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ORIGINAL PAPER

Perceptions of teaching quality and student achievement: an analysis of a large-scale national assessment in Indonesia

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Abstract

This paper discusses a current study examining the relationship between perceptions of teaching quality and student achievement in Indonesia through an analysis of the 2021 National Assessment results. The study compared the perspectives of students and teachers in high-performing and low-performing schools, gathering data from a large-scale, randomized sample covering 6,758,399 students and 256,366 schools. The findings revealed significant differences in perceptions of teaching quality. Schools with high performance exhibited higher perceived teaching quality across all educational levels, particularly at the elementary level. Teacher perceptions consistently rated teaching quality higher than student perceptions, indicating potential discrepancies in self-assessment. The study also found that students' perceptions of Classroom Management and Affective Support were strong predictors of Literacy and Numeracy achievements, whereas Cognitive Activation showed a weaker, negative correlation with student performance. On the contrary, teachers' perceptions of Cognitive Activation were strong positive predictors of student achievement. The implications of this study underscored the importance of incorporating student feedback in evaluating teaching quality and suggested that teacher training should focus on enhancing Cognitive Activation skills. Moreover, the study also advocated policies aimed at closing the quality gap between schools as well as improving teachers' self-evaluation and pedagogical practices.

Keywords National assessment · Perception · Student achievement · Teaching quality

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Background

To enhance student learning in critical areas, many countries have adopted performance-based accountability policies in recent decades. Typically, the policies have three elements: accountability systems, more autonomy for local districts and schools, and uniform standards (Sahlberg, 2016). The fundamental idea behind these reforms is to provide districts and schools with information through external accountability systems and hence the baseline to set quality improvement goals and the freedom to design strategies to meet those goals. Large-scale assessments are important in this situation because they offer information that can be used to determine whether educational institutions and systems have achieved the required predetermined standards. Stated differently, these evaluations serve as the cornerstone for the performance reviews that serve as a means of holding districts and schools accountable for their efforts in quality improvement (Noben et al., 2021). The focus of this paper is to investigate the relationship between perceptions of teaching quality and students' achievement through an analysis of the results of a large-scale assessment.

In general, research from Western contexts shows consistent findings that student perceptions of teaching quality are related to various student outcomes including cognitive achievement (Opdenakker & Van Damme, 2000) and noncognitive outcomes such as intrinsic motivation for learning (Hollembeak & Amorose, 2005) and academic engagement (Furrer & Skinner, 2003; Wilson et al., 2015). Although studies on the link between teaching quality and student achievement from non-Western contexts are scarce, some small-scale studies indicate the importance of teaching quality for noncognitive outcomes in some Asian contexts including Indonesia (Maulana, 2012; Maulana et al., 2016). To date, no large-scale national studies documenting student perceptions of teaching quality have been reported in scholarly journals.

In Western contexts, particularly, student perceptions are viewed as a powerful tool for obtaining information about the quality of learning environments, especially for tapping teaching practices in the classroom (König & Pflanzl, 2016; Maulana et al., 2016). However, the knowledge base on perceptions of teaching quality from non-Western contexts is underrepresented in the literature. To fill the gap, the aim of this study is to investigate student and teacher perceptions of teaching quality from Indonesian perspectives, by examining similarities and differences between high-performing and low-performing schools and the relationship between perceptions of teaching quality and students' achievement scores.

Indonesia offers an interesting example of an assessment system incorporating teacher and student perceptions of learning environments to complement measures of student achievement in Literacy and Numeracy. Prior to this, Indonesia enforced a high level of standardization in many areas of the system, including funding, staffing, school administration, and reporting on curriculum implementation, for about 20 years. In order for pupils to graduate from middle and senior high schools, they had to take standardized exit tests, which were also used as the foundation for public school rankings.

Recently, Indonesia changed its strategy to an assessment system that places more emphasis on the formative use of assessment data as input to instruments for planning and reflection. Launched in 2021, a new National Assessment program measured reading and math literacy as well as six categories of 'character' traits in kids in grades 5, 8, and 11 from each school through a random sampling. In addition, the assessment also gauged how well teachers and students thought the curriculum and learning were going as well as how safe and friendly the school was overall through surveys of learning environments administered to students, teachers, and school principals.

