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The Influence of Principals' Problem-Solving Competence on Teacher Performance

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Abstract:

This study aims to analyze the influence of principal problem-solving competence on teacher performance. The method used is quantitative with ex-post facto design and correlation and regression approaches. Data were collected through questionnaires and analyzed using SPSS version 17. Samples were taken randomly from 181 teachers. The collected data were analyzed mathematically. The results showed that principal problem-solving competence positively and significantly correlated with teacher performance (correlation value 0.608 or 60.8%). There is a direct influence of 28%, an indirect influence of 13%, and a total influence of 41% from problem-solving competence on teacher performance. Based on these findings, improving teacher performance is greatly influenced by the principal's competence in problem-solving. The study's implications indicate that to improve teacher performance, principals must have skills in dealing with and solving problems. Therefore, training in problem-solving for principals is essential to improve the quality of education.

Keywords: *Problem Solving Competence, Teacher Performance, Principal*

Abstrak:

Penelitian ini bertujuan menganalisis pengaruh kompetensi pemecahan masalah kepala sekolah terhadap kinerja guru. Metode yang digunakan adalah kuantitatif dengan desain ex-post facto dan pendekatan korelasi serta regresi. Data dikumpulkan melalui kuesioner dan dianalisis menggunakan SPSS versi 17. Sampel diambil secara acak dari 181 guru. Data yang terkumpul dianalisis secara matematis. Hasil penelitian menunjukkan bahwa kompetensi pemecahan masalah kepala sekolah memiliki korelasi positif dan signifikan terhadap kinerja guru (nilai korelasi 0,608 atau 60,8%). Terdapat pengaruh langsung sebesar 28%, pengaruh tidak langsung 13%, dan pengaruh total 41% dari kompetensi pemecahan masalah terhadap kinerja guru. Berdasarkan temuan ini, dapat disimpulkan bahwa peningkatan kinerja guru sangat dipengaruhi oleh kompetensi kepala sekolah dalam pemecahan masalah. Implikasi penelitian menunjukkan bahwa untuk meningkatkan kinerja guru, kepala sekolah perlu memiliki keterampilan dalam menghadapi dan menyelesaikan masalah. Oleh karena itu, pelatihan dalam pemecahan masalah bagi kepala sekolah sangat penting untuk meningkatkan kualitas pendidikan.

Kata Kunci: *Kompetensi Pemecahan Masalah, Kinerja Guru, Kepala Sekolah*

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INTRODUCTION

The principal's ability to solve problems has become a significant concern in education, especially in improving the quality of teaching and learning. In an era characterized by rapid change and complex challenges, principals are expected to function as managers and leaders who can respond to and solve the various problems schools face. According to Kilag et al. (2023), effective educational leaders can create an environment that supports teaching and learning using good problem-solving skills (Gkintoni et al., 2022).

Situational leadership theory, introduced by Hersey and Blanchard (1998), suggests that effective leaders should be able to adapt their leadership style according to the situation at hand, including problem-solving. Research shows that principals with good problem-solving competence tend to create a positive and supportive work environment for teachers, which contributes to improved teacher performance and student learning outcomes (Pardosi & Utari, 2022). In addition, problem-solving theories, such as the step-by-step model of problem-solving, emphasize the importance of problem analysis, the development of alternatives, and the evaluation and implementation of solutions (Ezeamuzie et al., 2022). Thus, principals' problem-solving skills not only influence their decision-making but also their ability to motivate and empower teachers, thereby contributing to the success of the school as a whole (Suklani & Sibaweh, 2024; Hadiati et al., 2022)

The principal will hierarchically supervise educators and education personnel to ensure the learning process runs well (Budi et al., 2020). Principal leadership even plays a crucial role in determining whether a school or other educational institution will qualify as a learning space and fulfil the goals it sets out to achieve (Pardosi & Utari, 2022). Schools are composed of human interactions, differentiating them from other organizations that may not primarily involve human contact (Meltzer & Petras, 2023). In addition, the number of human elements used in the education process is numerous and varied (Puspitarini & Hanif, 2019).

In education, principals function as managers and leaders who can influence teachers' motivation and work effectiveness. In other words, principals with good problem-solving skills can create a conducive school climate, support teachers in overcoming challenges faced in the classroom, and encourage them to continue to innovate in the teaching process (Onyeukwu, 2022). This argument is relevant to the social fact that effective education leadership dramatically influences the performance of educators.

