

EVALUATING THE PERFORMANCE OF PRIMARY GEOGRAPHY TEACHERS IN UTILIZING FORMATIVE ASSESSMENT AS A FUNDAMENTAL PILLAR TO ENHANCE DEEP LEARNING OF GEOGRAPHICAL CONCEPTS

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Abstract: Formative assessment plays a crucial role in enhancing students' understanding of complex subjects such as geography. This study aimed to explore the effectiveness of formative assessment practices employed by primary geography teachers in Saudi Arabia to promote students' comprehension of geographic concepts. Seventy teachers from the Eastern and Western regions participated. Data were collected through a structured classroom observation checklist designed to examine formative assessment strategies during geography lessons. Results indicated that teachers, in general, applied formative assessment techniques to foster critical thinking and analytical skills. Common strategies included open-ended questioning, constructive feedback, and peer assessment, which supported students' understanding and encouraged higher-order thinking. Teachers also promoted active student engagement by connecting lesson content to real-world contexts. However, challenges remained in fully integrating inquiry-based learning, problem-solving, and student-led demonstrations. Findings align with contemporary educational theories such as constructivism and social cognitive theory reveal a gap between theoretical knowledge and practical skill development. To address this, the study recommends expanding professional development programs to equip teachers with diverse formative assessment tools and instructional methods. Additionally, curricula should be revised to incorporate experiential learning opportunities, including fieldwork and modern technologies like Geographic Information Systems (GIS). Enhancing school infrastructure and supportive policies is essential to sustain student engagement and improve the quality of geographic education.

Keywords: Geography learning, formative assessment, geographical concepts, geography teachers

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INTRODUCTION

A student's academic and cognitive development is aided by primary education, which establishes the groundwork for subsequent education. During this stage, children start to acquire fundamental reasoning abilities, critical thinking patterns, and the capacity to methodically process information. Accordingly, education should focus on assisting those children in creating meaningful concepts rather than rote memorization (Montero-Mesa et al., 2023; Muammar et al., 2023).

In geography education, the importance of theory and practice must be balanced; students should not only learn to identify various places, name maps, memorize geographical features, and study the 'people and places', but should analyze natural and human phenomena (Tate & Hopkins, 2020; UNESCO, 2021; Wilmot et al., 2025). Geographical learning hinges on the ability to think spatially, as this allows learners to identify the relationships between the various elements of geography, understand and distribute those elements spatially, and predict the impact of different forces on human life in a given space (Park, 2021; Robinson et al., 2015). Active learning activities and strategies such as direct activities, map work, simple research activities, and field observations help students learn and understand complex geography concepts, build and defend their understandings, and learn to analyze and think critically (Al-Hassan et al., 2012). To implement such activities and strategies, the teacher-centered lecturing and presentation conventional approach, and the passive role of the students must be changed. The focus must be on participatory, inquiry-centered instruction. Formative assessments support this instructional model. While summative assessments evaluate results and periods of learning and include formal assessments of learning activities, formative assessments continuously internalize learning and include informal assessments of learning activities (Al-Hassan et al., 2012). Timely and high-quality formative feedback guides teachers to make instructional changes, increases student participation and improvement, develops students' academic competencies, and fosters sustained improvement (Lambert et al., 2015; Schulman & Demantowsky, 2024; Smit et al., 2023).

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When implemented effectively, formative assessment provides teachers with valuable insights into students' cognitive and practical abilities (Rodríguez-Aboytes et al., 2020). Through the use of tools such as classroom discussions, performance-based tasks, quizzes, and direct observations, educators can gain a comprehensive understanding of learning progress and adjust their teaching strategies accordingly (Tate & Hopkins, 2020).

Despite the documented benefits of formative assessment in primary geography education, its implementation remains inconsistent - particularly in systems where instructional and assessment frameworks have not been fully aligned with contemporary educational standards. This challenge is evident in various Arab countries, where a gap often exists between the policy-level endorsement of formative practices and their actual integration into classroom instruction (AlAli & Al-Barakat, 2024). Contributing factors include overloaded curricula, limited instructional time, reliance on high-stakes testing, and restricted access to interactive learning resources (Puttick, 2022; Spurná et al., 2024; Standish, 2021).

