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Implementation of Student Centered Approach (SCA) with Station Rotation Learning Model to Support 21st Century Learning

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Abstract: The Student-Centered Approach (SCA) is the basis for designing learning to equip learners with 21st century skills. One model that supports SCA is Station Rotation, which allows personalization of learning by dividing the class into stations with different activities. This research uses a systematic review of studies to analyze the impact of implementing Station Rotation in classroom learning. The results show that this model positively contributes to students' cognitive learning outcomes, critical thinking skills, collaboration, and learning motivation. This model can be applied at various levels of education, but needs to be combined with other learning strategies to be more optimal.

Keywords: Student-Centered Approach, Station Rotation, 21st century learning.

INTRODUCTION

21st century learning is the basis for educators to design strategies that focus on the Student-Centered Approach (SCA) (Haseski, Ilic, & Tugtekin, 2018). SCA places students at the center of learning with the aim of increasing their motivation and engagement in the learning process. This approach is considered effective in providing meaningful learning experiences and supporting deeper understanding for students (Tyabaev, Sedelnikova, & Voytovich, 2015).

Supporting the implementation of SCA in Indonesia, the education system has undergone a major transformation with the implementation of Merdeka Curriculum at all levels of education. This policy aims to replace conventional approaches in education with more innovative and creative learning methods for students (Anggraena et al., 2021). In addition, this new policy positions students as the main actors in learning, teachers only design how to facilitate students (Candra et al., 2020). This new approach is designed to address the challenges of the 21st century, including the development of critical thinking skills, creativity, collaboration, communication, problem solving, and digital literacy (Indarta et al., 2022; Tanggur, 2023).

The Merdeka Curriculum ensures that the learning approach in schools is fully learner-centered, where they are actively involved in the learning process tailored to their individual needs and developmental levels for their future (Tanggur, 2023; Praherdhiono et al., 2019). The main focus of this curriculum is the development of skills and knowledge that are relevant to

the world of work, so that students are better prepared to face various challenges in the future (Regina et al., 2023). In addition, Merdeka Curriculum carries the concept of Merdeka Belajar, which gives learners the freedom to explore their interests and talents and optimize their potential (Elviya & Sukartiningsih, 2023), while improving their learning outcomes (Safarati & Zuhra, 2023).

The concept of Merdeka Belajar supports the diverse characteristics of students, which is also a challenge for educators in implementing the learning process (Elviya & Sukartiningsih, 2023). Facilitating differences in learner characters and interests is a key factor in successful learning (Morgan, 2014). Jojor & Sihotang (2022) emphasized that the differentiated learning model is an effective adaptation strategy in the classroom to meet the various needs of learners in 21st century learning.

One strategy that can be applied in 21st century learning is the Station Rotation model (Fulbeck et al., 2022). This model allows personalization of learning according to the needs of learners and teachers by dividing the class into two, three, or even four different stations, each with varied learning activities. This approach is in line with the 21st century learning concept that promotes differentiated learning, as it can accommodate the diversity of learners in the learning process, adjusting to their level of readiness, interests and learning preferences (Ferlianti et al., 2022).

According to Larsari et al. (2023), the Station Rotation model consists of at least three learning stations that have different roles and functions. Teacher Station functions as a place where educators provide direct explanation, guidance, and direction to learners related to learning materials. Collaborative Station allows learners to work in small groups to solve tasks or problems given, so they can discuss and learn from each other. Meanwhile, Online Station utilizes technology by providing additional resources, interactive materials, or online platforms to support the learning process.

Based on this explanation, the problem statement in this literature review article is how the Station Rotation model affects learning that suits the needs of students in the context of 21st century learning, and which education levels can implement this model.

The purpose of this literature review is to review various scientific articles that discuss the application of Station Rotation in meeting the needs of students in the 21st century. The results of this review are expected to be taken into consideration for educators in choosing the right learning strategy.

METHOD

The method used in this research is Systematic Literature Review (SLR), as detailed by Barbara Kitchenham. In accordance with the guidelines put forward by Kitchenham et al. (2009), there are five main steps that must be carried out as shown in Figure 1.

