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# The Role of Teachers in Developing Contextual Mathematics Learning Based on the World of Work in Grade XII of Vocational Schools

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**Abstract**
The low motivation of students to learn where the perception that mathematics is less relevant in the world of work is a challenge in learning mathematics in Vocational High School (SMK) grade XII. In fact, metamatics has an important role in the world of work and is a supporter of vocational competence, especially the work readiness of vocational school graduates. An approach that is able to bridge these gaps is contextual mathematics learning based on the world of work. The purpose of this article is to examine the role of mathematics teachers in contextual mathematics learning based on the world of work in grade XII of vocational schools. The use of the literature study method for national and international journal articles for the 2021-2025 period is a support in the preparation of articles. The results of the study show that mathematics teachers have a strategic role as designers of learning contexts, facilitators of authentic learning experiences, and motivation to students. Contextual mathematics learning based on the world of work is able to increase students' involvement, understanding of concepts, and positive attitudes towards mathematics lessons. This article recommends strengthening the competence of vocational mathematics teachers in designing contextual learning so that mathematics becomes more meaningful and relevant for grade XII students at vocational schools.

**Keywords**: world of work, teachers, contextual mathematics, vocational school

## INTRODUCTION

Vocational High School (SMK) has the main goal of preparing students to become graduates who are ready to enter the world of work. Learning design in vocational schools should ideally be applicable and relevant to industrial needs (OECD, 2022). Mathematics learning in vocational schools, especially in grade XII, is still considered abstract and separate from the vocational context of students (Suryadi, 2021). This causes a gap and has an impact on low motivation and involvement of students in mathematics learning. Vocational school students tend to have lower motivation to learn mathematics compared to high school students, considering mathematics learning to be unimportant because it is not in accordance with their major and irrelevant to the world of work in the future (Gazali & Atsan, 2021).

The reality in schools shows that learning in vocational schools is often presented conventionally with an emphasis on mastery of formulas and procedures without relating to the context of vocational and daily life. Mathematics materials in grade XII of vocational schools, such as statistics, opportunities, and linear programs if associated with majors and daily life have an important role, such as quality control, production planning, and data analysis (Widodo & Wahyudin, 2023). Learning mathematics with a relevant contextual approach is one of the solutions to this problem. The approach emphasizes the relationship between mathematical concepts and students' daily lives, such as the world of work and industry (Johnson, 2021). Learning with a contextual approach does not only learn mathematical

concepts, but also by understanding meaning and usefulness in a real context (Ningsih & Retnawati, 2022).

Teachers are the pillars of contextual learning. Not only is it in charge of delivering material, but also designing meaningful learning experiences, facilitating the thinking process, and fostering students' motivation to learn (Lee & Buxton, 2024). Therefore, the study of the role of teachers in contextual mathematics learning based on the world of work in vocational schools has an urgency to be studied in more depth. This article aims to examine the role of teachers in developing contextual mathematics learning based on the world of work in vocational schools based on the latest literature review.

## METHOD

This article uses the method used in the literature. This method was chosen with the aim of reviewing and synthesizing various findings of previous research related to contextual mathematics learning, the role of teachers, and education (Creswell, 2023). Literature studies allow researchers to obtain a comprehensive conceptual picture without conducting data collection in the field.

The data source is in the form of national and international journal articles published in the 2021-2025 period. Through searching to obtain articles on Google Scholar and accredited national journals. The inclusion criteria include topic suitability, publication in reputable journals and has gone through a peer review process, and contributing to the development of mathematics education and vocational education studies (Sugiyono, 2022).

Data analysis was carried out using content analysis techniques. Each article is analyzed to identify concepts, findings, and recommendations related to the role of teachers in mathematics learning and contextual mathematics learning. The analysis process is carried out systematically so that the research can be replicated by other studies with the same procedure (Miles et al., 2020).