Therefore, principals' decisions can impact teacher performance as they are the educational managers in schools (Jazaudin et al., 2021). According to Manora, as a leader, the principal plays a vital role in maintaining and ensuring that the process goes well and that the results obtained are equally good (Warman et al., 2021). This means that a leader must have superior and superior abilities compared to others.

Research on principals' problem-solving management in improving school quality (Suparman & Macariola, 2022), Güneş (2022) researching the relationship between problem-solving skills, burnout levels and principals' self-efficacy beliefs, Galate (2023) with his research entitled Problem-solving skills and school administrator decision-making are influenced by individual preferences. The three research results show that problem-solving skills are important in helping school organizations run well.

Education is generally regarded as a fundamental principle of developing countries (Zaki, 2020). The teacher is one of the most important elements in education (Feszterová, 2024). As part of teaching and learning activities, teachers have a vital role in the success of learning because the main task of teachers is to design, manage, implement, and evaluate learning (Sayed & Afzal, 2021). In addition, the role of teachers in teaching and learning activities is vital and strategic (Larasati et al., 2020). Teacher education is strategic because teachers own and choose the subject matter for their students (Oolbekkink-Marchand et al., 2022). Therefore, the quality of teacher performance is essential to achieve the education system. An education system that demands many things makes teaching challenging (Kim et al., 2022).

However, many teachers perform far below the standard quality as educators, and it is not uncommon for teachers to teach to fulfil their obligations in duty (Siddik et al., 2021). Many factors cause the quality of teacher performance to be below standard, one of which can be caused by conflict and various problems experienced by teachers. Previous research has identified various important aspects (Rosmanida et al., 2022). However, limitations and gaps still exist. Lack of understanding of problem-solving competencies results in decreased teacher performance. This study provides a new view that improving teacher performance through principals' problem-solving competencies can fill the gap. The results of this study can also be used as a standard reference, both for education managers in particular and all organizational leaders in Indonesia in general, that a leader's problem-solving ability can affect subordinates' performance.

The problem of this study is the need for a better understanding of how the principal's competence in problem-solving can affect teacher performance at school. This research will answer the question: 'How do principals' problem-solving skills affect teacher performance in the context of education in Indonesia?' Various previous studies have shown the relationship between school leadership and teacher performance. For example, Liu's (2022) research showed that effective leadership improves teacher performance. However, the study has not explicitly examined problem-solving skills as a key factor in this context. The gap between the current study and previous studies lies in the lack of understanding of the specific mechanism of how principals' problem-solving competence can contribute to improved teacher performance. This research offers novelty by examining the specific role of principals' problem-solving competencies and their impact on teachers' motivation and performance. This study aims to identify and analyze how principals' problem-solving skills affect teacher performance and provide recommendations for developing more effective leadership in schools. The significance of this study is to provide better insights into the relationship

between principal leadership and teacher performance so that it can be used as a basis for improvement and innovation in educational leadership practices.

RESEARCH METHOD

This study involved teachers in 22 public primary schools in the Karangsembung sub-district, Cirebon District, Indonesia. This study utilized a quantitative approach, employed an ex-post facto or survey type of research, and used a correlation and regression design. Consequently, the questionnaires were processed using regression analysis data using the SPSS version 17 program (Creswell, 2014). The questionnaire used in this study consisted of 20 questions divided into two sections: (1) Teacher Performance and (2) Principal Problem Solving Competence. Each section was designed to measure different aspects of each variable. Between November 2021 and June 2022, this questionnaire was used to collect data. Twenty questions in Indonesian with a dichotomous scale (always, often, sometimes, and never) were organized into two groups of questions: teacher performance data and problem-solving data. Therefore, we modified the instrument by adding a 4-point Likert scale to provide more diverse options for rating each statement. Respondents are now asked to rate each statement based on the following scale: (1) Strongly Agree, (2) Agree, (3) Disagree, and (4) Strongly Disagree. We hope to better capture respondents' feelings and perceptions about teacher performance and principals' problem-solving competencies by adding the Likert scale. The questionnaire focused on the relationship between problem-solving competence and teacher performance. The questionnaires were distributed to the teachers through a direct survey method, where the researcher went to each school and explained the purpose of the study and how to complete the questionnaire. After completing the questionnaires, the data were collected and analyzed using regression analysis with SPSS version 17 (Creswell, 2014). Regression analysis was used to determine the relationship between principals' problem-solving competence and teacher performance to identify the extent of the influence. The results of this analysis are expected to provide a clear picture of the relationship between the two variables under study.

