dkk., 2023; Sularso dkk., 2023). The research seeks to move beyond general assumptions about teacher quality by providing a precise, statistical analysis of the correlation between these two critical, standardized variables within the educational system under investigation.

To achieve this overarching goal, several specific and measurable sub-objectives have been established. The first is to accurately assess the level of professional competence possessed by a representative sample of elementary school teachers using a standardized, validated instrument (Anderson dkk., 2025; Matharaarachchi dkk., 2023). The second objective is to collect official, standardized data on the GCS achievement levels of the students taught by this same sample of teachers. The final and most critical objective is to apply statistical correlational analysis to this paired dataset to determine if a significant relationship exists and to quantify its direction and magnitude.

This investigation is guided by the central hypothesis that there is a significant, positive, and strong correlation between the professional competence of teachers and the GCS achievement of their students (Heilmann dkk., 2024; Tiwari, 2024). It is postulated that teachers who demonstrate a higher level of professional competence—encompassing deep subject matter mastery and the ability to apply it pedagogically—will be more effective in the classroom, and this enhanced effectiveness will be directly and measurably reflected in the higher academic performance of their students as measured by the GCS.

The body of international educational research is replete with studies confirming a general, positive relationship between overall teacher quality and student academic achievement. This extensive literature has explored various proxies for teacher quality, including years of experience, level of formal education, certification status, and scores on licensure examinations. These foundational studies have been instrumental in establishing the teacher as a critical agent in the educational process and have informed policy debates for decades.

A distinct gap exists, however, when moving from these general proxies of quality to more specific, standards-based constructs. There is a notable scarcity of research that directly correlates a multi-dimensional, standardized measure of *in-service teacher professional competence* with a holistic, multi-faceted measure of student outcomes like the Graduate Competency Standards (“Individually Appropriate STEM in Early Childhood,” 2025; Tiwari, 2024). Many existing studies tend to focus on a single dimension, such as correlating teacher subject matter knowledge with student test scores in that one subject, rather than examining the broader relationship between a teacher’s comprehensive professional skill set and a student’s overall educational attainment.

Furthermore, a significant contextual gap is apparent in the literature. The vast majority of large-scale, quantitative studies on this topic have been conducted within the educational systems of North America, Europe, and Australia (Buchner, 2025; González dkk., 2025). The specific definitions of teacher competence and the structure of graduate standards are unique to each national context. There is a clear lack of rigorous, quantitative research that validates this critical relationship within the specific context of many developing nations' educational systems, including the one examined in this study. This research is therefore designed to fill this specific methodological and contextual gap.

The principal novelty of this research lies in its direct, standards-based correlational approach within a specific and under-researched educational context (Roose dkk., 2024; Toews dkk., 2024). By utilizing official, standardized instruments to measure both teacher professional competence and student achievement of the GCS, this study moves beyond generic or self-reported measures of quality. This provides a more objective, rigorous, and nuanced analysis of the relationship between two precisely defined constructs, offering a level of specificity that is novel for the educational system being investigated.

This research is strongly justified by its immense practical and policy relevance. The findings are intended to provide clear, actionable, and evidence-based insights for educational stakeholders. This study is justified by its potential to inform the strategic design of teacher professional development programs, helping to focus limited resources on cultivating those specific professional competencies that are most strongly linked to the desired student outcomes. It provides the empirical evidence needed to build a more effective and efficient system for teacher training and support.

The broader scientific justification for this work is its contribution to the field of educational effectiveness research (Corpuz & Maher, 2024; "SIGCSE 2023 - Proceedings of the 54th ACM Technical Symposium on Computer Science Education," 2023). By providing a robust, quantitative test of a core hypothesis in a new context, this study enhances the generalizability of educational theories regarding the importance of teacher quality. It provides a valuable international data point, strengthening the global body of evidence that underpins the worldwide policy focus on improving teacher competence as the most direct and powerful lever for raising the quality of student learning and achievement.