Existing research has demonstrated that formative assessment, when embedded within environments that promote collaboration, critical reflection, and evidence-based decision-making, results in measurable improvements in student achievement and engagement (Hammond & Healy, 2022; Schildkamp et al., 2020). While some policy initiatives in the Arab region - including the Gulf states - have emphasized the importance of formative assessment, many have fallen short in terms of practical implementation. A significant barrier lies in the limited availability of structured, ongoing professional development - both pre-service and in-service - that focuses specifically on formative assessment strategies. In the Saudi educational context, recent national reforms have increasingly highlighted the role of formative assessment within broader instructional modernization efforts. Nevertheless, implementation at the classroom level often remains fragmented and lacks a unified framework to guide practice. Empirical studies in Saudi Arabia point to a clear disconnect between policy objectives and actual teaching methods. This misalignment highlights an urgent need for sustained, targeted professional development to build teachers' capacity in planning and applying formative assessment practices that are both pedagogically sound and contextually relevant (AlAli & Al-Barakat, 2024; Scallon, 2015).

Based on this background, the present study explores the extent to which formative assessment practices are being employed in primary geography classrooms in Saudi Arabia. It aims to understand how effectively teachers utilize formative strategies to support deeper comprehension of geographic concepts. The study is guided by the following central research question: To what extent do primary geography teachers effectively employ formative assessment as a foundational strategy to enhance students' conceptual understanding of geography?

LITERATURE REVIEW

Formative assessment in primary geography classrooms plays a significant role in supporting student learning and fostering a deeper understanding of geographical concepts (Bijsterbosch et al., 2016; Dann, 2014). It extends beyond evaluating academic performance to function as an instructional strategy that promotes geographical thinking and enables students to build meaningful, connected knowledge structures (Alazemi, 2024; Dannemann, 2022; Foster, 2024; García de la Vega, 2022). Foundational practices of formative assessment - such as structured classroom observation, open and guided questioning, and timely, targeted feedback - have demonstrated effectiveness in monitoring students' development in essential geographic competencies. These include spatial orientation, location awareness, map-reading skills, recognition of environmental patterns, and interpretation of human-environment relationships (Alordiah, 2025; Black & Wiliam, 2009).

From a pedagogical perspective, teachers use observation of learners' engagement in geographical activities as a means of evaluating their participation and learning behaviors. Such observations provide valuable, even though limited, qualitative and quantitative information about learners' understanding (Al-Hassan et al., 2012). Additionally, employing open and guided questions promote inquiry-based learning and enable students to express their understanding of a geographical concept and its application, for example, evaluating the distribution of a population and the geographical features of a region and how that affects settlement (Chan et al., 2023; Cisse et al., 2021; Donaghue & Heron, 2024). In this context, the significance of this momentary feedback in guiding learners' thinking and understanding toward a more accurate and refined understanding of a concept cannot be overstated (Allal, 2018, 2019; Bendl et al., 2023). Formative assessment goes beyond tracking the achieving goals to diagnosis. For example, learning difficulties specific to map scales, symbols, and spatial reasoning have been documented (Alotaibi et al., 2025; Parmigiani et al., 2025; Ramdhani et al., 2024; UNESCO, 2021; Wilmot et al., 2025). This directs towards using specific digital tools that address deficits, such as interactive maps, 3D models, and educational games (Al-Halalat et al., 2024; Fletcher, 2018). Adaptive instructional techniques, including collaborative group work and visual representations assist teachers in addressing and adjusting lesson delivery when overall student confusion or wider gaps in understanding a concept are evident (AlAli & Al-Barakat, 2024; Panadero et al., 2019).

