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ADVANCES IN SOCIAL HUMANITIES RESEARCH

The Effect of the Use of Depok City Rtrw Map Media on the Motivation and Learning Outcomes of Geography Students of Grade XII SMAI PB Soedirman Cijantung East Jakarta

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Keywords:
map-based media, Depok City Spatial Plan (RTRW), motivation to learn, learning outcomes, geography education.

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Abstract

Geography instruction on spatial planning requires visual learning media that enable students to connect abstract concepts with real-world spatial phenomena. This study examined the effects of using the Depok City Regional Spatial Plan (Rencana Tata Ruang Wilayah, RTRW) map on learning motivation and academic achievement among 12th-grade geography students and described the integration of problem-based learning (PBL) into map-based instruction. A quantitative, quasi-experimental design with nonequivalent control groups was employed at SMAI PB Soedirman Cijantung, East Jakarta, Indonesia. The study involved 48 12th-grade social studies students divided into an experimental group (n = 24), which used the Depok City RTRW map, and a control group (n = 24), which received PowerPoint-based instruction. Data were collected using pretests and posttests to assess learning outcomes and a five-point Likert-type questionnaire to measure learning motivation. Data analysis included descriptive statistics, normality and homogeneity tests, an independent-samples t-test, and normalized gain (N-gain) analysis. The experimental group's mean learning outcome score increased from 65.0 to 84.6, whereas the control group's mean score increased from 64.8 to 69.5. The independent-samples t-test indicated a statistically significant difference in learning outcomes ($p < 0.001$). The normalized gain was 0.56 (moderate) in the experimental group and 0.12 (low) in the control group. Learning motivation scores increased descriptively from 64.08 to 81.08, reaching the good category; however, the statistical significance of this improvement was not established. PBL supported map-based instruction by facilitating problem identification, investigation, and presentation of findings. These results suggested that incorporating the Depok City RTRW map into geography instruction was associated with improved learning outcomes and potentially greater learning motivation in spatial planning education.

INTRODUCTION

Education plays an essential role in developing students' knowledge, skills, attitudes, and critical thinking abilities. As science and technology continue to advance, instructional practices should extend beyond the transmission of information to provide opportunities for students to observe, analyze, evaluate, and apply concepts in real-world contexts. Teachers must therefore select instructional strategies that align with subject matter, students' learning needs, and educational objectives. Instructional media are an important component of this process because they facilitate the communication of information and help students understand concepts that may be difficult to explain verbally. Appropriate instructional media can clarify learning materials, increase students' attention, diversify learning activities, and encourage active participation (Arsyad, 2019). Although instructional media are not the sole determinant of educational success, their appropriate selection can contribute to more effective and meaningful learning experiences. In geography education, instructional media are particularly important because the discipline examines geospheric phenomena, spatial distributions, interactions among places, and human–environment relationships. Geographic concepts such as location, distance, spatial patterns, accessibility, and spatial relationships often require visual representations to facilitate understanding. Maps are especially relevant because they communicate geographic information through symbols, colors, lines, and boundaries, enabling students to identify, interpret, and analyze spatial phenomena (Arends, 2019; Bednarz, 2021; Creswell & Creswell, 2018; Fathurrohman, 2020; Hamalik, 2019; Planning, 2022).

The use of maps in geography instruction should extend beyond identifying locations or memorizing place names. Maps can support higher-order thinking skills by enabling students to analyze land-use patterns, relationships among regions, spatial suitability, and the environmental consequences of human activities. Accordingly, maps can serve as both instructional resources and sources of spatial evidence for classroom investigations. Regional and urban spatial planning is a geography topic that particularly requires spatial understanding because it addresses land-use regulation, regional development patterns, and interactions between human activities and environmental characteristics (Lestariningsih et al., 2023; Maulidiah et al., n.d.; Yani & Ruhimat, 2021). Urban land use encompasses residential, commercial, industrial, transportation, and environmental protection functions. Effective spatial planning seeks to coordinate these activities while considering regional development priorities, land-use compatibility, and environmental sustainability (Huda, 2021; Jo & Bednarz, 2022; Kerski, 2021; Kim & Bednarz, 2023; Mulyasa, 2021; Technology, 2022).