After validation, the survey was sent to a pre-test and applied to a sample chosen "by ability" (Monteiro et al., 2023). During May and June 2022, this application was conducted online through the Google Forms platform. After this pre-test stage, the language used was changed, some questions were omitted, and others were added to gather information about teachers' abilities in primary schools. A sample of 181 teachers from 22 public elementary schools in Karangsembung District, Cirebon Regency, received a link to the questionnaire. The researchers ensured that participants understood what was involved in the study, how the data would be used, and how and to whom the data would be conveyed (Creswell, 2014). In addition, the participants were assured and informed of their right to participate in the study freely and voluntarily at no cost, and they had the right to withdraw from it at any time. In addition, the confidentiality and anonymity of the participants' data were guaranteed through confidential and anonymized data (Eungoo & Hwang, 2023).

Data obtained from the closed questions were statistically analyzed using the SPSS v.17 program package. This included frequency analysis to determine the principal's ability to solve problems and how it impacts the quality of teacher performance. Additionally, we performed tests for heteroskedasticity to ensure that the residuals of the regression model were constant across all levels of the independent variables. Pre-analysis (fluent reading), exploration of the material (coding and categorization), and processing, conclusion, and interpretation of results based on the research objectives (Creswell, 2014).

RESULT AND DISCUSSION

Result

This research data consists of two variables: data on the problem-solving competency variable (X) as the independent variable and teacher performance (Y) as the dependent variable. This descriptive analysis is expected to provide a clear picture of each variable's data, and conclusions can be drawn that can apply to the entire population, which is the Object of the research conducted.

The findings of the partial research results from the questionnaire and survey on the effect of the problem-solving Strategy on Teacher Performance statistically show the results of the coefficient of determination reaching 0.608 Hypothesis testing with the results of seeing Sig.F0.000 then H0 is accepted, meaning it is not significant. Therefore, the problem-solving strategy positively affects teacher performance; however, teacher performance decreases.

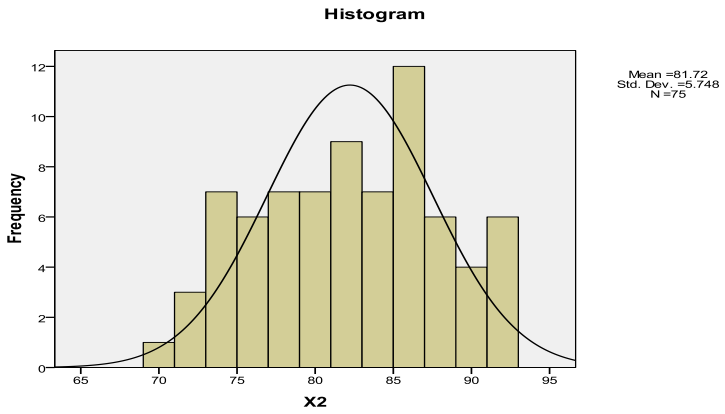

Figure 1. Histogram of Problem solving

An overview of the problem-solving strategy variable results of descriptive statistical analysis with the help of SPSS version 17 was obtained: Mean (81.72), Median (82), Mode (86), Standard Deviation (5.748), Variance (33.042), minimum data (70), maximum data (92) and Range (22). Histogram data bars form like a bell. By looking at these descriptive statistical elements, it can be understood that first, referring to the Mean data (81.72), if this data is made into a percentage, then 86.02% is obtained (81.72/95x100%). If the figure of 86.02% is converted to PPM, then the problem-solving strategy in State Elementary Schools in Karangsembung

District Cirebon Regency is classified as very good. Second, referring to the Histogram whose bars form a bell indicates that the variable data from the problem-solving strategy is usually distributed. This is also confirmed by the Kolmogrov-Smirnov (KS) test results. It turns out that the Sig. F value, 0.553, which means that the data is usually distributed.

