



A Study of Literature Review of the Use of Problem Based Learning Model for Higher Order Thinking Skills in Geography Material

Studi Tinjauan Pustaka tentang Penggunaan Model Pembelajaran Berbasis Masalah untuk Keterampilan Berpikir Tingkat Tinggi dalam Materi Geografi

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ABSTRACT

Geography learning examines the reciprocal interactions between humans and space which form the basis for understanding a phenomenon that requires high-level thinking skills with PBL (Problem Based Learning). However, the development and application of these models are still dominated by physical and environmental geography materials, while social geography materials receive relatively less attention. Therefore, this study aims to synthesize the latest literature (2020–2025) to compare the determinants of the proportion of PBL-based research on physical/environmental geography and social geography materials, analyze the factors that influence this development gap, and formulate strategies for using higher-order thinking learning models in the application of social geography materials. The study uses a meta-synthesis approach to summarize qualitative and quantitative findings from various research results. The results show that 76% of PBL applications use physical/environmental geography material. One of the main strategies is the design of authentic problems based on spatial social phenomena, such as urbanization, regional inequality, spatial utilization conflicts, and socio-cultural changes. These issues can encourage students to conduct cause-and-effect analysis, policy evaluation, and data-based decision making, as well as spatial data integration and local case studies, for example through the use of thematic maps, population data, current news, and field observation results. This approach allows students to relate social concepts to spatial realities, thereby improving their critical and reflective thinking skills. The results of this study are expected to contribute to strengthening the balance of holistic and integrative geography learning development in both physical/environmental geography and social geography materials.

ABSTRAK

Pembelajaran geografi mengkaji interaksi timbal balik antara manusia dan ruang yang menjadi dasar dalam memahami suatu fenomena menuntut kemampuan berpikir tingkat tinggi dengan PBL (Problem Based Learning). Namun, pengembangan dan penerapan model-model tersebut masih didominasi pada materi geografi fisik dan lingkungan, sementara materi geografi sosial relatif kurang mendapatkan perhatian. Oleh karena itu, kajian ini bertujuan untuk mensintesis literatur terkini (2020–2025) guna membandingkan determinan besaran porsi penelitian berbasis PBL pada materi geografi fisik/lingkungan dan geografi sosial, menganalisis faktor-faktor yang memengaruhi kesenjangan pengembangan tersebut; dan merumuskan strategi penggunaan model pembelajaran berpikir tingkat tinggi dalam penerapan materi geografi sosial. Kajian menggunakan pendekatan meta-sintesis untuk merangkum temuan kualitatif dan kuantitatif dari berbagai hasil riset. Hasil penelitian menunjukkan sebesar 76% penerapan PBL menggunakan materi geografi fisik/ lingkungan. Salah satu strategi utama adalah perancangan masalah autentik berbasis fenomena sosial spasial, seperti urbanisasi, ketimpangan wilayah, konflik pemanfaatan ruang, dan perubahan sosial budaya. Masalah-masalah tersebut dapat mendorong peserta didik melakukan analisis sebab-akibat, evaluasi kebijakan, serta pengambilan keputusan berbasis data, serta integrasi data spasial dan studi kasus lokal, misalnya melalui dasar penggunaan peta tematik, data kependudukan, berita aktual, dan hasil observasi lapangan. Pendekatan ini memungkinkan peserta didik mengaitkan konsep sosial dengan realitas ruang, sehingga meningkatkan kemampuan berpikir kritis dan reflektif. Hasil penelitian ini diharapkan dapat memberikan kontribusi dalam memperkuat keseimbangan pengembangan pembelajaran geografi yang holistik dan integrative baik dalam materi geografi fisik/lingkungan dan geografi sosial.

INTRODUCTION

The objects of study in geography are very broad, comprising five objects, namely the anthroposphere, atmosphere, hydrosphere, lithosphere, and biosphere. Geography education does not solely focus on the physical study of the earth and the natural environment, such as landforms, climate, or geospheric processes. Geography also studies the reciprocal interaction between humans and space, making human activities an important part of its study (Aksa, 2019; Sejati et al., 2022). In this context, geography plays a role in understanding how humans utilize, manage,

and influence space and natural resources, as well as how the physical conditions of a region shape the patterns of life and social activities of its people (Fan, 2022).