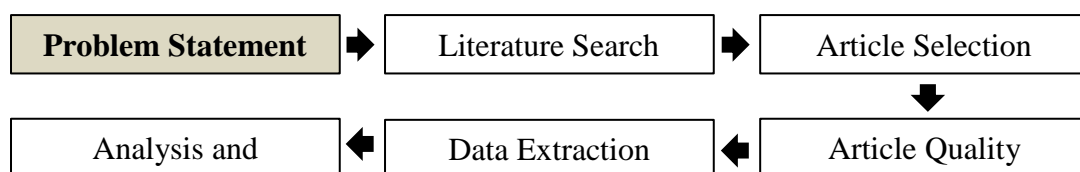


Figure 1. Stages of Systematic Literature Review

The literature search process was carried out to obtain relevant sources in answering the problem formulation. The search was conducted by entering the keyword "Station Rotation" using the Publish or Perish search engine, which is based on data from Google Scholar. Furthermore, the filter option was performed by applying a filter based on the year of publication of the article to ensure that the information used was in accordance with the specified publication period.

The article selection stage was carried out to determine the eligibility of the information obtained in the research inclusion and exclusion process. Articles that meet the inclusion criteria will be reviewed and used as primary data, while those that do not meet the criteria will be grouped into exclusion. The inclusion criteria in this study include: (1) Articles covering the 2020-2025 publication period. (2) The search source came from Google Scholar. (3) Articles came from scientific journals, not seminar results or proceedings. (4) Articles are the result of quantitative or qualitative experimental research. (5) Articles with the same title or duplication were considered as one article. Before the exclusion process, 50 articles were collected. After selection based on the inclusion criteria, the number of articles used was reduced to 30 articles. Subsequently, the data collection process was carried out for further study quality assessment.

An assessment of the quality of the articles was conducted to ensure that each article used was able to answer the formulation of the research problem. This evaluation was based on the relevance of the article to the study. In addition, the quality assessment also considers the number of citations, where only articles that have more than two citations are selected. This process was carried out using the Publish or Perish application, resulting in 13 articles that met the criteria. After the quality assessment stage, the research process continued to the data extraction stage for further analysis.

The article data extraction stage involved several important steps, including reading key sections such as abstracts, introductions, and research results. In addition, a summarization process was carried out by highlighting the important elements of each article, namely the title, year of publication, methodology used, variables measured, selection of research subjects, and research results. After the data extraction stage was completed, the process continued with analyzing the findings and synthesizing the articles. At this stage, the information that has been collected is analyzed to identify patterns, key findings, and relationships between articles. By following these steps, researchers can gain a deeper understanding of the research topic and develop a strong article synthesis.

RESULT AND DISCUSSION

The data extraction results from the identified scientific articles show that there are 13 articles relevant to this study, which specifically discuss the Station Rotation model. The analysis of these articles is presented systematically in Table 1, which includes information on article title, year of publication, research methodology, variables measured, selection of research subjects, and research results. Table 1 serves as a basis for understanding the contribution of each article to the research, as well as assisting in the process of synthesizing and further discussion.

Table 1. Results of Article Analysis

No.	Title	Year	Methodology	Variables measured	Research Subject	Research Results
1	Penerapan Pembelajaran Diferensiasi Dengan Metode Blended Learning Station Rotation untuk Meningkatkan Hasil Belajar Peserta didik Pada Materi Tekanan Hidrostatik	2022	Pre-testing Method	Cognitive learning outcomes	Junior high school students in Grade 9	There is an increase in student learning outcomes between before and after the application of the Blended Learning Station Rotation learning method on hydrostatic pressure material.
2	Station Rotation Type Blended Learning Model Against Critical Thinking Ability of	2020	Quasi-experiment with non-equivalent	Critical thinking skills	Primary 4 students	The application of blended learning model with station rotation type has a positive effect on critical