Formative assessment is vital in promoting higher-order thinking skills since it helps students in developing spatial analysis skills, environmental reasoning, formulating and posing questions, and analyzing patterns of human-environment systems (Lebona & Ayanwale, 2024; Mahat et al., 2024). Recent studies stress the need to use both formative and interactive assessment strategies alongside real-time adaptive teaching and active monitoring. This paradigm positively impacts learning and boosts students' motivation, engagement, and academic self-efficacy (Schildkamp et al., 2020).

Besides, formative assessment helps students develop a sense of responsibility as well as self-regulated learning. Concept maps, reflective learning journals, and progress-tracking charts assist students in assuming greater responsibility over their learning and facilitate even greater mastery of geography skills (Al-Barakat & Al-Hassan, 2009; Naylor & Veron, 2021). When implemented properly, formative assessment leads to a positive change of the classroom to an active, cooperative, and purposeful learning space (Hammond, 2022; Ismail et al., 2022; Parmigiani & Ingersoll, 2024; Van der Linden et al., 2023). Three essential questions determine the success of formative assessment: What are the learning goals? Where do students

currently stand? And how can they be supported to achieve those goals? (AlAli & Al-Barakat, 2025; Narciss et al., 2020). Formative assessment extends beyond enhancing academic understanding; it also plays a significant role in increasing students' intrinsic motivation, particularly when engaging with complex topics such as climate change, topography, population dynamics, and environmental sustainability. Timely, constructive feedback fosters learner confidence, encourages active participation, and promotes autonomy. Moreover, the iterative and low-stakes nature of formative assessment contributes to a psychologically safe learning environment, reducing performance anxiety and supporting experiential learning through activities such as geographic modeling and simulation (Bani Irshid, 2023; Fraihat et al., 2022; Kohnke et al., 2022; Krause et al., 2021; Schreiber & Nöthen, 2023). Recent studies further illustrate the current state and implementation of formative assessment, especially in early education settings. Alordiah (2025) conducted a systematic review of formative assessment practices in African educational contexts, revealing that such assessment significantly improves academic achievement, critical thinking, and problem-solving. However, challenges such as insufficient teacher preparation, limited resources, and a gap between educational policies and practical application were also identified.

Foster's (2024) meta-analytical review similarly demonstrated the positive impact of formative assessment on student learning outcomes, particularly when effective feedback and active student engagement are emphasized. Nevertheless, the efficacy of these practices varies according to teacher proficiency and the educational context. Ramdhani et al. (2024) highlight that formative assessment, with emphasis on the role of teacher's feedback, improves students' understanding, motivation, and engagement. Through integrating formative assessment in digital learning environments, Alazemi (2024) reported the enhancement of the learning experience through promoting academic enjoyment and self-regulation. Furthermore, Ismail et al. (2022) compared formative and summative assessment approaches and found that formative assessment more effectively fosters motivation, positive attitudes toward learning, reduces test anxiety, and supports self-regulation skills.

Despite their valuable contributions, these studies share certain methodological limitations. Most rely on literature reviews or descriptive analyses without incorporating extensive empirical or longitudinal research that captures the complexities of classroom dynamics over time. Additionally, some studies focus primarily on broad policy or theoretical frameworks, rather than the practical, day-to-day challenges teachers encounter. These gaps highlight the significance of the current study, which uniquely focuses on formative assessment practices in elementary geography classrooms through direct observation. This research aims to analyze the specific tools employed and their effectiveness, while addressing the necessity for continuous professional development and adequate resource provision to support sustainable formative assessment practices (Alordiah, 2025; Alazemi, 2024; Foster, 2024; Detyna & Kadiri, 2020; Ismail et al., 2022; Ramdhani et al., 2024).

Although formative assessment is a prevalent topic in educational research, much of the existing literature concentrates on general theories and broad strategies, often lacking focus on its practical application, especially within primary geography education in Saudi Arabia. As discussed, formative assessment fulfills a multifaceted role by deepening conceptual understanding, fostering active student participation, and promoting critical skills development. Its effectiveness depends on varied methods that enable educators to monitor progress and provide tailored, constructive feedback. Building on these theoretical and empirical foundations, the following section outlines the methodology adopted in this study, including data collection and analysis procedures, in alignment with established research standards.