Geography covers human geography, which includes social geography as one of its main fields of study. Social geography encompasses population geography, economic geography, political geography, rural and urban geography, agricultural geography, and cultural geography (Fan, 2022; Long, 2022). Through holistic geography learning, students not only understand physical spatial aspects, but are also able to analyze social issues, regional inequalities, and sustainable

development from an integrated spatial perspective (Buttimer, 2023).

In social geography learning, examples of materials studied include population geography, which examines the relationship between population dynamics, human resource quality, and environmental carrying capacity in a region (Weckroth & Ala-Mantila, 2022). In addition, economic geography studies human economic activities related to space and territory (Boschma, 2022). Political geography examines how the geographical conditions of a region, such as its strategic location, size, and natural resources, influence political policy, defense, and relations between regions and countries (Peet & Thrift, 2023). Rural-urban geography examines the relationship and interdependence between rural and urban areas, such as migration flows, urbanization, population mobility, distribution of goods and services, and the dependence of rural areas on cities and vice versa (Muryanti, 2022; Kautsar et al., 2025).

Other areas of social geography include agricultural geography and cultural geography. The main focus of study includes the distribution of agricultural land, types of agriculture, and patterns of land use for agricultural activities in various regions (Hadi, & Christanto, 2023). Cultural geography studies the relationship between human culture and geographical space. Its main areas of study include the distribution of cultural elements on the earth's surface, such as language, customs, belief systems, livelihoods, traditional architecture, and community life patterns in various regions (Syarif, 2023; Hasriyanti, 2025).

Materials related to phenomena in the scope of social geography also require a high level of understanding from students. The development of geography learning models aimed at facilitating students' higher-order thinking skills has progressed rapidly in this century (Hmelo & Eberbach, 2011). All the advantages of this geography learning model

have addressed the problems in teaching geography materials. Various geography learning models that we are familiar with, such as Problem Based Learning (PBL), Project Based Learning (PjBL), Inquiry Learning, Discovery Learning, and Case Based Learning (CBL), have been widely used to determine their effectiveness (Sumarmi, 2020).

However, the development of this learning model has not been widely implemented in the scope of social geography. This implies that there is a worrying imbalance with the division of focus on actual geography material. Geography, as a form of human adaptation to the environment in accordance with regional conditions, will be marginalized if equal weight is not given to developing geography material using higher-order thinking learning models, both in terms of physical/environmental material and social material (Aksa, 2019).

The main objectives of this study are, first, to identify the extent of research on the development of higher-order thinking learning models that focus on PBL (Problem-Based Learning) in the application of physical/environmental material with social material in geography. Second, what influences the gap between the two. Third, strategies for using higher-order thinking learning models in the application of social material in geography.

METHODS

Study Design

This study uses a Qualitative Meta-Synthesis approach supported by Comparative Quantitative Analysis (Meta-Review). This approach was chosen to synthesize findings from various empirical studies that have been selected and narrowed down based on several criteria (Pramono & Wulandari, 2024). Meta-synthesis allows for the summarization of descriptive and qualitative research findings (e.g., the use of PBL in geography learning materials) (Pramono & Wulandari, 2024; Rahmat & Sudarsono, 2021), as well as comparing quantitative data such as the

prevalence and determinants of stigma in various study populations (Adiansyah, Ramani, & Baroya, 2023; Rahmi & Sari, 2023).

Literature Search Strategy and Selection Criteria

A systematic search was conducted on leading academic databases, including Scopus, SINTA (Science and Technology Index), Copernicus, and Web of Science. The search strategy focused on articles published in the last 5 years (2020–2025) and focused on the Indonesian context (Sudastri, Wulandari, & Januraga, 2025).

Strict Inclusion Criteria Applied:

1. Publications must be made between 2020 and 2025.
2. The main topic must focus on the PBL (Problem Based Learning) higher-order thinking learning model with geography material.
3. The research population must focus on the application of learning at the high school level.

The results of this study are presented in a table intended to provide a clear picture of the PBL (Problem Based Learning) higher-order thinking learning model in relation to materials in geography learning.