An overview of the teacher performance variable and the results of descriptive statistical analysis with the help of SPSS version 17 were obtained: Mean (86.37), Median (86), Mode (91), Standard Deviation (5.963), Variance (35.561), minimum data (74), maximum data (96) and Range (22). Histogram data bars form like a bell.

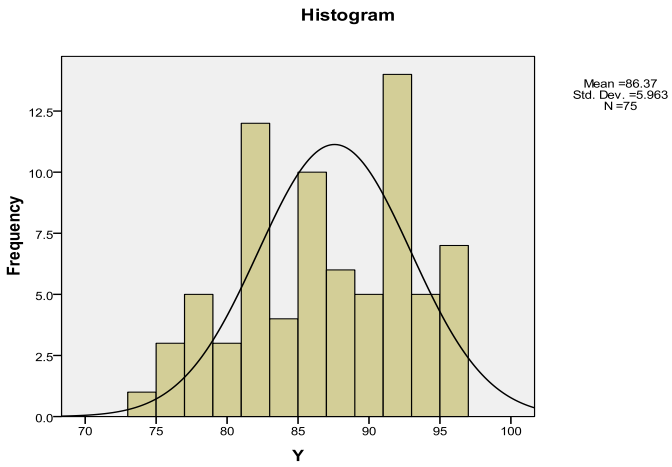

Figure 2. Histogram of Teacher Performance

By looking at these Descriptive statistical elements, it can be understood that Referring to the Mean data (86.37), if this data is made into a percentage, it is obtained 86.37% (86.37/100x100%). If the figure of 86.37% is converted to PPM, then the teacher performance in State Elementary Schools in Karangsembung District, Cirebon Regency, is classified as very good. Referring to the Histogram, whose bars form a bell, clearly indicates that the teacher performance variable data is usually distributed. This is also confirmed by the Kolmogrov-Smirnov (KS) test results, which show that the Sig. F value, 0173, which means that the data is usually distributed.

The results of the Classical Assumption Test Analysis Regression Analysis for the data above concluded that all data were standard; there was no multicollinearity, heteroscedasticity, or autocorrelation. Thus, the regression model in this study is good to use to predict changes in the dependent variable (teacher performance) due to changes in the independent variable (conflict management and problem-solving strategy).

The study's results, based on the descriptive statistical analysis results taken using SPSS version 17.0 on the research variables above, can be concluded in Table 1.

Table 1. The Results of Descriptive Statistical Analysis

No	Aspects	Calculation
1	Direct influence	PX2Y= $(PYX2)^2$ x 100% = $(0,530)^2$ x 100% = 0,28 x 100% = 28%
2	Indirect influence	PX1Y=[(PYX2)x(rX1X2)x(PYX1)]x100% = (0,323x0,771x0,550)x 100% = 0,13 x 100% = 13%
3	Total effect	Direct effect + Indirect effect = 28%+ 13%= 41%

Based on Table 1, it is known that partially the direct effect of the problem-solving strategy variable (X_2) on the value of the teacher performance variable (Y) is 28%. The indirect effect of the problem-solving strategy variable (X_2) on the value of the Teacher Performance variable (Y) through the conflict management variable (X_1) is 13%. The total effect of the problem-solving strategy (X_2) on the teacher performance variable (Y) value is 41%.

Discussion

Problem-solving is critical to managerial tasks but needs to be learned independently of specific task areas. Modern school principals require the ability to solve problems effectively (Suklani & Imam Sibaweh, 2024). This skill is particularly essential because effective problem-solving by principals can directly influence teacher performance and student outcomes. Research has shown that when principals engage in collaborative problem-solving, it fosters a culture of continuous improvement among teachers, leading to enhanced teaching practices.

Educators and trainers have changed their curriculum to adapt to new workplace demands, changing professional standards, evolving learning theories, and the latest research on problem-solving (Galate, 2023). This adaptation is crucial because it equips principals with the tools to navigate complex educational challenges, enabling them to support their teachers better. For instance, principals who employ data-driven decision-making techniques to solve problems can provide targeted support to teachers, which has been linked to higher teacher efficacy and performance.