METHODS AND PROCEDURES

1. Study Design

This study adopted a descriptive-analytical approach aimed at identifying the extent to which formative assessment strategies are employed in teaching geography at the primary stage. Data were collected using a structured and systematic observation tool designed to monitor classroom practices and analyze how formative assessment techniques are applied in real instructional settings. The observation instrument was developed based on educational literature and focused on capturing essential dimensions of formative assessment such as goal setting, student feedback, questioning strategies, and instructional adjustments based on assessment evidence.

2. Study Sample

The study sample consisted of 70 geography teachers from the Eastern and Western regions of the Kingdom of Saudi Arabia. The sample was selected purposefully to represent a diverse group of educators in terms of academic qualifications, teaching experience, and gender. These participants were observed during regular class sessions to gather authentic data on how they implement formative assessment strategies in their classrooms. The diversity within the sample helped provide a comprehensive description of the current practices across varied school contexts without the intention of comparing specific subgroups. As for the demographic characteristics of the sample participants in terms of their gender, academic qualifications, and teaching experience, they are visually presented in Figures 1 and 2, as well as in Table 1.



Figure 1. Distribution of study sample participants

Table 1. Demographic Characteristics of the Study Sample

Variables	Categories	Frequency	Percentage (%)
Gender	Male	40	57.1%
	Female	30	42.9%
Experiences	Less than 5 years	14	20.0%
	5 to 10 years	26	37.1%
	More than 10 years	30	42.9%
Academic Qualification	Bachelor's Degree	38	% 54.29
	Postgraduate Degree (MA/PhD)	32	% 45.71

This figure in this study were designed by the researchers based on the study data. According to Table 1, the sample included 40 male teachers, which constitutes 57.1% of the participants, and 30 female teachers, which constitutes 42.9% of the sample. This demonstrates that there is equal representation of both sexes with a moderate majority of males. Concerning teaching experience, the largest group was the participants with more than 10 years of experience at 42.9%, followed by those with 5 to 10 years at 37.1%, while less than 5 years of experience was represented by 20.0%.

This particular pattern indicates that most participants are experienced practitioners, which, alongside the observed practices, strengthens the credibility and generalizability of the study findings within the local context.

With regard to academic qualifications, the table shows that around 54.29% of the sample are bachelor's while 45.71% are postgraduates (master's or PhD). This variation reflects diversity in the academic backgrounds of the teachers, which may influence their awareness and implementation of formative assessment strategies effectively within the classroom environment. These data have been visually represented in Figure 2. Based on this description, the study sample is characterized by diversity in gender, professional experience, and academic qualification, which allows for a deeper understanding of how geography teachers employ formative assessment in various educational contexts.

This also paves the way for drawing practical recommendations that contribute to the development of geography instruction at the primary level and enhance the quality of students' learning of geographical concepts.