This current study has analyzed the results of the 2021 National Assessment and focused on the relationship between perceptions of teaching quality and students' achievement in Literacy and Numeracy. The analysis centers on the perceptions of teachers and students as a crucial element in the execution of Indonesia's recently implemented policy on performance-based accountability. The particular objectives are to examine differences in teachers' judgments and students' perceptions at the school level and investigate possible explanations of that variation in regard to their relationships with student achievement scores. This study also looks into differences in high-performing and low-performing schools. High-performing schools are those with the top 20% Literacy and Numeracy scores which are more than 60, while low-performing schools score the lowest 20% less than equal to 56.

This study is specifically guided by the following research questions:

(1) Are there differences in student perceptions of teaching quality between high-performing and low-performing schools?
(2) Are there differences in teacher perceptions of teaching quality between high-performing and low-performing schools?
(3) Are there differences between student perceptions and teacher perceptions of teaching quality?
(4) How do students' and teachers' perceptions of the teaching quality predict the students' achievement scores in Literacy and Numeracy?

Literature review

The three teaching quality dimensions can be further associated with the Community of Inquiry (CoI) concept. Grounded in John Dewey's and Charles Sanders Peirce's philosophical and educational principles on the social and collaborative nature of learning, the CoI framework was later popularized by Garrison et al. (1999) to understand and foster online education. It emphasizes the importance of Social Presence, Cognitive Presence, and teaching presence in creating a meaningful and effective online learning experience (Prijambodo & Lie, 2021). Although the framework is developed to explain online learning, expectations for teachers to perform three roles (Anderson et al., 2001) apply to all learning environments. In the CoI learning environment, Cognitive Presence refers to the degree of students' capability to construct understanding and interpret meanings. This Cognitive Presence parallels the Cognitive Activation dimension in the National Assessment parameter which concerns teachers' ability to activate learners' schemata or prior knowledge and scaffold their acquisition of new knowledge. This role will be possibly fulfilled only through the Teacher Presence which covers three tasks: (1) the teachers' ability to design, select, and provide meaningful collaborative learning activities for learners; (2) teachers' capability of being a model for students to lead, guide, and be engaged in learning processes; and (3) teachers' strategies to deliver instructional content. To add to Teacher Presence in the CoI, Cheung et al. (2020) added another subcategory related to teachers' roles which is Management where teachers are expected to 'maintain class discipline and ensure effective activities.' As the last CoI role, Social Presence covers students' emotional state toward the interactions with classmates or teachers around intellectual activities and tasks (Swan et al., 2009). The Social Presence corresponds to the Affective Support dimension of teaching quality.

The execution of Indonesia's recently implemented policy on performance-based accountability yields valuable data revealing differences in teachers' judgments and students' perceptions at the school level and triggering possible explanations of that variation in regard to their relationships with student achievement scores. Analyzing perceptions of teachers and students serves as a crucial step to advance the knowledge base on teaching quality in Indonesia. A number of studies (Van Damme et al., 2004) revealed evidence supporting the importance of surveying students about their experiences rather than teachers about their instruction. Research revealed that student perceptions of their learning environment explained a greater amount of the diversity in student results than did teacher perceptions about their instruction. Studying the different perspectives of the stakeholders, a study of 64 school principals, 193 teachers, and 3457 students was conducted in three provinces in Indonesia employing a survey, interviews, and classroom observations (Harjanto et al., 2017). This study found that the students' perceptions of their teachers' behaviors were more consistent with the independent observers' report of the classroom processes, but they did not corroborate the teachers' perceptions of their own teaching. Teachers generally thought that their students showed more initiative (i.e., by asking questions) than what the observers saw and the students themselves reported.

Methods

This study analyzed the results of the 2021 Indonesian National Assessments (NA). In this project, the Ministry of Education conducted the NA which consisted of: (1) assessing students' Literacy and Numeracy and (2) surveying students and educators on the quality of the teachers' teaching quality. We included large student data on teaching quality across Indonesia. The $N_{\text{total students}} = 6{,}758{,}399$, whereas the $N_{\text{total schools}} = 256{,}366$. The sampling technique employed was random sampling. Of the students, 50.61% were from primary schools, 28.21% were from junior high school, 12.18% were from general senior high school, and 7.66% were from vocational senior high school. A total of 77.02% students were from Western Indonesia, 18.84% were from central Indonesia, and 2.81% were from Eastern Indonesia. A large portion of students (61.27%) were from public schools.