Furthermore, school principals have been seeking ways to transform their management systems in response to criticism from various sectors about the quality of education (Bailey & Gibson, 2019). Many people argue that principals are the main factor that can indirectly influence the education system through their policies, which can significantly enhance or hinder the quality of teacher performance in teaching (Pagán-Castaño et al., 2021). Principals who understand problem-solving nuances are more adept at creating supportive environments that empower teachers to innovate and improve their instructional methods.

The implications of these findings are profound. By recognizing the critical role that problem-solving plays in educational leadership, stakeholders can focus on developing training programs for principals emphasizing problem-solving

skills. This can lead to a more effective management style that addresses immediate challenges and promotes long-term improvements in teacher performance and student achievement. For example, principals trained in adaptive problem-solving may be better equipped to implement innovative teaching strategies, increasing student engagement and fostering a positive learning environment.

Principals often need to understand the context and application of the knowledge to learn facts and procedures. Problem-solving has evolved into combining facts and procedures in a learning environment, improving teacher performance across various contexts. For instance, a principal who effectively addresses issues related to curriculum implementation can help teachers adapt their instructional strategies, thus directly impacting student engagement and achievement. Ultimately, the ability of principals to engage in reflective and context-aware problem-solving enhances their leadership effectiveness and cultivates an environment where teachers can thrive and excel.

When designing and building professional learning environments and teacher performance, principals must fully understand that dynamic interactions or tensions can cause problems among teachers' authentic tasks, the social conditions of the community, and the school environment (Amna et al., 2021). However, there are only a few design principles, cases, and empirical studies on problem-solving and teacher performance. According to Carnevale & Probst (1998), in the study of Breuker (2023), finding solutions to unknown problems has intellectual, social, and cultural value. Therefore, solving problems is an important part of life and helps people feel valuable.

The definition of issue-solving varies among practitioners and educational scholars. The first meaning is applying flimsy techniques to tackle novel, unidentified challenges in any field (Merriënboer, 2013). The second definition of problem-solving refers to a robust method that can be used to solve specific problems in a particular domain (Buchanan & Kourouthanassis, 2021). A robust method is typically defined as a particular if-then rule in a given domain that generates a solution to a well-structured problem, which is a problem that shows the student every aspect of the problem, necessitates the application of several rules or procedures, and has an understandable solution (Breuker, 1994). Although most educators agree that powerful methods should be taught in education, many would not define the application of robust methods as problem-solving but rather as "just going through the motions." However, describing it as the most drastic and successful problem-solving approach is also accurate.

Knowledge-based problem-solving methods are the third category, including weak and strong methods (Ahmadzadeh et al., 2022). Finding workable answers to unstructured problems - problems with unknown components, few workable solutions, or none at all - that also have few standards for evaluation of solutions and often require principals to make decisions based on judgment - can be aided by this approach. The first educational researcher to highlight the value of using unstructured challenges in training and education (Jiang et al., 2022;

Cheng et al., 2023). Most of his research focuses on instructional strategies for teaching unstructured problem-solving. In order to identify potential solutions, this problem-solving process involves examining domain expertise and examples that have already been encountered. This definition states that effective issue-solving requires a thorough domain understanding. If problem solvers have a solid understanding of how things in a domain are named and interrelated (conceptual models), how things function and affect each other (causal models), and how things are built or organized (structural models), they can construct a given problem situation and find tentative solutions for a long time (Maries & Singh, 2023; Mast et al., 2023).

This complexity necessitates a nuanced understanding of how these elements influence each other. Recent research highlights the importance of collaborative problem-solving in educational settings. For instance, Li et al. (2022) found that fostering collaborative cultures among teachers significantly enhances their professional development and effectiveness. They argue that working together to solve problems improves their instructional practices and creates a supportive community that positively impacts student outcomes.

Moreover, Smith and Jones (2023) conducted a comprehensive review of the impact of professional learning communities (PLCs) on teacher performance. Their findings suggest that structured PLCs promote shared leadership and collective inquiry and improve teacher satisfaction and retention rates. This supports the notion that addressing social conditions and creating a conducive school environment is critical for enhancing teacher performance.

According to Merriënboer (2013), The fourth and final definition combines structured and unstructured problem-solving perspectives. They apply to solving problems in the actual world. Nearly all problems in the real world require a combination of well-structured and unstructured problem-solving techniques and the cognitive processes involved in both types of problem-solving (knowledge-based techniques and unstructured techniques).