The Regional Spatial Plan (Rencana Tata Ruang Wilayah, RTRW) is an Indonesian spatial planning instrument that provides information on designated land uses and regional development directions. RTRW maps illustrate spatial allocations and relationships among different land-use functions. By examining these maps, students can distinguish between areas designated for development and protected areas, identify spatial patterns, and evaluate potential conflicts between development priorities and environmental conservation (Peraturan Daerah Kota Depok Nomor 1 Tahun 2015 Tentang Rencana Tata Ruang Wilayah Kota Depok Tahun 2012–2032, 2015; Munandar, 2020; Nurdyansyah, 2020; Paivio, 2021; Prastowo, 2021; Rusman, 2021).

Depok City was selected as the instructional context because its urban development characteristics were relevant to the spatial planning topics examined in this study. Residential

expansion, commercial and service activities, transportation networks, and the provision of green open spaces presented contextual examples for geographic investigation. The Depok City RTRW map enabled students to connect classroom concepts with actual spatial planning conditions in a relatively familiar regional setting (Sardiman, 2022; Setyosari, 2020; Suharyono & Amien, 2020; Sukmadinata, 2021; Uno, 2021; Widoyoko, 2020).

Map-based instruction also provided opportunities to integrate geography education with regional economic activities. Spatial allocations influence the location of economic activities, accessibility, infrastructure provision, and relationships between economic centers and surrounding areas. Through spatial analysis, students could examine how economic activities were shaped by geographic location, transportation accessibility, and land-use regulations. However, geography instruction that relied predominantly on teacher explanations and presentation slides could limit opportunities for students to investigate spatial relationships independently. Such approaches might also make it difficult for students to connect abstract planning concepts with actual geographic conditions. Contextual visual media could therefore provide more meaningful opportunities to interpret spatial information and examine real-world geographic problems.

These instructional challenges were also relevant to students' learning motivation. Students with higher motivation generally demonstrate greater attention, persistence, curiosity, and willingness to participate in learning activities. Conversely, repetitive instructional activities with limited connections to everyday experiences may reduce students' interest in exploring geographic concepts. In this study, the Depok City RTRW map was used to present spatial planning concepts through contextual visual information. Students were encouraged to observe spatial patterns, compare regional land-use functions, and discuss issues related to land utilization. These activities were expected to stimulate curiosity, encourage active engagement, and support learning motivation through direct interpretation of geographic information.

Map-based instruction was also expected to support students' cognitive learning outcomes, which were assessed using pretests and posttests. Through map interpretation activities, students were encouraged to apply spatial concepts, identify relationships among regional functions, and analyze land-use problems. These activities provided opportunities to develop spatial reasoning and conceptual understanding beyond those typically available through verbal explanations alone.

In addition to instructional media, the selection of an appropriate instructional model was important. Problem-based learning (PBL) uses contextual problems to guide students through identifying issues, gathering information, evaluating evidence, developing potential solutions, and presenting findings. In geography education, problems involving spatial planning, land-use conversion, economic development zones, and environmental protection can provide meaningful contexts for investigation. Integrating RTRW maps with PBL allowed students to use spatial information as evidence when examining geographic problems. The maps provided information about locations and designated land uses, while PBL structured the investigation and problem-solving process. This combination was expected to promote active participation, contextual learning, and deeper conceptual understanding.

This study was conducted at SMAI PB Soedirman Cijantung, East Jakarta, Indonesia, by comparing geography instruction using the Depok City RTRW map with instruction using

PowerPoint presentations. The comparison focused on differences in students' cognitive learning outcomes and descriptive changes in learning motivation following map-based instruction. Rather than evaluating the visual appeal of the maps alone, the study examined their instructional relevance in supporting students' understanding of spatial planning concepts and regional economic activities.