4. Studies must be indexed in Scopus, SINTA, or Copernicus.

Data were extracted from selected articles based on study population, research design, and the use of PBL (Problem Based Learning) learning models with identified geography materials (e.g., population geography, economic geography, political geography, urban and rural geography, agricultural geography, and cultural geography), and physical/environmental materials (environmental pollution, hydrology, atmosphere, etc.) reported. The findings were then grouped based on the focus of social and physical/environmental materials to facilitate in-depth comparative analysis

RESULTS

No	Use of Materials	Combination	Measured Variables	Analysis Findings	Source (Author, Year)
1	Natural Resources in Indonesia	STEM	HOTS	STEM-based PBL has been proven to increase students' HOTS.	Aprilia et, al. (2025)
2	Natural Disaster Mitigation	-	Critical Thinking Skills	PBL has a significant impact on critical thinking skills.	Irma et, at. (2025)
3	Natural Resources in Indonesia	Kahoot	Learning Outcomes	Kahoot-based PBL has been shown to improve student learning outcomes.	Wardana & Sri (2023)
4	Environmental pollution	Local wisdom	Student understanding	Local wisdom-based PBL has been proven to improve students' understanding.	(Awaluddin, 2025)
5	Climate Change	-	Learning Outcomes (Cognitive)	PBL has a significant impact on student learning outcomes.	Anisa et, al. (2025)
6	Environmental pollution	E-Modul	HOTS	E-Module based PBL is proven to increase students' HOTS	(Wijayanto, 2023)
7	Natural Disaster Mitigation	Micrplearning	Critical Thinking Skills	PBL has a significant influence on Critical Thinking Skills	(Adilah & Rosyida, 2024)

8	Atmosphere	-	Spasial Thingking	PBL has a significant influence on spatial thinking	(Mike & Nofrion, 2023)
9	Atmosphere	-	Spasial Thingking	PBL has a significant effect on spatial thinking.	(Ningrum & Perkasa, 2024)
10	-	-	Keaktifan Belajar	PBL has an effect on increasing learning activity.	(Ekstrada et al., 2023)
11	Biodiversity	-	Critical Thinking Skills	PBL has a significant influence on Critical Thinking Skills	Nurfadilah et, at (2023)
12	Population	-	Learning Outcomes	PBL has been proven to improve student learning outcomes.	(Nur, 2020)
13	Maritime Axis	-	Critical Thinking Skills	PBL has a significant influence on Critical Thinking Skills	(Herzon & Utomo, 2020)
14	Atmosphere	-	Analytical Thinking Skills	PBL has a significant influence on analytical thinking skills	(Rahim & Pambudi, 2025)
15	Space and Environment	Outdoor Study	Learning Outcomes	Outdoor Study-based PBL has been proven to improve student learning outcomes.	(Kusuma et al., 2025)
16	Hydrologic Cycle	-	Critical Thinking Skills	PBL has a significant impact on critical thinking skills.	(Makbul Muavi et al., 2024)
17	-	-	4C (Critical, Creativity, Communication, Collaboration)	PBL has a significant influence on 4C (Critical, Creativity, Communication, Collaboration)	(Tanamir & Rianto, 2024)
18	Region	Kahoot	Learning Outcomes	Kahoot-based PBL has been shown to improve student learning outcomes.	(Manek & Asa, 2025)
19	Inter-Regional and Inter-Country Trade	-	Literasi Geografi	Kahoot-based PBL has been shown to improve students' geographic literacy.	(Khotimah et al., 2022)
20	Hydrologic Cycle	Prezi Presentation	Learning Outcomes	Prezi Presentation-based PBL has been shown to improve student learning outcomes.	(Wibawati & Prastono, 2024)
21	-	-	Literasi Geografi	PBL has been shown to improve students' geographic literacy.	Nurdessyanah et, al. (2025)
22	Population	Webgis	Spasial Thingking	WebGIS-based PBL has a significant influence on spatial thinking	Laksmiarini et, al. (2025)
23	Geographic Information Systems	-	Spasial Thingking	PBL has a significant influence on spatial thinking	Bana et, al. (2025)
24	Environmental pollution	-	Learning Outcomes	PBL has been proven to improve student learning outcomes.	Rosa (2020)
25	Atmosphere	-	Analytical Thinking Skills	PBL has a significant influence on analytical thinking skills	Nisa & Aida (2024)
26	Environmental pollution	-	Creative Thinking Skills	PBL has a significant influence on Creative Thinking Skills	Novia (2020)