Indonesia is an archipelago of over 17,000 islands, with diverse cultures, ethnicities, and economic conditions across its regions. The country is typically divided into several major regions, such as Sumatra, Java, Kalimantan, Sulawesi, Papua, and others. Each region has unique characteristics and population densities. Thus, the percentages of samples were determined to ensure representation across these diverse regions, reflecting their population sizes, economic contributions, and cultural diversity. This approach ensures that the study captures a comprehensive picture of Indonesia as a whole.

Furthermore, teaching quality was measured using a three-dimensional construct originally developed in the German context including Classroom Management, Student (Affective) Support, and Cognitive Activation (Kleickmann et al., 2020; Praetorius et al., 2018), using a four-response category (1 = Never–4 = Always) to indicate frequency of occurrences of the measured dimension. The responses are then converted into a 0–100 scale to standardize the scores for analysis and comparison (Pusat Asesmen Pendidikan, 2022). The psychometric quality of these instruments has been proven to be satisfactory (Chevrier et al., 2022). However, as the instruments were adapted to the Indonesian context, a validity and reliability measurement was also conducted in order to ensure that potential biases could be avoided. The pilot tests for the instrument

were administered twice, at a smaller level involving 22 schools and then at a wider level involving 790 schools. The results of the validity and reliability measurement were eventually used as the basis to revise the instruments.

To analyze the data, both descriptive and inferential statistics analyses (i.e., *t* test, ANOVA, and multiple regression) were employed. The descriptive statistics were used to display the distributions of the questionnaire results. Meanwhile, mean comparisons were used to investigate the differences between students' perceptions, as well as the differences of teachers' perceptions. In addition, the effect size was computed by using Cohen's *d* (with $d = 0.8$ to ≥ 1.0 as an indicator of a large effect). Furthermore, multiple regression was employed to predict the relationships between student and teacher perceptions on teaching quality and students' literacy/numeracy scores.

Findings

Differences between students perceptions of teaching quality between high-performing and low-performing schools

The findings concerning student perceptions of teaching quality between high-performing and low-performing schools revealed a significant difference across all educational unit levels (elementary to secondary education) with large effect sizes ($d > 1$). Moreover, the largest effect size for the perceived teaching quality was found at the elementary school level ($d = 2.265$). This indicates a potential gap in the quality of the learning environment, particularly teaching quality, that can be identified based on student perceptions from the elementary level. The following table presents the average scores and effect sizes, illustrating the magnitude of these differences.

As shown in Table 1, students in high-performing schools consistently rated teaching quality higher than those in low-performing schools. Furthermore, as indicated from the mean scores and the effect size values which were the highest across all educational levels, younger students seemed to be more sensitive to variations in teaching quality, which may have a considerably pronounced impact on their academic achievement. These findings underscore the importance of addressing such disparities in teaching quality at the early stages of education.

Table 1 Mean comparison and effect size of student perceptions on teaching quality between high-performing and low-performing schools

	High-performing average score	Low-performing average score	Effect size (Cohen's *d*)
Elementary school	67.04	56.31	2.265***
Junior high school	60.65	55.80	1.113***
Senior high school	61.88	56.05	1.337***
Vocational high school	60.87	55.85	1.553***

$p < 0.0005$

The scores are on a 0–100 scale

Table 2 Mean comparison and effect size of teacher perceptions on teaching quality between high-performing and low-performing schools

	High-performing average score	Low-performing average score	Effect size (Cohen's *d*)
Elementary school	67.85	63.41	1.043***
Junior high school	64.43	60.53	0.99***
Senior high school	65.30	60.86	1.086***
Vocational high school	65.61	60.25	1.714***

$p < 0.0005$

The scores are on a 0–100 scale

Table 3 Mean comparison and effect size of teacher and student perceptions on teaching quality

	Student perceptions	Teacher perceptions	Effect size (Cohen's *d*)
Elementary school	58.98	65.09	1.207***
Junior high school	58.47	63.28	1.097***
Senior high school	59.66	63.85	0.915***
Vocational high school	58.87	64.43	1.540***

$p < 0.0005$

The scores are on a 0–100 scale

Differences between teacher perceptions of teaching quality between high-performing and low-performing schools

Teacher perceptions of teaching quality indicated a similar trend of significant difference across all educational unit levels with considerably large effect sizes ($d > 0.9$). In addition, the largest effect size ($d = 1.714$) was found at the vocational high school level, which was different from the findings we obtained for the students' perception, as summarized by the table below.