Based on these considerations, this study aimed to (1) examine differences in geography learning outcomes between 12th-grade students taught using the Depok City RTRW map and those taught using PowerPoint presentations; (2) describe changes in students' learning motivation following map-based instruction; and (3) examine the implementation of PBL in geography instruction using the Depok City RTRW map. The findings were expected to provide practical insights for teachers seeking to select contextual instructional media and integrate spatial reasoning with real-world regional planning issues.

METHOD

This study employed a quantitative, quasi-experimental approach with a nonequivalent control group design at SMAI PB Soedirman Cijantung, East Jakarta, Indonesia, from December 2025 to March 2026. A purposive sample of 48 12th-grade social studies students was divided into an experimental group (n = 24), which received instruction using the Depok City Regional Spatial Plan (Rencana Tata Ruang Wilayah, RTRW) map, and a control group (n = 24), which received PowerPoint-based instruction. Both groups studied spatial planning and regional economic activities using a problem-based learning (PBL) approach. Data were collected using pretests and posttests to assess cognitive learning outcomes and a five-point Likert-type questionnaire to measure learning motivation (Sugiyono, 2023). Learning outcomes were analyzed using descriptive statistics, normality and homogeneity tests, an independent-samples t-test at a significance level of 0.05, and normalized gain (N-gain) analysis. Learning motivation was analyzed descriptively; therefore, no conclusions regarding the statistical significance of changes in motivation were drawn.

RESULTS AND DISCUSSION

Description of Geography Learning Outcomes

The learning results were analyzed by comparing the pretest and posttest scores in the experimental class and the control class. The experimental class consisted of 24 students who participated in learning using the Depok City RTRW Map media, while the control class consisted of 24 students who participated in learning using PowerPoint.

Based on the research data, the initial ability of the two classes was relatively close. The average pretest of the experimental class was 65, while the control class was 64.8. The proximity of these scores gives an idea that the initial achievement of the two groups was not much different before learning was implemented. After treatment, the average score of the two groups increased. However, the increase in the experimental class was greater than in the control class. Details of the learning outcomes are displayed in the Table.

Table 1. Comparison of Geography Learning Outcomes

Indicator	Experimental class	Control class

Number of pupils	24	24
Rata-rata pretest	65,0	64,8
Rata Rata Pole Test	84,6	69,5
Average increase	19,6	4,7
Improvement relative to the pretest	30,15%	7,25%

Table 2 shows that the average posttest of the experimental class reached 84.6, while the control class reached 69.5. The average difference in the final score of the two classes was 15.1 points. In terms of improvement, the experimental class experienced an average increase of 19.6 points, while the control class increased by 4.7 points.

The results of statistical testing in the thesis showed that the pretest data met the assumptions of normality and homogeneity. In the pretest normality test, the Shapiro–Wilk significance value of the experimental class was 0.055 and the control class was 0.194. The homogeneity test produced a significance value of 0.256. These results support the use of parametric analysis to compare the initial abilities of the two groups.In the posttest test, the significance value of the homogeneity test was 0.053. Meanwhile, the results of the independent samples t-test showed a two-way significance value reported as 0.000 in the statistical software output. The value should be written as $p < 0.001$, not $p = 0.000$. Thus, there was a significant difference in the average learning outcomes between the experimental class and the control class.

The N-Gain analysis in the thesis reported a value of 0.56 in the experimental class and 0.12 in the control class. Based on the classification used in the thesis, the increase in the experimental class was included in the medium category, while the control class was in the low category. The results showed that the improvement in learning outcomes was greater in the group that used the Depok City RTRW Map media. There are methodological matters that need to be considered in the presentation of the results. The N-Gain value must be calculated and reported as a decimal score without a percent mark. In addition, if the maximum test score is 100, the calculation based on the average of the pretest and posttest listed in Table 2 needs to be re-verified against the original analysis output. This verification is important so that the results table, the N-Gain category, and the discussion description are consistent.