From the table, it can be seen that there are 26 articles on the development of Higher Order Thinking Skills (HOTS) learning models based on Problem Based Learning (PBL) in geography teaching. These articles are considered highly credible for review because they are indexed in reputable national and international journals. Of the twenty-six articles, only three specifically discuss the use of PBL (Problem Based Learning) in relation to social material in geography, namely two articles on population and trade between regions/countries (economic geography).

In comparison, the use of physical/environmental material is far less common, with only twenty articles or more than 76%. Three applications of PBL (Problem Based Learning) were found without linking to geography material. The physical/environmental material most often linked to PBL (Problem Based Learning) was environmental pollution with a percentage of 25%, atmospheric dynamics 25%, hydrological cycle 10%, natural resources 10%, disaster mitigation 10%, GIS (Geographic Information System) 5%, regional studies 5%, maritime 5%, and biodiversity 5%.

Discussion:

A. Research Portion on the Development of a PBL-Based Higher-Order Thinking Learning Model for Physics/Environment and Social Geography Materials

Research on the development of Higher Order Thinking Skills (HOTS) learning models based on Problem Based Learning (PBL) in geography education shows a tendency to be more dominant in physical or environmental subjects than in social subjects. Physical geography subjects, such as lithosphere dynamics, hydrosphere, atmosphere, and environmental issues, are more often associated with the application of PBL (Problem Based Learning). This raises an

interesting discussion as to whether the use of such material is based more on the difficulty students have in understanding these materials or whether it is considered easier to contextualize them in the form of real problems that are empirical, measurable, and based on natural phenomena. This makes PBL relatively more frequently used to train students' analytical, evaluative, and problem-solving skills (Sumarmi, 2020).

Conversely, research on the development of HOTS-oriented PBL (Problem Based Learning) in social geography subjects, such as population, economics, culture, and other social interactions, still shows a more limited portion. In fact, social subjects also have great potential to develop critical and reflective thinking skills through the study of social issues, conflicts of interest, and the spatial dynamics of society. This imbalance in research indicates a pedagogical tendency to place geography more as a natural science than as an applied social science. However, if we return to the philosophy of geography, we cannot separate the physical study of a region from its influence on the social activities of its people, or vice versa (Aksa, 2019; Sejati et al., 2022).

B. Factors Affecting the Gap in PBL Implementation in Physical/Environmental and Social Materials in Geography

The gap in the application of HOTS-based PBL (Problem Based Learning) learning models between physical and social materials in geography is influenced by several main factors. First, teachers' perceptions still view social materials as conceptual and descriptive, so they are considered less suitable for systematic problem-solving approaches such as PBL (Problem Based Learning). This perception results in a low level of exploration of social issues as real-world problems in learning. In fact, the dynamics of social phenomena are faster and more complex due to technological acceleration, globalization,

changes in economic structures, and changes in human needs (Ulum, 2025).

Second, the availability of learning tools and assessment instruments. PBL tools and HOTS instruments for physical subjects are relatively more widely available and easier to develop because they are based on quantitative data and observable phenomena. In contrast, social subjects require more complex, contextual, and often qualitative instruments, which demand higher pedagogical competence. This is something that has not yet been achieved by secondary school students. Third, the curriculum and assessment factors that tend to emphasize factual cognitive achievements in social studies materials also widen the gap in the application of higher-order thinking learning models such as the application of PBL (Problem Based Learning).

C. Criticism of Inequality in the Analysis of Contemporary Geography Learning Materials

We present several important studies in the field of social geography, including: Economic geography, which mainly studies the distribution of natural resources, the location and patterns of production, distribution, and consumption of goods and services in various regions, and helps to understand how economic activities shape spatial patterns and how differences in regional characteristics affect the economic development of an area. Economic geography is very important in helping the economic development of a region that is inseparable from the surrounding areas (Dombroski, 2026).