## RESULTS AND DISCUSSION

The results of the literature review show that teachers are the central pillar as designers of contextual mathematics learning in vocational schools. Teachers have the responsibility to select and develop learning contexts that are relevant to the competencies of students' expertise, such as in the fields of manufacturing, accounting, tourism, engineering, and business and management. Contextual learning that is relevant to cheese can be in the form of production problems, stock management, profit analysis, and quality control, all of which require an understanding of mathematical concepts (Widodo & Wahyudin, 2023).

Contextual learning design requires teachers to not only master math material, but also understand the characteristics of the world of work and the needs of industry. Johnson (2021) emphasized that effective contextual learning must relate abstract concepts to real-life experiences so that students can adapt questions, examples, and learning activities to the vocational competencies possessed by students so that mathematics is not seen as a standalone subject, but integrated with students' fields of expertise. Teacher-led learning design can encourage learners to think critically and solve authentic problems. Good learning planning allows students to associate mathematical concepts with relevant learning experiences, thereby improving the concept of engagement mathematics and concept experience (Ningsih & Retnawati, 2022). Thus, the role of teachers as learning designers is the main pillar of the success of contextual metaphysics learning based on the world of work.

Teachers play the role of facilitators in the implementation of contextual mathematics learning. Teachers guide students to explore, discuss, and reflect on the mathematical concepts learned through the context of the world of work. Not as the only source of knowledge, but the teacher as a companion who helps students build understanding independently (Lee & Buxton, 2024). Active interaction between students and real problems is a demand in itself. Teachers facilitate group discussions, encourage students to express their opinions, and provide feedback on constructivism learning that emphasizes the active role of students in building knowledge (Hidayat & Suryadi, 2023).

The results of the study show that the role of teachers as facilitators is able to increase the active involvement of vocational school students in mathematics learning. Students are directly involved in solving contextual problems, facilitating the process of understanding concepts and relating them to the

needs of the world of work (Rahmawati & Kurniawan, 2023). This shows that teachers are able to facilitate learning effectiveness and make the key to the success of contextual mathematics learning.

Students' motivation is greatly influenced by the way teachers present materials and explanations of the relevance of mathematics to students' daily lives and worlds of work. Research by Gazali and Atsnan (2021) shows that the motivation to learn mathematics for vocational school students increases after they understand the practical benefits of mathematics for life, especially the future in the world of work that is in accordance with their major. Yanti and Nurhayati (2025), revealed that this approach is able to help students realize the importance of mathematics lessons not only as a compulsory lesson, but also as an important tool in solving work problems. Emotional support and motivation are positive reinforcements from teachers in building students' confidence in mathematics learning.

Students not only understand mathematical concepts theoretically, but are also able to apply them in real-life situations that are relevant to the expertise major (Widodo & Wahyudin, 2023). Contextual learning contributes to the development of high-level thinking, critical thinking, problem-solving, and decision-making skills. These skills are needed in the modern world of work that requires vocational school graduates to adapt to various work situations (Rahmawati & Kurniawan, 2023). In line with the findings of the OECD's recommendations (2022) which emphasize the importance of integrating 21st century skills in vocational education.

Contribution in strengthening the theoretical foundation of the role of teachers in contextual mathematics learning based on the world of work. The success of mathematics learning in vocational schools is not only determined by the material, but also by the role of teachers in planning, facilitating, and motivating students. This study expands the application of contextual learning in the context of vocational education, especially in mathematics learning in grade XII of vocational schools. Thus, this tool can be a conceptual reference for teachers, prospective teachers, as well as further research in the development of relevant, meaningful, and adaptive mathematics learning in the needs of the world of work.

## CONCLUSION

Based on a literature review, it can be concluded that teachers have a strategic role in developing contextual mathematics learning based on the world of work in vocational schools. Through the role of planners, facilitators, and motivators, teachers are able to increase students' motivation and understanding of mathematical concepts. Contextual mathematics learning makes an important contribution to the development of mathematics education that is relevant to the needs of vocational education and the world of work.

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