Table 2 demonstrates that teachers in high-performing schools rated their own teaching quality higher than those in low-performing schools. This finding stands in contrast to the previous student-reported data, which highlighted that the greatest disparity occurred at the elementary school level. The observed discrepancy between teacher and student perceptions at various educational levels indicates the need for further investigation into how dimensions of teaching quality might be experienced and understood differently.

Differences between student perceptions and teacher perceptions of teaching quality

In general, from the descriptive findings related to the teaching quality, there are consistent yet also contradictory results between student and teacher perceptions, which are interesting to explore further. Table 3 shows that teacher perceptions on teaching quality across educational unit levels indicate a significantly higher score than those of the students ($p < 0.0005$) with considerably a large effect size ($d > 0.9$).

Table 3 illustrates a noticeable gap between student and teacher perceptions, with teachers consistently rating their performance higher across all dimensions. Furthermore, based on the average scores, the 'Affective Support' dimension tends to show a quite high average score from both student and teacher perceptions compared to the other two dimensions of teaching quality. Additionally, the average scores of teachers' perception for the 'Classroom Management' dimension compared to those of the students. These findings indicate a potential overestimation by teachers of their instructional performance in certain areas, implying a mismatch between teacher self-perceptions and student experiences.

Perceptions of teaching quality and achievement in literacy and numeracy

The prediction model obtained from students' perceptions in general across all educational unit levels shows that the quality of the learning environment can strongly and significantly predict students' Literacy and Numeracy scores. Students' perceptions of the overall quality of the learning environment can explain approximately 36–54.52% of their Literacy and Numeracy scores. More specifically, as seen in Table 4, the teaching quality dimensions, i.e., Classroom Management and Affective Support, are found to be the strongest predictors of students' Literacy and Numeracy achievements. However, it is worth noting that the coefficients (β) obtained from the multiple linear regression computed for 'Cognitive Activation' reveals a consistent negative result across different educational unit levels. The partial bivariate correlation coefficient calculated for this dimension also displays a relatively weak result, compared with the other two dimensions. The higher student perception of the quality of Cognitive Activation is, the lower their Literacy and Numeracy achievement scores tend to be.

Based on teachers' perceptions, the quality of the learning environment in general also significantly predicts students' Literacy and Numeracy scores, although not as strongly as the results from students' perceptions, with a proportion of variation of around 9.13–15.23%. In addition, all dimensions of teaching quality become the strongest positive predictors, as indicated by the coefficients (β) obtained from the multiple linear regression. Except for the elementary school level, teachers' perception on their 'Cognitive Activation' dimension shows the strongest predicting value. This is, however, contrary to the results found from the students' perceptions, as illustrated in the table above.

As displayed in Table 4, student perceptions of two particular teaching quality dimensions, namely 'Classroom Management' and 'Affective Support', were found to be strong predictors of their Literacy and Numeracy outcomes. Moreover, their perceptions of the 'Cognitive Activation' dimension revealed a negative correlation- which contradicts teachers' positive self-evaluations of this dimension. These findings highlight the intricacy of evaluating teaching quality especially related to its influence on student achievement, suggesting that students may interpret cognitively demanding instructional practices differently than intended by their teachers.

Discussion

One of the most important steps in expanding the body of research on teaching quality is to analyze teacher and student perspectives. The implementation of Indonesia's recently enacted performance-based accountability policy has produced useful data that highlights discrepancies between high-performing and low-performing schools,

Table 4 Prediction models and correlation between student and teacher perceptions on teaching quality and students' literacy–numeracy scores

Prediction model	Respondent	Multiple linear regression (R) overall	Coefficients (β)			Pearson product moment correlation (r)[a]		
			CM	AS	CA	CM	AS	CA
Elementary school: Learning Environment Quality and LitNum Score	Student	0.60***	0.55***	0.85***	− 0.93***	0.55*	0.55*	0.28*
	Teacher	0.34***	0.28***	0.20***	0.17***			
Junior high school: Learning Environment Quality and LitNum Score	Student	0.65***	0.46***	0.72***	− 0.78***	0.58*	0.60*	0.21*
	Teacher	0.35***	0.14***	0.18***	0.27***			
Senior high school: Learning Environment Quality and LitNum Score	Student	0.67***	0.58***	0.46***	− 0.67***	0.57*	0.53*	0.20*
	Teacher	0.39***	0.19***	0.05***	0.35***			
Vocational high school: Learning Environment Quality and LitNum Score	Student	0.74***	0.55***	0.46***	− 0.67***	0.63*	0.60*	0.22*
	Teacher	0.34***	0.11***	0.12***	0.31***			

[a]x variables = each teaching quality dimension; y variable = Literacy and Numeracy (LitNum) Score

CM Classroom Management; *AS* Affective Support; *CA* Cognitive Activation

$p < 0.05$*; $p < 0.0005$***

between teachers' views of themselves and students' perceptions at the school level, and the associations between perceptions of the teaching quality and the students' achievement scores in Literacy and Numeracy as well as potential explanations for those variations in relation to student achievement scores.