In addition, political geography examines political dynamics in space, such as geopolitics, territorial conflicts and disputes, territorial integration and disintegration, and the influence of globalization on state sovereignty. This field also discusses election patterns, the distribution of political power, and the relationship between states, societies, and

territories. Thus, political geography helps to understand political phenomena from a spatial and territorial perspective. We know that today's global geopolitical turmoil can affect aspects of international society, such as the uncertainty of oil and gold prices and the fluctuating value of the dollar (Conlon et al., 2026).

Rural-urban geography examines the relationship and interdependence between rural and urban areas, such as migration flows, urbanization, population mobility, distribution of goods and services, and the dependence of rural areas on cities and vice versa (Muryanti, 2022; Kautsar et al., 2025). Other topics studied include urban and rural issues, known as rural-urban geography, which focuses on various issues such as poverty, slums, unemployment, land use change, and sustainable rural and urban planning and development. In strengthening the food security of an urban area, an in-depth study of rural-urban geography is essential as it is a reciprocal relationship that cannot be separated (Umar & Syarif, 2020).

Agricultural geography, which studies the distribution of agricultural land, types of agriculture, and patterns of land use for agricultural activities in various regions. This field also analyzes the influence of physical factors such as climate, soil, topography, and water availability on crop types, cropping systems, and agricultural productivity levels in various regions (Hadi, & Christanto, 2023). In addition, agricultural geography examines the social and economic aspects of agriculture, such as land ownership systems, agricultural labor, agricultural technology and modernization, and the relationship between agriculture and the market and surrounding areas. Other topics studied include food security, changes in agricultural land use, the impact of development and urbanization on agriculture, and efforts to develop sustainable agriculture based on regional potential. Strengthening food security in a region or country requires in-depth study of agricultural

geography to map and project food security (Maulana et al., 2024).

Cultural geography helps us understand how the environment and geographical conditions influence the formation of a community's cultural character. In addition, cultural geography examines cultural interactions and dynamics in space, including history, cultural diffusion (the spread of culture), acculturation, assimilation, and cultural changes resulting from migration, globalization, and technological developments (Syarif, 2023). This field also discusses regional cultural identity, preservation of local culture, cultural conflicts, and the role of culture in the development of a region by relying on tourism. Thus, cultural geography provides an understanding of human cultural diversity from a spatial perspective (Sya et al., 2023).

D. Strategy for Implementing a PBL-Based Higher-Order Thinking Learning Model in Social Geography Materials

To optimize the application of PBL-based higher-order thinking learning models to social geography, a systematic and contextual strategy is required. One key strategy is designing authentic problems based on socio-spatial phenomena, such as urbanization, regional inequality, conflicts over space use, and socio-cultural change. These problems can encourage students to conduct cause-and-effect analysis, policy evaluation, and data-driven decision-making.

The next strategy is the integration of spatial data and local case studies, for example through the use of thematic maps, population data, current news, and field observations. This approach enables students to connect social concepts with spatial realities, thereby enhancing critical and reflective thinking skills. Furthermore, strengthening teacher competency in designing PBL syntax and HOTS assessment instruments is key to successful implementation. With this strategy, social

geography material is not merely descriptive but can be measured and modeled, and also serves as an effective means to develop students' higher-order thinking skills.

CONCLUSION

To optimize the application of PBL-based higher-order thinking learning models in social geography materials, a systematic and contextual strategy is needed. One of the main strategies is the design of authentic problems based on spatial social phenomena, such as urbanization, regional inequality, conflicts over land use, and socio-cultural changes. These problems can encourage students to conduct cause-and-effect analysis, policy evaluation, and data-based decision making.

The next strategy is the integration of spatial data and local case studies, for example, through the use of thematic maps, population data, current news, and field observation results. This approach allows students to relate social concepts to spatial realities, thereby enhancing their critical and reflective thinking skills. In addition, strengthening teachers' competence in designing PBL syntax and HOTS assessment instruments is key to successful implementation. With these strategies, social geography material is not only descriptive, but can also be measured, patterned, and become an effective means of developing students' higher-order thinking skills.

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