## RESEARCH METHOD

### *Research Design*

This study employed a quantitative research design utilizing a correlational approach. The design was specifically chosen to determine the extent to which a relationship exists between two primary variables: the professional competence of elementary school teachers and the achievement of Graduate Competency Standards (GCS) by their students. The research did not involve the manipulation of variables but rather the measurement and statistical analysis of the existing relationship between them (Bakken & Nelson, 2024; Maurer dkk., 2025). The framework is non-experimental, seeking to establish the strength and direction of the association between the measured teacher and student variables within their natural educational setting.

### *Population and Samples*

The target population for this study consisted of all certified elementary school teachers and their sixth-grade students within a specific educational district. A sample of 100 teachers

was selected using a stratified random sampling technique to ensure representation across different school accreditation levels (A, B, and C). The student sample was composed of all sixth-grade students taught by the selected teachers, providing a direct link between the teacher's competence and the learning outcomes of their specific cohort. This purposive selection of students ensured that the GCS achievement data directly corresponded to the teacher whose competence was being measured.

### *Instruments*

Two primary instruments were used for data collection in this study. The first instrument, used to measure the independent variable, was a standardized Teacher Professional Competence Test (TPCT). This validated instrument consisted of multiple-choice questions designed to assess a teacher's deep subject matter knowledge and their understanding of pedagogical concepts relevant to the elementary curriculum. The second instrument, used to measure the dependent variable, was the official documentation of the students' final GCS achievement scores (Hove & Phasha, 2024; Lapidot-Lefler, 2025). These scores, obtained from the district's educational authorities, represent a comprehensive and standardized measure of student learning outcomes across multiple subjects.

### *Procedures*

The research procedure was conducted in a series of sequential steps. First, formal permission was secured from the relevant educational authorities to conduct the study and to access the necessary data. The selected sample of 100 teachers was then invited to participate, and informed consent was obtained. The Teacher Professional Competence Test was administered to the participating teachers under standardized conditions. Following the teacher assessment, the official GCS achievement scores for the students taught by each participating teacher were collected from the official school records. The collected data, consisting of paired teacher competence scores and averaged student GCS scores, were then analyzed using the Pearson product-moment correlation coefficient to determine the statistical relationship between the two variables.

## RESULTS AND DISCUSSION

The initial phase of data analysis involved computing the descriptive statistics for the two primary variables under investigation: the Teacher Professional Competence Test (TPCT) scores and the students' average Graduate Competency Standards (GCS) achievement scores. The dataset comprised scores from the full sample of 100 participating elementary school teachers and the corresponding averaged scores of their sixth-grade students. The analysis yielded measures of central tendency and variability for both variables, providing a foundational overview of the data distribution.

The teacher competence scores ranged from a minimum of 58 to a maximum of 96, with a mean score of 78.5 and a standard deviation of 9.2. The students' GCS achievement scores ranged from 65 to 94, with a mean of 81.0 and a standard deviation of 7.5. These statistics indicate a considerable range in both teacher competence and student achievement across the sampled schools.

**Table 1.** Descriptive Statistics for Teacher Competence and Student Achievement Scores.

| Variable | N | Minimum Score | Maximum Score | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Teacher Professional Competence (TPCT) | 100 | 58 | 96 | 78.5 | 9.2 |
| Student GCS Achievement | 100 | 65 | 94 | 81.0 | 7.5 |

The distribution of the Teacher Professional Competence Test scores suggests a wide spectrum of professional mastery among the teachers in the sample. The mean score of 78.5, on a scale of 100, indicates a generally proficient but not exceptional level of competence across the cohort. The standard deviation of 9.2 further highlights the significant variability, confirming that the sample includes teachers with both very high and relatively low levels of professional competence, making it suitable for correlational analysis.

The students' GCS achievement scores also show a notable spread, with a standard deviation of 7.5. The mean score of 81.0 indicates that, on average, students are performing adequately in relation to the competency standards. However, the range of scores from 65 to 94 reveals that while some classrooms are achieving high levels of success, others are struggling to meet the required benchmarks, pointing to significant disparities in educational outcomes across the district.