The first finding yielding significant differences in student perceptions of teaching quality between high-performing and low-performing schools across all educational unit levels (elementary to secondary education) with large effect sizes ($d > 1$) reveal that students at all levels can assess their teachers appropriately. Students in high-performing schools evaluate their teachers' quality more favorably than their peers in low-performing schools. It is interesting to note that the largest effect size between high-performing and low-performing schools was found at the elementary school level ($d = 2.265$). This means that younger students' perceptions of the teaching quality matter and identify the quality of the learning processes pertinently. This finding supports other studies (Maulana et al., 2013; Opdenakker & Maulana, 2010; Opdenakker & Minnaert, 2014; Stroet et al., 2015) that teaching quality is essential for inspiring students, promoting their learning engagement and enhancing their academic achievement and propounds that students' views of the teaching and learning processes can be a trustworthy source of data, especially for tapping teaching practices in the classroom. Thus, any strategy to improve teacher quality should include eliciting students' perspectives of their learning experiences.

The second finding sheds light on the differences between student perceptions and teacher perceptions of teaching quality. The data show consistent and yet contradictory judgments of students and teachers. Across all educational unit levels, teacher assessments of the quality of instruction show a substantially higher score than student assessments ($p < 0.0005$) with a notably large effect size ($d > 0.9$) in Classroom Management and Cognitive Activation. The 'Affective Support' dimension component tends to exhibit a relatively high average score from both student and teacher perspectives compared to the other two components of teaching quality. In brief, teachers tend to assess themselves more positively than their students. This finding is in line with the study of Indonesian teachers in Sumatera (Harjanto et al., 2017), revealing that what observers viewed were more consistent with the survey results from the students, but they did not substantiate the teachers' perceptions of their own teaching quality. Teachers generally thought that their teaching was more active and student-centered than what the observers saw and the students themselves reported. Students and external observers reported more teacher-centered activities during class.

Finally, both student and teacher perceptions can strongly and significantly predict students' Literacy and Numeracy scores. Student perceptions of two teaching quality dimensions—Classroom Management and Affective Support—strongly predict students' Literacy and Numeracy achievements. However, it is worth discussing that the third dimension–Cognitive Activation—reveals a relatively weak result, compared with the other two dimensions. Furthermore, it is also indicated from the statistical analysis results that this particular dimension is a negative predictor. This implies that the higher student perception of the quality of Cognitive Activation is, the lower their Literacy and Numeracy achievement scores tend to be. On the other hand, teacher perceptions of the teaching quality also significantly predict students' Literacy and Numeracy scores, although not as strongly as the results from student perceptions. In addition, all dimensions of teaching quality become the strongest positive predictors. Except for the elementary school level, teachers' perception on their 'Cognitive Activation' dimension shows the strongest predicting value. This is, however, contrary to the results found from the students' perceptions.

This finding on Affective Support confirms other studies (Maulana et al., 2013; MC. Opdenakker & Maulana, 2010; MC. Opdenakker & Minnaert, 2014; Stroet et al., 2015; de Van Gaer et al., 2006) that students' sense of connectedness with their teachers have a beneficial impact on their achievement. Teacher involvement is essential for inspiring students and promoting their academic engagement. For students to satisfy this fundamental psychological need, they must experience a sense of community. The strongest predictive value is seen in teacher perceptions of their 'Cognitive Activation' skill. This implies that teacher awareness of their ability in activating their students' cognitive capabilities is an essential step to improve their teaching competence as well as enhance their students' performance and should be integrated with the other two dimensions of teaching quality.

Of the three teaching quality dimensions, the results indicate that Indonesian teachers have done fairly well in Classroom Management and Affective Support but still need to improve their Cognitive Activation ability. Teachers' abilities to maintain class disciplines and create enjoyable learning activities for students as well as to make students feel safe and comfortable in class should be expanded to enhance their capability in Cognitive Activation. The pitfall in many classrooms is when students are considered learning when they are passively listening to the teachers' instruction. To tackle this issue, teachers should further explore and enrich their repertoire of teaching strategies so that they acquire the pedagogical knowledge of promoting student-centered learning. Maintaining a teacher-centered approach in class offers fewer opportunities for students to be actively engaged in each step of their learning process. In addition, teachers should also sharpen their content knowledge along with their pedagogical knowledge.