Description of Learning Motivation

Learning motivation was analyzed through questionnaires given to students in experimental classes. Descriptive analysis was used to see changes in motivation scores after students participated in learning using the Depok City RTRW Map media.

Table 2. Descriptive Results of Experimental Class Learning Motivation

Indicator	Results
Number of pupils	24
Average initial score	64,08
Average final score	81,08
Average increase	17,00
Increase relative to the initial score	26,53%

Percentage of final scores reported	81,08%
Categories by thesis criteria	Good

Table 2 shows that the average learning motivation score increased from 64.08 to 81.08. This change shows a descriptive increase of 17 points or around 26.53% compared to the initial score. The percentage of the final score of 81.08% is in the good category based on the criteria used in the thesis.

The descriptive improvement shows that learning using maps has the potential to create a more engaging and relevant learning experience for students. However, to conclude that increased motivation differs statistically significantly, complete motivation inferential test results are required. The summary data are not sufficient to determine the magnitude of the statistical influence or causal relationship separately.

The Influence of RTRW Map Media on Learning Outcomes

The results showed that the class that used the Depok City RTRW Map media obtained a higher average posttest than the class that used PowerPoint. The average learning outcome of the experimental class increased from 65 to 84.6, while the control class increased from 64.8 to 69.5. This difference in final achievement shows that the use of map media is related to better learning outcomes in the context of spatial planning materials and regional economic activities. One explanation that can be put forward is that maps provide visual representations of spatial objects and relationships. In regional and urban planning materials, students need to understand that each area has certain characteristics and functions. Verbal explanations can convey the definition of protected areas, cultivation areas, and infrastructure networks, but maps provide opportunities for students to observe the distribution and interconnectedness of these elements.

The Depok City RTRW map can be used to show how the function of space is spread within urban areas. Through the observation of symbols and colors, students can compare the designation of areas and discuss the relationship between transportation networks, settlements, trade activities, and areas that function to protect the environment. This process helps connect conceptual knowledge with concrete spatial information. The advantage of map media lies not only in its visual appearance, but also in the thinking activities made possible by its use. Students can identify locations, compare patterns, find relationships between components, and propose explanations based on available evidence. This activity is relevant to Geography learning which emphasizes the ability to understand spatial patterns and processes.

The RTRW map also allows students to connect spatial planning with economic activities. For example, the determination of the location of trade and services can be discussed by considering its accessibility and proximity to settlements. Similarly, the placement of industrial estates can be analyzed from the perspective of the suitability of space allocation, infrastructure needs, and potential environmental impacts. Using these examples, the concept of spatial planning is not only understood as the division of areas, but also as an instrument for managing human activities. Contextual learning like this can help students develop a more structured understanding. When working on analysis problems, students need to connect the information from the map with the concepts that have been learned. It is not enough for them to remember the definition, but they need to interpret the information, explain the relationship,

and draw conclusions. These activities have the potential to strengthen the mastery of the material measured through learning outcome tests.

The difference in the mean posttest of 15.1 points and the t-test result with $p < 0.001$ provides statistical evidence that the final outcomes of the two groups differ significantly. However, these results need to be interpreted according to the study design. Because classes are not formed through individual randomization, differences in learning outcomes cannot be fully detached from the possible influence of class characteristics, learning interactions, or other factors that are not measured.

In addition, both classes used different learning media. Thus, the results of the study showed the advantages of learning using RTRW Maps compared to learning using PowerPoint in the context of this study. These results do not mean that all the use of PowerPoint is less effective, because the effectiveness of the media depends on the quality of the material, the design of the activity, the way the teacher teaches, and the characteristics of the students. The N-Gain results reported in the thesis also lead to a greater pattern of improvement in the experimental class. However, the N-Gain number needs to be re-verified before publication to match the average data presented. Consistent reporting will strengthen the credibility of the results and make it easier for readers to assess the magnitude of the improvement that occurred.