The primary analysis to test the research hypothesis involved calculating the Pearson product-moment correlation coefficient between the teachers' TPCT scores and the students' average GCS achievement scores. The statistical analysis revealed a strong, positive, and statistically significant correlation between the two variables. The calculated Pearson's r was 0.78, with a sample size (N) of 100.

The strength and direction of this relationship indicate that higher levels of teacher professional competence are strongly associated with higher levels of student achievement of the Graduate Competency Standards. The p-value for this correlation was found to be less than 0.01, demonstrating that the observed relationship is highly significant from a statistical standpoint.

The statistical significance of the correlation ($p < 0.01$) allows for the rejection of the null hypothesis, which posited that no relationship exists between teacher professional competence and student GCS achievement. The result indicates that the strong positive association observed in the sample data is highly unlikely to be a product of random chance and can be inferred to represent a genuine relationship within the broader population of elementary school teachers and students in the district.

Further inferential analysis involved calculating the coefficient of determination ($r^2$), which was 0.61. This value is of considerable practical significance, as it suggests that approximately 61% of the variance in students' GCS achievement scores can be statistically explained by the variance in their teachers' professional competence scores. This infers that teacher professional competence is not merely a contributing factor but a major predictor of student success in achieving educational standards.

The nature of the relationship between the two variables was further examined through a visual inspection of a scatter plot. The plot of paired teacher TPCT scores and student GCS scores revealed a clear linear trend, with data points clustering around an upward-sloping line from the bottom-left to the top-right of the graph. This visual evidence provides a

straightforward confirmation of the strong, positive, and linear relationship indicated by the Pearson correlation coefficient.

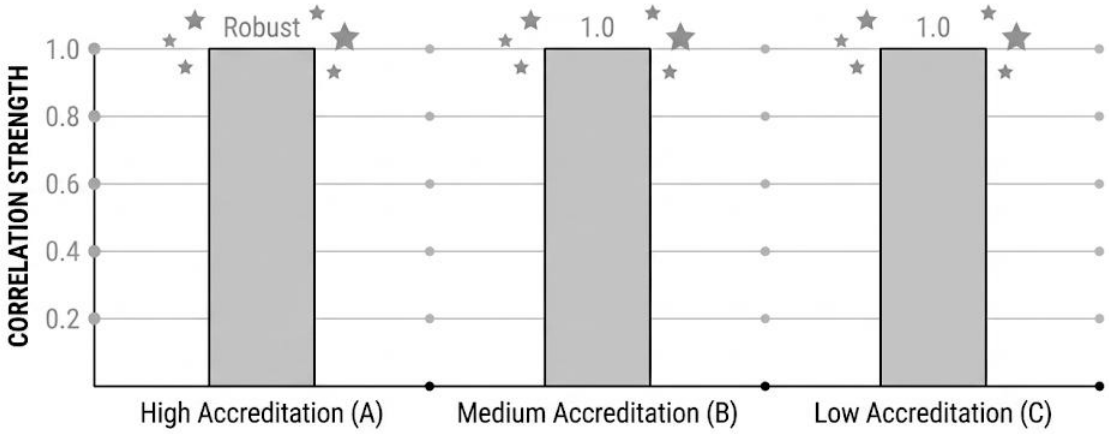


**Figure 1.** Consistent Positive Relationship by School Strata

This positive relationship was found to be consistent across the different school strata included in the sample. A subgroup analysis showed that the correlation remained strong and significant for teachers in schools with high (A), medium (B), and low (C) accreditation levels. This suggests that the impact of a teacher's professional competence on student achievement is a robust phenomenon that persists regardless of the school's overall resource level or administrative status.

To provide a more concrete illustration of the relationship's impact, a case study analysis was conducted by comparing the two extreme groups within the teacher sample. The top 10% of teachers, who scored highest on the TPCT (mean TPCT score = 94.2), were compared with the bottom 10% of teachers, who scored lowest (mean TPCT score = 62.5). The students taught by the high-competence group achieved a mean GCS score of 91.5.