No.	Title	Year	Methodology	Variables measured	Research Subject	Research Results
	Fourth Grade Students		control group design			thinking skills of fourth grade students.
3	Effect of Station Rotation Mode of Instructional Delivery for Mathematics in the Era of Advancing Technology	2020	Pretest, posttest, control group quasi experimental.	Cognitive learning outcomes	High school students	The use of the station rotation model can improve math learning outcomes
4	Effect of Blended Learning using the Station Rotation Model towards Students' Achievement in Learning Chemistry	2020	One-group pre and post-test design	Cognitive learning outcomes	High school students	There was a significant increase in chemistry learning outcomes after using the station rotation model.
5	Penerapan Model Blended Learning Tipe Station Rotation dalam Meningkatkan Kemampuan Menulis Kalimat Bahasa Jepang Mahapeserta didik Pendidikan Bahasa Jepang Semester 4 FKIP UHAMKA	2022	One Group Pre-test Post-test Design	Japanese writing skills	College students	<ul style="list-style-type: none"> • Station rotation type blended learning model can improve Japanese sentence writing skills • The application of blended learning type station rotation can attract students to learn
6	Peningkatan Keterampilan Sosial Anak Berkebutuhan Khusus Melalui Strategi Pembelajaran Station Rotation Berbasis Tiered Task	2022	One-Group Pretest-Posttest	Improved social skills of learners with special needs	Elementary, junior high, vocational students with special needs	Using a station rotation model based on tiered tasks can significantly improve the social skills of students with special needs.
7	Innovation in the teaching of human physiology at university and school: pedagogical process based on interdisciplinarity and learning station rotation.	2021	Qualitative using a scale-based questionnaire	Learner satisfaction level	Junior and senior high school students	Learning with the station rotation model can increase students' acceptance of learning materials and facilitate student-teacher dialog.
8	The Effects of the Station Rotation Model in Promoting Libyan Students' EFL Writing: Blended Learning	2021	Pretest, posttest, control group quasi experimental.	Writing skills	Junior high school students	The use of the station rotation model can improve students' writing skills.
9	Pre-Service Teachers' Views on How the Station Rotation Model with a Blended Social Learning Environment (SRM-	2022	Qualitative data analysis with interviews	Critical thinking skills	College students	The use of station rotation model with Blended Social Learning Environment can improve students' critical thinking skills.

No.	Title	Year	Methodology	Variables measured	Research Subject	Research Results
	BSCLE) Enhances their Critical Thinking Skills					
10	Station Rotation with Gamification Approach to Increase Students' Engagement in Learning English Online	2023	Qualitative research with data triangulation using observation, self-report and interview.	Learner engagement in learning	College students	There is an increase in learner engagement in three dimensions, namely increased learner interest, increased motivation, and learner engagement in learning using the station rotation and gamification approach.
11	The Effect of Station Rotation Online Model on Problem Solving Students Ability: A Case Study at Junior High School	2021	Quasi-experiment with nonequivalent control group design	Problem solving ability	Junior high school students	The use of the station rotation model can improve students' problem-solving skills.
12	The Effect of Station Rotation Learning Model on Critical Thinking in Elementary School-level Students	2023	Posttest-only control group design	Thinking skills	Primary school students	There is a significant effect of using station rotation on students' thinking skills
13	Blended Learning Station-Rotation Model: Does it Impact on Preservice Teachers' Scientific Literacy?	2021	Posttest-only design with nonequivalent groups	Science literacy skills	College students	There is no effect of station rotation on students' science literacy skills without being combined with other learning models

Based on the results of the literature review analysis of 13 journal articles, it was found that the Station Rotation model has been applied at various levels of education. This finding shows that this approach is effective in improving critical thinking skills at all levels of education (Nugraha, 2020; Hamida et al., 2021; Oktariato et al., 2023). The distribution of Station Rotation implementation at various levels of education can be seen visually in Figure 2, which provides an overview of the distribution of the application of this model in the learning context.

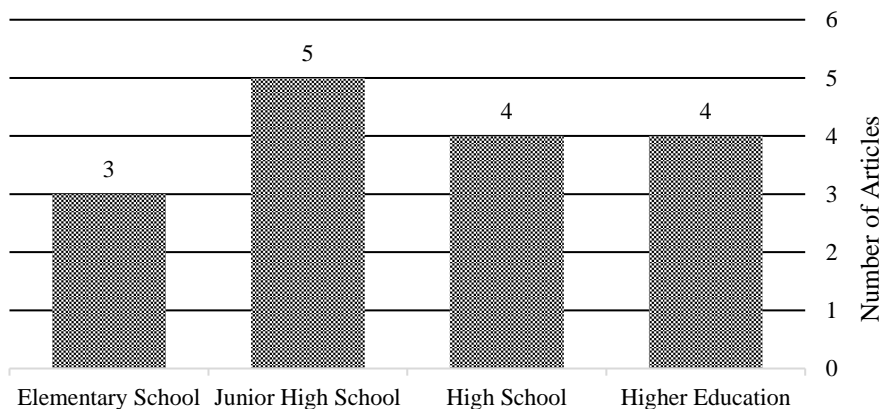


Figure 2: Graph of Station Rotation Implementation at Education Levels

The analysis obtained shows that the implementation of Station Rotation in education is not limited to schools with students who have reached the formal operational cognitive