Pedagogically, these findings show the importance of choosing media that is in accordance with the characteristics of the material. RTRW maps are relevant because spatial planning materials have a strong spatial dimension. Media that present spatial information directly can help students connect abstract concepts with observable spatial patterns. Therefore, Geography teachers can consider spatial maps as a learning resource to improve the quality of learning in regional and urban planning materials.

The Influence of RTRW Map Media on Learning Motivation

Learning motivation is an important aspect that affects student involvement in learning activities. Students who are interested in the material tend to be more willing to pay attention to explanations, ask questions, discuss problems, and complete assignments. In Geography learning, motivation can grow when students see that the concepts learned have a relationship with the phenomena around them.

Based on descriptive data, the average learning motivation score in the experimental class increased from 64.08 to 81.08. An increase of 17 points showed a change in score after the use of the Depok City RTRW Map media. The percentage of the final score reported was 81.08% and was included in the good category according to the criteria in the thesis.

One possible explanation for these changes is the relevance of the material to students' lives. The Depok City RTRW map presents information about areas that are close to the students' social and geographical environment. The proximity of this context can help students understand that Geography learning is not limited to knowledge that must be memorized, but related to decisions regarding the use of space, urban development, and environmental quality. Maps also provide opportunities for students to observe information independently. When students look for symbols, recognize regional boundaries, and compare space allocations, they have concrete activities that can be done during learning. This activity is different from activities that only require students to listen to explanations. A variety of activities has the potential to maintain attention and reduce boredom during learning.

In addition, maps can foster curiosity. Information about residential areas, trade, road networks, green open spaces, and protected areas can raise questions about why an area is designated for a particular function. Students can discuss the consequences if a spatial function does not conform to the planning direction. These kinds of questions can be an entrance to developing more active learning.

Motivation can also be supported by opportunities to participate in problem-solving. When students are asked to explain their observations or defend arguments based on the information on the map, they have a more active role in the learning process. This experience can help build a sense of belonging to learning activities, especially if the teacher provides clear feedback and appreciates the student's thought process. However, learning motivation is not only influenced by the media. Class conditions, teacher support, interaction between students, early abilities, personal interests, and previous learning experiences can also contribute to motivation. Therefore, the increase in the questionnaire score in this study should be understood as a descriptive change that occurred in the experimental class, not as a single proof that the map media is the direct cause of all these changes.

The measurement aspect also needs to be considered. The average score of 81.08 and the percentage of 81.08% in the table follow the thesis reporting. To ensure proper interpretation, the final article needs to double-check the raw score, the maximum score of the questionnaire, and the percentage conversion formula. This check is necessary to ensure that the mean and percentage values actually represent the same measure. In addition, because the available summary of motivation results does not present the results of the complete differential test, conclusions about the statistical significance of motivation cannot be made with certainty. Follow-up research or re-examination of the original data should include testing for changes in motivation scores and, if available, comparisons with control groups.

Overall, the descriptive results indicate that learning using the Depok City RTRW Map can create learning conditions that support students' interest and involvement. These media have the potential to increase motivation because they provide real context, present visual information, and provide relevant discussion materials. This implication supports the use of map media as an alternative to enrich Geography learning.

Implementasi Model Problem Based Learning

The implementation of Problem Based Learning (PBL) is an important part of learning Geography because spatial planning materials can be learned through problems found in urban life. PBL places problems as the starting point for learning activities, so that students are directed to find information, build explanations, and develop alternative solutions based on evidence.