In stark contrast, the students taught by the low-competence group achieved a mean GCS score of only 70.2. The difference in student achievement between these two groups was over 21 points, a substantial gap in educational outcomes. An independent samples t-test confirmed that this difference was statistically significant ($t(18) = 8.9$, $p < 0.001$), highlighting the profound practical implications of the observed correlation.

The substantial achievement gap between the students of high- and low-competence teachers can be explained by differences in instructional quality. Teachers in the high-competence group possess a deep and flexible understanding of their subject matter, enabling them to present complex concepts clearly, address student misconceptions accurately, and design engaging, high-level learning tasks. Their strong pedagogical knowledge allows them to effectively scaffold learning and differentiate instruction to meet the needs of all students, thereby guiding them toward mastery of the GCS.

Conversely, teachers in the low-competence group likely struggle with aspects of the curriculum and may lack the pedagogical tools to make the material accessible and meaningful for their students. This can lead to an over-reliance on rote memorization and lower-order thinking tasks, which are insufficient for developing the critical thinking and problem-solving skills mandated by the GCS. The resulting instructional delivery is less effective, which directly explains the lower average achievement of their students.

In summary, the results of this study provide strong and unambiguous quantitative evidence supporting the research hypothesis. The analysis revealed a statistically significant,

strong, and positive correlation between the professional competence of elementary school teachers and the achievement of Graduate Competency Standards by their students. This relationship was found to be consistent across different school types and was vividly illustrated by the large achievement gap between students taught by the most and least competent teachers.


**Figure 2.** A Comprehensive Strategy for Positive

The findings are interpreted as a clear confirmation of the central role that teacher quality plays in the educational process. The study concludes that a teacher's professional competence is a powerful and direct predictor of student success. Therefore, any policy or program aimed at improving the quality of elementary education and raising student achievement must prioritize strategic investments in the continuous and targeted professional development of the teaching workforce.

This study provided a definitive quantitative analysis of the relationship between teacher professional competence and student achievement in elementary schools. The primary finding was the existence of a strong, positive, and statistically significant correlation ($r = 0.78$, $p < 0.01$) between the scores of teachers on a professional competence test and the average scores of their students on the Graduate Competency Standards (GCS). This result empirically substantiates the core hypothesis of the research.

The coefficient of determination ($r^2$) was calculated to be 0.61, a finding of considerable practical importance. This statistic indicates that 61% of the observed variation in student GCS achievement can be statistically accounted for by the variation in their teachers' professional competence. This underscores the role of teacher competence not merely as an influential factor, but as a primary predictor of student academic success within this educational context.

The strength of this relationship was further illuminated through an analysis of extreme groups. A substantial and statistically significant achievement gap of over 21 points was found between students taught by the top 10% most competent teachers and those taught by the bottom 10% least competent teachers. This stark contrast provides a clear and compelling illustration of the profound real-world impact that a teacher's professional mastery has on the educational outcomes of their students.

The consistency of the findings across different school types further strengthens the conclusions. The strong positive correlation was found to be a robust phenomenon, persisting regardless of a school's official accreditation level. This suggests that the individual teacher's professional competence is a powerful driver of student achievement that operates independently of the school's broader institutional context or resource level.

The central finding of a strong, positive correlation between teacher competence and student achievement is broadly consistent with a vast body of international educational research. Landmark studies have repeatedly affirmed that the teacher is the most significant in-school factor affecting student learning. Our result of $r = 0.78$ provides a powerful, context-specific validation of this global consensus, confirming that this fundamental principle of educational effectiveness holds true within the specific educational system under investigation.

This study builds upon and refines the existing literature by moving beyond general proxies for teacher quality, such as experience or certification status, to a direct measure of professional competence. Many previous studies have used more indirect measures, which can sometimes yield ambiguous or weak correlations. By using a standardized test of professional competence, our research establishes a more direct and less ambiguous link between a teacher's specific professional knowledge and their students' learning outcomes, thereby offering a more nuanced contribution to the field.