Problem-solving is a skill that develops over time due to practice (Adeoye & Jimoh, 2023). There are two skill models: the phase model and the System 1/System 2 model (Conway-Smith & West, 2022). Phase models usually associate problem-solving with one or more skill acquisition or development stages. Dreyfus, for instance, outlines the five phases of skill development: novice, competence, proficiency, expertise, and mastery (Aylward & Cronjé, 2022). According to the phase model, an expert can be defined as someone who has automated most of his work (Coombs et al., 2020). In some areas, like well-organized schoolwork, this might be true. In more difficult professions, however, specialists differ from novices not just because they have automated many routine components of the activity but also because they can discover and correct errors, cc (Chuang & Chang, 2024). Expertise encompasses the automatic completion of routine tasks and the application of knowledge-based techniques to solve non-routine problems, assess the reliability of the solutions obtained, and transition between approaches to problems as needed.

Table 2. The System 1/System 2 Model's Implications for Acquiring Practical Problem-Solving Techniques (Merriënboer, 2013)

Cognitive principles	Learning principles
A combination of System 1 and System 2 processing is always required to solve real-world problems.	– A good workout should appeal to both routine (System 1) and non-routine (System 2) aspects. – For routine aspects, exercises should be repeated (System 1). – The exercise must be different for non-routine elements (System 2).
System 1 (strong method) processing does not only grow through repeated practice; at first, it requires immediate feedback and how-to instructions during practice.	– Relevant information for routine aspects should be in the form of how-to instructions, be timely, and encourage knowledge compilation. – Feedback should be immediate, point out mistakes, and offer direction for the next step.
System 2 processing, or knowledge-based methods, not only develop through a diversity of practices, but initially require relevant understanding and reflection to gain feedback.	– To encourage elaboration and problem solving, domain models and systematic approaches should be a relevant source of information for non-routine aspects. – Domain models and systematic approaches should be a source of relevant information for non-routine aspects to encourage elaboration and problem solving.
System 1 processing is much slower than System 2.	To develop the routine aspects to a very high level of automaticity, repeated practice is required.

Table 2 outlines the System 1-System 2 model's implications for solving problems in the actual world (Merriënboer, 2013). Initially, activities designed to enhance these abilities should prioritize the comprehension of System 1 and System 2 processing, together with the principal's capacity to control both systems. To put it another way, exercises should focus on enhancing both the routine and non-routine facets of problem-solving behavior, such as reasoning (e.g., by applying knowledge from a single domain) and applying knowledge from a single domain. New principals should be aware of two behaviors in the System: Repetitive talents and System 1 (Merriënboer, 2013); they are seen as constant across various problematic scenarios. Practice is key to developing repeatable skills. Non-repetitive skills are System 2 behaviors that vary depending on the problem scenario.

The results of this study indicate that principals' problem-solving competence plays an important role in improving teacher performance and the stability of the principal's managerial System. This finding aligns with research by Aulia and Sari (2022), who found that principals with good problem-solving skills can create a supportive and productive work environment for teachers. In addition, research by Rahman (2023) confirmed that developing problem-solving competencies among principals improves teacher performance and strengthens a positive school culture. Thus, the results of this study contribute to the existing literature by showing that the development of problem-solving competencies should be a significant focus in principal training. This study also paves the way for future research to explore how problem-solving competencies can be

integrated into principals' professional development programs and their impact on student learning outcomes.

Thus, the results of this study support previous opinions that the principal's problem-solving competence can be a solution to improving teacher performance and stability in the principal's managerial System. Therefore, this study's results can be principals' primary focus in developing their competence.

CONCLUSION

The conclusion of this study shows that although challenges for primary school teachers in Cirebon district still exist, good teacher performance can overcome these challenges. The results indicate that principals' problem-solving competence significantly and positively influences teacher performance. Therefore, problem-solving ability is one of the important skills that principals must possess to improve teacher motivation and performance in achieving learning success. As a recommendation, future research is suggested to explore the effect of problem-solving competence at different school levels and consider other variables that may affect teacher performance. More diverse research approaches, such as mixed methods or qualitative, may provide deeper insights into the factors contributing to teacher performance across different educational contexts.

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