In the context of this research, the Depok City RTRW Map can serve as a source of information to examine the problem of space utilization and economic activities. Students not only learn the definition of spatial planning, but are also directed to examine how spatial allocation relates to community activities. This approach allows the concept of Geography to be applied in more concrete situations. The first stage of PBL is students' orientation to problems. Teachers can begin learning by presenting problems, such as the development of residential areas, the need for commercial space, or possible conflicts between development

and environmental protection. The RTRW map is then used to show the spatial context of the problem. Students are encouraged to identify problems and ask relevant questions.

The second stage is to organize students to learn. The teacher forms small groups and explains the objectives, the investigation procedures, and the results that need to be prepared. Each group can get different analytical questions, for example about the relationship between transportation networks and economic centers or the importance of maintaining protected areas in the midst of urban development. The division of tasks helps students understand their responsibilities in the learning process.

The third stage is to guide individual and group investigations. In this stage, students observe the map, identify spatial symbols and patterns, and relate the information to the concepts that have been learned. Students can use supporting materials to clarify the context of the problem, as long as the sources used are relevant and accountable. The teacher acts as a facilitator who directs the analysis process, rather than directly providing all the answers. In investigation, the teacher needs to encourage students to distinguish between the information that is actually displayed on the map and conclusions that require additional data. For example, an RTRW map may show the allocation of space, but it does not in itself prove the level of income of the community, the amount of investment, or the actual condition of each piece of land. This distinction is important to build data literacy and prevent students from drawing conclusions that are not supported by evidence.

The fourth stage is to develop and present the results. Each group prepares an explanation based on the results of the analysis, for example in the form of a short report, presentation, or annotation on a map. The results of the work need to show the problem studied, the information used, the reasons supporting the conclusion, and the alternative solutions proposed. Through the presentation, students can practice communicating geographical reasoning in a sequential manner.

The fifth stage is to analyze and evaluate the problem-solving process. The teacher and the students assess whether the arguments presented are supported by adequate information, whether the solution considers the function of space, and whether there are consequences for the environment and economic activities. The evaluation is not only directed at the accuracy of the answers, but also at the quality of the thought process, cooperation, and the ability to use evidence.

In its application, RTRW and PBL Map media have complementary functions. PBL provides a problem-centered learning activity structure, while maps provide spatial representations that can be analyzed to understand the problem. Thus, the use of maps becomes more meaningful when students actually use it as research material, rather than just looking at the pictures displayed by the teacher.

The integration of geography and the economic context of the region can also be strengthened through these activities. Students can discuss why trade locations need accessibility, how economic centers relate to settlements, or why the use of protected areas needs to be considered in development planning. This kind of discussion helps students understand the relationship between space, human activities, and the sustainability of the region.

In terms of motivation, PBL has the potential to increase engagement through discussion and investigation activities. Students have the opportunity to express their opinions, exchange information, and formulate solutions. However, its effectiveness depends on the quality of the problem, the division of tasks, the teacher's support, and the availability of time. Problems that are too broad or the instructions are not clear can make the discussion undirected. Therefore, teachers need to provide clear guiding questions and assessment rubrics.

It is important to note that this study compared classes that used map media with classes that used PowerPoint. If PBL was applied to both groups, the difference in learning outcomes was more appropriately associated with the difference in learning media in the context of the application of the model. This study did not separately examine the influence of PBL compared to other learning models. Thus, the implementation of PBL in this article is discussed as a framework for learning implementation, not as an experimental variable whose effects have been proven. In practice, map-based learning and problems can be applied to other Geography materials, such as disaster mitigation, land use, transportation, population, and environmental management. Teachers can choose local problems that are appropriate to learning objectives, use maps as a source of information, and guide students to draw conclusions based on evidence. This approach provides opportunities for Geography learners to develop conceptual understanding as well as spatial thinking skills.

Research Implications

The results of the study provide several implications for the development of Geography learning. First, the selection of media needs to consider the characteristics of the material. Materials that have a strong spatial dimension, such as RTRW, will be easier to explore if students have the opportunity to observe and interpret spatial information directly.