The magnitude of the effect size found in this study ($r^2 = 0.61$) is notably large compared to many other studies in educational research. This may be attributable to the direct and aligned nature of the variables measured—a test of professional competence directly relevant to the elementary curriculum and a holistic measure of student mastery of that same curriculum. This finding contrasts with studies that examine less direct relationships, and it highlights the importance of using well-aligned, standards-based measures to accurately capture the impact of teaching on learning.

The finding that the relationship holds true across schools of varying accreditation levels contributes to an important discourse in the literature regarding the relative importance of teacher versus school effects. Our results align with studies suggesting that while school-level factors are important, the impact of the individual classroom teacher is exceptionally powerful and can be a greater determinant of student success. This provides a compelling counter-narrative to deterministic views that overemphasize the role of school resources alone.

The results of this study signify a powerful reaffirmation of the centrality of the teacher in the educational enterprise. The strong statistical link between teacher competence and student success is a clear indicator that investments in the human capital of the teaching force are likely to yield the greatest returns in improving educational quality. It reflects the fundamental truth that curricula, standards, and policies are only as effective as the teachers who are tasked with implementing them.

The large coefficient of determination ($r^2 = 0.61$) is a particularly significant finding. It signals that teacher professional competence is not just one of many minor variables but is arguably the single most dominant and predictable factor influencing student achievement of the GCS. This reflects the immense responsibility placed upon elementary school teachers and underscores the critical importance of ensuring that every teacher possesses the deep professional knowledge required to fulfill that responsibility effectively.

The dramatic achievement gap observed between the students of high- and low-competence teachers is a sobering reflection of the profound equity implications of teacher

quality. The findings signify that a student's opportunity to succeed and meet educational standards is, to a very large extent, determined by the professional competence of the teacher to whom they are assigned. This highlights the issue of teacher quality as a fundamental matter of educational justice and equity.

Ultimately, the consistency of the findings across different school contexts signifies the universal importance of high-quality instruction. The results suggest that a highly competent teacher is a powerful force for student learning, capable of fostering success even in less-resourced school environments. This reflects the resilience and impact of excellent teaching and provides an optimistic and empowering message that focusing on improving instructional practice is a viable strategy for overcoming broader systemic challenges.

The foremost implication of this work is for educational policy and resource allocation. The findings strongly imply that policies aimed at improving student achievement should be laser-focused on enhancing the professional competence of the existing and future teaching workforce. This means prioritizing strategic, long-term investments in high-quality pre-service teacher education, rigorous certification standards, and, most importantly, continuous, evidence-based professional development for in-service teachers.

For school administrators and educational leaders, the implications are direct and actionable. This research implies that the most effective lever for school improvement is a focus on instructional leadership. School principals and district supervisors should prioritize creating robust systems for teacher observation, feedback, and coaching. The results justify the implementation of professional learning communities and other collaborative structures that allow highly competent teachers to mentor their peers and share best practices.

The findings have significant implications for the design and content of teacher training and professional development programs. The strong correlation suggests that these programs should be tightly aligned with the specific knowledge and skills that constitute professional competence. This implies a move away from generic, one-size-fits-all workshops towards more targeted, content-focused training that deepens teachers' subject matter knowledge and their pedagogical content knowledge, as these are the core components measured by the TPCT.

This study also has implications for teacher recruitment and retention policies. The clear link between competence and student outcomes implies that attracting and retaining highly competent individuals in the teaching profession should be a top priority. This could involve creating more competitive salary structures, offering performance incentives, and establishing clear career ladders that recognize and reward demonstrated professional expertise, thereby making teaching a more attractive long-term career for talented individuals.

The strong positive correlation between teacher professional competence and student achievement is fundamentally caused by the direct link between a teacher's knowledge and their instructional practice. Teachers with high professional competence possess a deep and integrated understanding of the subject matter they teach. This allows them to explain concepts with clarity and accuracy, anticipate common student misconceptions, and represent complex ideas in multiple ways, making the content more accessible to a diverse range of learners.