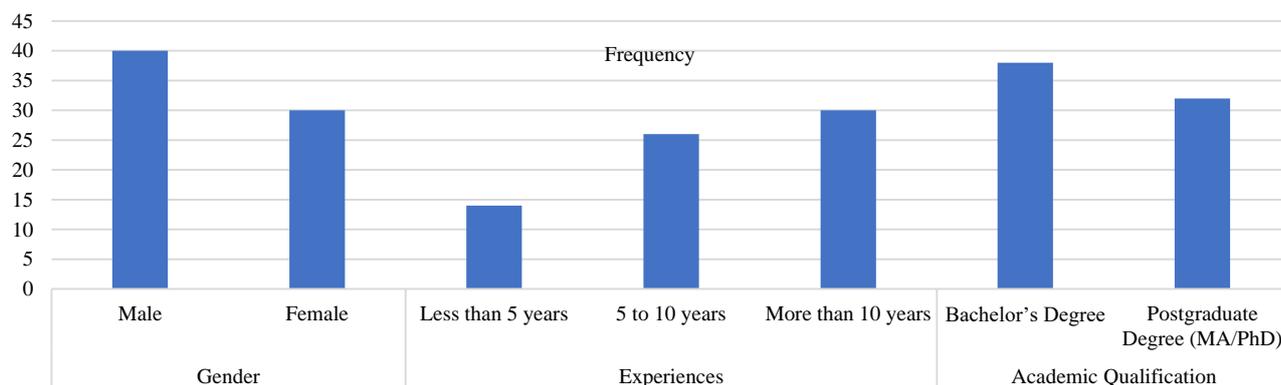


Figure 2. Distribution of study sample participants

3. Study Instrument

A structured classroom observation checklist was developed as the primary instrument to capture formative assessment practices employed by geography teachers. The checklist utilized a three-point Likert scale ("to a great extent," "to a moderate extent," "to a small extent") to measure both the frequency and quality of the observed practices. The initial version of the checklist included 47 items. In relation to the curriculum and educational assessment expert panels opinion validation, the instrument was further reduced to 43 items. These were then consolidated into the following five fundamental dimensions, as each of which aims to measure a formative assessment component that focuses on a specific element of geography instruction.

1. **Diversifying Teaching Methods and Geographic Activities.** This dimension consisted of nine items that focus on the evaluation of methods employed by the teacher and the extent to which the learners participate and are active during geographic activities. This aimed at evaluating the extent to which a teacher is responsive to the varying needs of learners and helps them interact meaningfully.

2. **Monitoring Students' Progress in Geographic Concepts.** This dimension consisted of nine items that focus on teacher's evaluation employed methods, such as questioning, observation, and ongoing in-class assessments of the learners' understanding.

3. **Developing Geographic Thinking Skills.** This dimension contained seven items which aimed at evaluating the instructional approaches used to facilitate the development of the higher order spatial, analytical, and critical thinking skills, thereby broadening the learners' conceptual understanding of the geography phenomena.

4. **Activating Effective Student Participation in Geography Lessons.** This dimension consisted of nine items that aimed to explore how teachers encourage active participation in lessons. This goes beyond listening to discussions, working in groups, and cooperative learning activities.

5. **Enhancing Practical Skills in Geography.** This dimension also consisted of nine items that encompassed teaching the practical skills of geography, including reading and interpreting maps, data, simulation, and observation skills in the real world. Prior to generalization, a pilot study was conducted to ascertain the relevance, clarity, contextual appropriateness, and overall suitability of the checklist, consequently, some refinements were incorporated. The trained observers subsequently conducted numerous, non-intrusive, classroom geography lesson visits across an array of schools and, using the completed checklist, documented lesson descriptions. This approach afforded the opportunity to produce considerable and profiled data that reflected the variety of formative assessment practices in use. The data also provided insight into the variations in practices used across different school environments and teaching methodologies.

4. Validity and reliability

Developed instrument used for assessing formative assessment practices in primary geography classrooms was reviewed for validation and reliability by 15 university scholars in geography education and digital technologies who

offered constructive feedback and triggered key changes, as wording of some items was made much clearer, grammatical mistakes were corrected, and four items, labelled unnecessary or inappropriate by over 30% of the reviewers, were dropped, these amendments lead to 43-items instrument. A pilot study that focused on the checklist was conducted. The internal consistency was verified using composite reliability (CR) and McDonald's omega statistical tests.

The values of omega varied from 0.84 to 0.86 and the values of CR varied from 0.81 to 0.87 and all exceeded 0.70, which the study considered the cut-off-value, thus demonstrates strong reliability in measuring formative assessment practices. In addition, average variance extracted (AVE) scores ranged from 0.69 to 0.77, exceeding the threshold of 0.50, which also supports the construction validity and that the items fit well with their respective dimensions. These results provide additional evidence that the instrument is valid and reliable for evaluating the importance of formative assessments as a building block in primary geography education at an advanced level (AlAli & Al-Barakat, 2022).