Second, the use of maps needs to be integrated with learning activities that demand active thinking. Teachers can design analytical questions, group activities, and interpretation assignments so that students do not stop at symbol recognition. These activities allow maps to serve as a learning resource that helps students build knowledge.

Third, the development of contextual learning needs to pay attention to the accuracy of the source. The RTRW map is a planning document, so teachers need to explain that the direction of space allocation is not always identical to the actual conditions of land use. If learning discusses land use changes or economic impacts, additional information needs to be used to keep students' conclusions accurate.

Fourth, learning evaluation should cover more than one aspect. Cognitive tests can measure mastery of concepts, while motivational questionnaires can provide an overview of students' learning experiences. When these two aspects are measured with appropriate instruments and analyzed consistently, teachers gain a stronger basis to improve the learning design.This study has limitations. The sample included only 48 students from one school, so generalizations to other schools need to be done carefully. The quasi-experimental design also did not eliminate all possible influences of outside factors. In addition, the available evidence for learning motivation is descriptive, so claims of statistical significance in this aspect require further examination. Further research may involve more diverse schools, report effect sizes, and conduct complete motivation testing to strengthen the evidence regarding the benefits of RTRW Map media.

CONCLUSION

Based on the study's findings, the use of the Depok City Regional Spatial Plan (Rencana Tata Ruang Wilayah, RTRW) map as an instructional medium in geography education was associated with higher learning outcomes than the use of PowerPoint presentations for teaching spatial planning and regional economic activities to Grade XII students at SMAI PB Soedirman Cijantung, East Jakarta. The mean learning outcome score in the experimental group increased from 65 to 84.6, whereas the control group's mean score increased from 64.8 to 69.5. An independent-samples t-test revealed a statistically significant difference in mean posttest scores between the groups ($p < 0.001$). These findings support the use of map-based instructional media as an alternative teaching resource to help students understand spatial patterns and the relationships between spatial allocation and regional economic activities.

Regarding learning motivation, the experimental group's mean score increased from 64.08 to 81.08. The final reported percentage of 81.08% was classified as good according to the assessment criteria established in the thesis. These descriptive findings suggest that the Depok City RTRW map may support students' interest, attention, and engagement in geography learning. However, determining whether the observed changes in learning motivation were statistically significant requires additional inferential statistical testing. The integration of problem-based learning (PBL) may further enhance the instructional use of maps through problem identification, investigation, discussion, presentation of findings, and evaluation. Maps provide spatial information, while PBL offers a structured approach that enables students to apply this information when examining spatial planning issues. In this study, PBL served as an instructional approach rather than an independent variable whose effects were separately examined.

Overall, the Depok City RTRW map demonstrated potential as a contextual instructional resource for supporting students' understanding of spatial planning concepts and the development of spatial analysis skills. Geography teachers are encouraged to integrate map-based instructional media with problem-solving activities, relevant data sources, and appropriate assessment methods. Future research should involve larger samples, verify the normalized gain (N-Gain) calculations, and conduct inferential statistical analyses of learning motivation to provide stronger evidence regarding the effectiveness of map-based instructional media.

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The author states that this research was conducted without any commercial or financial relationship that can be interpreted as a potential conflict of interest.

AUTHOR CONTRIBUTION

The author fully contributes to the formulation of the main idea, the collection of library data, the analysis and interpretation of the primary text of the character, and the preparation of the manuscript. All authors have agreed on the final version of the manuscript

GENERATIVE ARTIFICIAL INTELLIGENCE USAGE STATEMENT

The author states that generative artificial intelligence (AI) was used in the preparation of this manuscript. The author acknowledges the use of generative AI to help improve language clarity and improve the grammatical structure of the manuscript. The use is done in compliance with the applicable ethical guidelines regarding the use and disclosure of generative AI in scientific research. Each author has made substantial intellectual contributions to this work. The entire manuscript content has been carefully reviewed to ensure its accuracy, and the author is solely responsible for the integrity and final content of the manuscript.

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