This deep content knowledge is coupled with strong pedagogical content knowledge, which is the ability to translate disciplinary expertise into effective teaching strategies. Competent teachers know how to sequence learning, design appropriate tasks, ask high-level questions, and provide targeted feedback that moves student learning forward. This causal

chain—from deep knowledge to effective instructional delivery—is the primary reason why the competence of the teacher is so powerfully linked to the achievement of the student.

Conversely, the lower achievement of students taught by less competent teachers can be causally explained by a breakdown in this chain. A teacher with a shaky grasp of the content may inadvertently teach misconceptions, be unable to answer student questions accurately, or rely heavily on a textbook, leading to a superficial and disengaged learning experience. A lack of pedagogical tools can result in a classroom environment dominated by rote learning and passive listening, which is insufficient for developing the deeper conceptual understanding required by the GCS.

The consistency of the relationship across different school types is because these core instructional dynamics are largely independent of the school's overall resources. While a better-resourced school may offer more amenities, the critical moment-to-moment interactions of teaching and learning are primarily shaped by the teacher's professional competence. A highly competent teacher can create a rich and effective learning environment with basic resources, while a less competent teacher may struggle to do so even in a state-of-the-art facility, explaining why the teacher effect is so robust.

Future research should aim to build upon these correlational findings by employing experimental or quasi-experimental designs. The next logical step is to design and implement a targeted professional development intervention aimed at improving the specific competencies measured by the TPCT. By measuring student achievement before and after the intervention and comparing it to a control group, such a study could establish a causal link and provide even stronger evidence for the effectiveness of investing in teacher training.

A qualitative or mixed-methods study is recommended to provide a deeper, more nuanced understanding of the mechanisms behind the observed correlation. This would involve conducting in-depth classroom observations and interviews with teachers from the high- and low-competence groups identified in this study. Such research could illuminate the specific instructional practices, classroom management techniques, and teacher-student interactions that differentiate the two groups, providing rich, practical examples of what effective teaching looks like in practice.

The scope of the investigation should be broadened to include the other domains of teacher competence, namely pedagogical, personal, and social competencies. While this study focused on the critical professional domain, a more comprehensive model that includes all four legally mandated competencies would provide a more holistic picture of teacher effectiveness. Future research could develop instruments to measure these other domains and use structural equation modeling to analyze their relative and combined effects on student achievement.

Finally, a longitudinal study that tracks both teachers and students over several years is highly recommended. Such a study could investigate how teacher professional competence develops over the course of a career and could measure the cumulative, long-term impact of being taught by a sequence of high- or low-competence teachers on a student's educational trajectory. This would provide invaluable insights for designing more effective teacher career development pathways and for understanding the long-term equity implications of teacher quality distribution.

## CONCLUSION

The most distinct finding of this research is the quantification of a remarkably strong predictive relationship between teacher professional competence and student achievement. The study established that 61% of the variance in students' Graduate Competency Standards (GCS) scores could be statistically explained by their teachers' scores on a professional competence test. This moves beyond a general acknowledgment of teacher importance to a specific, data-driven conclusion that a teacher's professional mastery is the single most dominant factor in determining whether students meet holistic educational benchmarks in this context.

This study's primary contribution is methodological, providing a robust and replicable model for empirically validating the core tenets of an educational system. By using standardized, system-aligned instruments to directly correlate a specific teacher input (professional competence) with a specific student output (GCS achievement), this research offers a more precise and powerful method for evaluating educational effectiveness than studies relying on more general or indirect proxies for quality. It provides a clear, evidence-based framework for data-driven policymaking.

The research is limited by its correlational design, which identifies a strong relationship but does not establish causality, and by its focus on only the professional domain of teacher competence. Future research must therefore be directed towards experimental or quasi-experimental studies to determine the causal impact of professional development interventions on student achievement. Furthermore, a broader investigation incorporating the pedagogical, personal, and social competencies is essential to develop a more comprehensive, multi-dimensional model of teacher effectiveness.

## AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest

## REFERENCES

Anderson, J. E., Nguyen, C. A., & Moreira, G. (2025). Generative AI-driven personalization of the Community of Inquiry model: Enhancing individualized learning experiences in digital classrooms. *International Journal of Information and Learning Technology*. Scopus. https://doi.org/10.1108/IJILT-10-2024-0240

Bačová, V. (2024). Developing a safe learning environment in primary-level innovative schools in the Czech Republic. *Education 3-13*. Scopus. https://doi.org/10.1080/03004279.2024.2410482

Bakken, J. P., & Nelson, C. (2024). SPECIAL EDUCATION: ADVANCING VALUES. Dalam *Adv. Spec. Educ.* (Vol. 38, hlm. 1–9). Emerald Publishing; Scopus. https://doi.org/10.1108/S0270-401320240000038001

Buchner, T. (2025). On 'integration rooms', tough territories, and 'places to be': The ability-space-regimes of three educational settings at Austrian secondary schools. *International Journal of Inclusive Education*, *29*(2), 192–209. Scopus. https://doi.org/10.1080/13603116.2021.1950975

Culturally appropriate STEM in early childhood. (2025). Dalam *Reinventing STEM in Early Child. Educ.: A Constr. Approach* (hlm. 52–76). Taylor and Francis; Scopus. https://doi.org/10.4324/9781003488873-3

González, M. J. A., Ramos, I. B., & Chauvie, D. B. (2025). Life history of teachers in rural schools: The discovery of diversity as a "Standard practice". *International Journal of Educational Research*, *131*. Scopus. https://doi.org/10.1016/j.ijer.2025.102597

Heilmann, J. J., Bertone, A., & Wojtyna, A. (2024). How Inclusive Practice Increases the Educational Relevance of Individualized Education Programs. *Language, Speech, and Hearing Services in Schools*, *55*(2), 231–248. Scopus. https://doi.org/10.1044/2023_LSHSS-23-00088

Hove, N., & Phasha, N. T. (2024). Support services for learners with learning disabilities in mainstream classrooms using capability theory. *South African Journal of Childhood Education*, *14*(1). Scopus. https://doi.org/10.4102/sajce.v14i1.1418

Individually appropriate STEM in early childhood. (2025). Dalam *Reinventing STEM in Early Child. Educ.: A Constr. Approach* (hlm. 32–51). Taylor and Francis; Scopus. https://doi.org/10.4324/9781003488873-2

Jung, Y. J., Kim, K.-H., Baek, G.-E., & Lee, J.-Y. (2023). A Study on Developing Model for Inclusive Teaching and Learning Practice in General Music Education. *Korean Journal of Research in Music Education*, *52*(1), 77–105. Scopus. https://doi.org/10.30775/KMES.52.1.77

Lapidot-Lefler, N. (2025). Teacher Responsiveness in Inclusive Education: A Participatory Study of Pedagogical Practice, Well-Being, and Sustainability. *Sustainability (Switzerland)*, *17*(7). Scopus. https://doi.org/10.3390/su17072919

Mah Tjun Lyn, J., Cheong, L. S., & Binti Rosli, N. A. (2024). Defining the roles and responsibilities of Malaysian primary school educators in supporting the Pre-Transition Stage of inclusive transitions: A Fuzzy Delphi method. *International Journal of Inclusive Education*, *28*(5), 577–593. Scopus. https://doi.org/10.1080/13603116.2021.1942567

Matharaarachchi, M. A. N. C., Samarawickrama, G. U. N., Hemantha, T. G. S., Jayasinghe, H. M. L. M., Ganegoda, D., & Gunathilake, M. P. (2023). E- Learning Assistive System for Autism Spectrum Disorder (ASD) for Kids. *ICAC - Int. Conf. Adv. Comput.: Technol. Innov. a Sustain. Econ., Proc.*, 442–447. Scopus. https://doi.org/10.1109/ICAC60630.2023.10417500