Our findings highlight the importance of student and teacher perceptions of teaching quality as a source of rich feedback for improving teaching practices leading to the improvement of learning outcomes. The importance of student perceptions is particularly emphasized. In order for student feedback to be more effective, Indonesia can benefit from integrating student feedback into teaching quality assessments using novel and technology-enhanced methods stemming from a rapid growth of artificial intelligence (AI) in education. Knowledge-base AI, which converts human expertise into digital formats that computers can process, can automatically extract insights to provide personalized feedback for teachers (Holmes & Tuomi, 2022).

Furthermore, the current study contributes to advancing our understanding of the interplay between teaching quality and student achievement by presenting the findings from Indonesia, a non-Western context that is relatively underrepresented in the current literature of learning environments. The study is among the first and the only study including large and representative data of students and teachers from one single country in the field of learning environments, examining the role of the three dimensions of teaching quality for student learning outcomes. The findings of the study are in line with those conducted in Western countries, highlighting the importance of student and teacher perceptions of teaching quality for student learning outcomes (König & Pflanzl, 2016; Maulana et al., 2016, 2023). In the literature, student perceptions are commonly used, whereas teacher perceptions are less commonly used. Hence, the current study expands the current knowledge base by showing the significant role of teachers' teaching for students' learning outcomes from the lens of both students and teachers. Although the two perceptions of teaching quality are largely in line, some differences are evident. Hence, student and teacher perceptions of teaching quality should be viewed as complementary that can be useful for teaching quality improvement (Maulana & Helms-Lorenz, 2016).

Conclusion

The study is significant as it fills a gap in the literature on how teaching quality perceptions differ among stakeholders in a large educational system and how these perceptions correlate with student achievement. Particularly, the present study contributes to advance the knowledge base on teaching quality as revealed in the student and teacher perceptions, which provide evidence regarding the relevance of measuring teaching quality to foster teaching quality improvement from the key stakeholders' of education (i.e., students and teachers) perspectives. Subsequently, the findings of the current study have implications for educational theory and practice, including the field of learning environments (Maulana & Helms-Lorenz, 2016), teacher effectiveness (Maulana et al., 2015), and teaching quality measurement (van der lans et al., 2021). The study paves the way for further advancing the quality and equity aspects of teaching in the country and other contexts with comparable systems.

Based on the results, this study proposes recommendations for policymakers and practitioners. To achieve the Ministry's goal of quality education for all, policy enactment should be directed toward closing the gap between high-performing and low-performing schools by enhancing teacher capacity in self-evaluating their own pedagogical knowledge and teaching quality.

At the practitioner level, teacher professional development should start at building teacher awareness of the areas they need to improve as well as of the need to elicit their students' feedback as both student and teacher perceptions of teaching quality are positive predictors of student Literacy and Numeracy achievement. Furthermore, the weakest area of teaching quality is the Cognitive Activation capability. This finding is also in line with findings of past research from Western contexts. There is evidence that Cognitive Activation is most effective at enhancing student learning in combination with well-structured Classroom Management and a supportive, student-centered classroom climate (Vieluf et al., 2012). Within the CoI framework, teacher professional development sessions should aim to transform teachers' capacity to enable students to construct understanding and interpret meanings during their learning experiences.

Albeit with marginal effect size, differences in student perceptions of teaching quality are significant. However, there is also a methodological limitation that the multilevel and/or hierarchical modeling analyses could not be implemented in this research, to be considered for future research. Furthermore, future research, particularly in Indonesia, should also attempt to incorporate other means of evaluating teaching quality (e.g. observation, cf. Maulana et al., 2021) in addition to the existing instruments which have been employed in this study, in order to validate whether or not differences in perceptions of teaching quality matter for student learning outcome and teacher performance.

Declarations

Conflict of interest The authors declare that they have no competing interest.

Ethics approval The study was approved by the Research and Community Service Institute of Widya Mandala Surabaya Catholic University (691/WM01.5/N/2024). The study has been reviewed by the Institutional Review Board and met all requirements of the Ethical Clearance. Participants' identities will be kept confidential.

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