development stage (age 12 years and above), such as junior high school, high school, or higher education, who have more mature logical thinking skills (Syar, 2020). This model can also be applied at the elementary level which is still at the preoperational and concrete operational stages of cognitive development, as well as in schools that serve students with special needs. Based on the analysis, the implementation of Station Rotation at various levels of education shows positive results on students' learning output. This proves that this learning model can be applied from elementary school level (Nugraha, 2020; Oktariato et al., 2023) to higher education (Hadiprayitno et al., 2021; Mamman et al.; Rahma & Sukmara, 2022; Xiangze & Abdullah, 2023).

Based on the results of the journal analysis that has been done, learning with the station rotation method has various benefits. Some of these include improved cognitive learning outcomes (Akinos et al., 2020; Ayob et al., 2020; Ferlianti et al., 2022), critical thinking skills (Nugraha, 2020; Hamidah et al., 2021; Mamman et al., 2022; Oktariato et al., 2023), writing skills (Belazi & Ganapathy, 2021; Rahma & Sukmara, 2022), and learner engagement and satisfaction in learning (Dos Santos et al., 2021; Xiangze & Abdullah, 2023). In addition, this method also contributes to the development of learners' social skills (Marlina et al., 2022). For these benefits to be optimized, station rotation should be combined with other learning models or methods (Hardiprayitno et al., 2021).

One effective way to incorporate station rotation is with learning that is designed to meet the learning needs of 21st century learners. Learning will be effective if it can facilitate the diversity of learners (Surahman et al., 2019). The station rotation approach with differentiated learning allows personalization of learner activities by dividing the class into several different stations, with varied activities. The combination of the station rotation model with differentiated learning can improve students' cognitive learning outcomes (Ferlianti et al., 2022).

In addition to improving cognitive learning outcomes, station rotation can also be combined with Problem-Based Learning (PBL) to hone students' critical thinking skills (Hamidah et al., 2021). In line with these research results, critical thinking skills and students can be enriched through the application of relevant learning strategies (Hidayati et al., 2020). Furthermore, this method also helps to improve social skills as learners have more opportunities to collaborate with their classmates (Marlina et al., 2022). The interaction that occurs in station rotation-based learning can also increase learners' engagement in the learning process (Xiangze & Abdullah, 2023).

The high level of learners' engagement and satisfaction in learning directly contributes to their increased motivation to learn. High learning motivation is likely to improve learning outcomes (Akinoso et al., 2020; Ayob et al., 2020; Ferlianti et al., 2022). Therefore, the use of station rotation can be an effective strategy in improving students' motivation and learning outcomes. By being learner-centered, this method can be the right choice for teachers in facing educational challenges in the millennial era (Xiangze & Abdullah, 2023).

However, the implementation of station rotation in the field needs to be combined with other learning strategies so that the results are more optimal (Hadiprayitno et al., 2021). Combining these methods also opens up opportunities to enrich learning variations, so that they are more in line with the needs of students according to their era and place students as the main actors in learning activities.

CONCLUSION

Station Rotation is a learning model that carries the Student-Centered Approach (SCA), which is an approach that places the focus of learning on students with the expectation that students actively participate in learning. This has a positive impact on learning outcomes, critical thinking, and collaborative skills. In addition, the use of the station rotation model can also increase students' learning motivation and can be a learning strategy needed by the millennial generation in preparing them for the future with 21st century skills.

The Station Rotation model can be applied at all levels of education, from elementary school to university. However, in practice, this method needs to be combined with other learning strategies for optimal results. This combination not only increases the effectiveness of learning, but also enriches the variety of learning strategies to better suit the needs of students according to the time of day. In addition, this approach opens up opportunities for further research in the future to develop more innovative learning strategies.

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