Maurer, K. J., Sturm, A., & Kasari, C. (2025). Students Educated With Alternate Curriculum in Elementary School: Timing, Switching, and Educational Placements. *Research and Practice for Persons with Severe Disabilities*, *50*(1), 50–65. Scopus. https://doi.org/10.1177/15407969241261634

Oliver, A. N., Lewis, C. D., & Harges, A. (2024). Cultivating strong relationships in special education: Strategies for practitioners. Dalam *Best pract. For behav. Interv. In spec. Educ.* (hlm. 140–165). IGI Global; Scopus. https://doi.org/10.4018/979-8-3693-0583-6.ch007

Roose, I., Vantieghem, W., Vanderlinde, R., & Van Avermaet, P. (2024). Professional vision as a mediator for inclusive education? Unravelling the interplay between teachers' beliefs, professional vision and reported practice of differentiated instruction. *Educational Review*, *76*(3), 483–505. Scopus. https://doi.org/10.1080/00131911.2022.2054957

Roski, M., Sebastian, R., Ewerth, R., Hoppe, A., & Nehring, A. (2023). Dropout Prediction in a Web Environment Based on Universal Design for Learning. Dalam Wang N., Rebolledo-Mendez G., Matsuda N., Santos O.C., & Dimitrova V. (Ed.), *Lect. Notes Comput. Sci.: Vol. 13916 LNAI* (hlm. 515–527). Springer Science and Business Media Deutschland GmbH; Scopus. https://doi.org/10.1007/978-3-031-36272-9_42

Strogilos, V., Lim, L., & Binte Mohamed Buhari, N. (2023). Differentiated instruction for students with SEN in mainstream classrooms: Contextual features and types of curriculum modifications. *Asia Pacific Journal of Education*, *43*(3), 850–866. Scopus. https://doi.org/10.1080/02188791.2021.1984873

Sularso, S., Wadiyo, W., Cahyono, A., Suharto, S., Pranolo, A., & Nuryana, Z. (2023). Digital Transformation in Music Education: Addressing Challenges in Technology-Enhanced Music Education. Dalam Moreira F., Gonzalez-Gonzalez C.S., Infante-Moro A., Infante-Moro J.C., Gallardo-Perez J., Garcia-Holgado A., & Garcia-Penalvo F.J. (Ed.), *Proc. - JICV : Int. Conf. Virtual Campus*. Institute of Electrical and Electronics Engineers Inc.; Scopus. https://doi.org/10.1109/JICV59748.2023.10565641

Sun, C.-C., Lee, C.-Y., & Kung, H.-Y. (2023). A Remedial Instruction Program in a Rural Junior High School Through an Inclusive Evaluation Approach. *Journal of Research in Education Sciences*, *68*(3), 141–178. Scopus. https://doi.org/10.6209/JORIES.202309_68(3).0005

Tiwari, A. (2024). Inclusive practices in an independent private school: Insight into teachers' perspectives, beliefs and practices. *Support for Learning*, *39*(1), 22–33. Scopus. https://doi.org/10.1111/1467-9604.12461

Toews, S. G., Kurth, J. A., Zimmerman, K. N., Mansouri, M. K., Lockman Turner, E., & Crump, N. (2024). Professional Development with Emailed Practice-Based Feedback to Support Teacher-Led Inclusive Small Group Literacy Instruction. *Research and Practice for Persons with Severe Disabilities*, *49*(1), 36–55. Scopus. https://doi.org/10.1177/15407969231218388

Williams, B. W., & Welindt, D. (2023). Assisting physicians who exhibit disruptive behavior: Understanding the costs, contributors, and corrections. *Australasian Psychiatry*, *31*(2), 132–135. Scopus. https://doi.org/10.1177/10398562231156477

Zhao, G., Li, W., & Chang, C.-H. (2024). Bilingual education in a globalized age: An ecological perspective on two Chosonjuk schools in China. *International Journal of Bilingual Education and Bilingualism*, *27*(4), 522–536. Scopus. https://doi.org/10.1080/13670050.2023.2213799