5. Data Collection and analysis

Data was collected by observing and monitoring the teaching and learning activities focusing on geography education. This was achieved after class visit scheduling and permission acquisition for the 45-minute class visit. Application of formative assessment for each of the five dimensions stated on the observation checklist during the visits was focused on. These included organizing and implementing educational geographic information science (GIS) activities, monitoring mastery of geographic concepts, developing geographic thinking, class participations, practical geography skills and track geography skill listening. Teacher's acted responses were evaluated through high, medium and low criterion after documenting the relevant actions into the various dimensions. To confirm the reliability of the data, a two-observer system was implemented, where a second observer reviewed all the notes of the observers and each lesson evaluation for a single classroom. The two observers completed the evaluation forms independently for each of the three sessions during which each teacher was observed. Prior to the data collection phase, observers received comprehensive training to ensure uniformity and reduce subjectivity within the assessment, as well as ensuring that all the observers had a unified understanding about the checklist components, the nuances of the rating scales, and the checklist in general.

The training included calibration exercises that incorporated practice exercises, observations and instructional videos through frequent meetings to resolve differences in understanding or misalignments of vision. Data collected by each observer was processed using appropriate statistical methods. The results demonstrated impressive concordance between the observers as chance was controlled, Intraclass Correlation Coefficient (ICC) was 0.98 and Cohen's Kappa was 0.95 (Walter et al., 2019). These extremely high coefficients highlight the intended strictness of training, the methodology of the assessment, and the baseline calibration that was provided throughout the classroom observation period.

6. Data analysis

Means and standard deviations of the indicators of the classroom observation checklist were calculated, each indicator was scored on a 1-3 rating scale, where 1 was assigned the least level of practice and 3 the most. The mean score was used to assess the integration level of the practices based on the following ranges: the formative assessment practices are weak or almost nonexistent if the mean score is below 1.50, moderately present if the mean score falls between 1.50 and 2.39, and well-developed and fully integrated if the mean score is 2.40 or above. This, in turn, enabled researchers to better illustrate how formative assessments were integrated into teaching.

FINDINGS OF THE STUDY

This study attempts to assess the level of primary geography teachers' formative assessment practices and how these practices contribute towards enhancement of learners' comprehension of geographical concepts. To achieve this objective, the researchers used means and standard deviations to evaluate the extent to which formative assessment practices impact students' understanding of geographical concepts. The results of the analysis done on each aspect of formative assessment will be provided in the subsequent subheadings:

1. First Dimension - Diversifying Teaching Methods and Geographic Activities

This dimension includes 9 items relating to formative assessment's diversification role in broadening teaching methodologies and geographic activities to enhance students' understanding of geographical concepts.

The items are graphically available in Figure 3 and Table 2.



Figure 3. Diversifying Teaching Methods and Geographic Activities

The overall mean for the dimension of diversifying teaching methods and geographic activities reached 2.70 according to Table 2, which is considered a high level according to the study’s scale. The study shows that geography teachers heavily depend on formative assessment because they find it an effective method to improve educational outcomes. The high level indicates that teachers actively work to create diverse teaching methods, which accommodate different student requirements. The results show that formative assessment serves purposes beyond performance measurement because it helps teachers improve and adjust their teaching methods continuously.

Teachers understand the value of employing different flexible teaching methods, which create deeper student understanding of geographical concepts through interactive and realistic learning experiences.

Table 2. Means and Standard Deviations for the Dimension of Diversifying Teaching Methods and Geographic Activities

No.	Items	Mean ¹	St. Dev.	Rating
1	Encourages the use of diverse teaching methods that enhance student interaction with geographic content.	2.90	0.28	High
2	Provides practical activities such as interactive maps and field trips to connect theory with practice.	2.87	0.30	High
3	Integrates visual and technological educational aids to facilitate understanding of geographic concepts.	2.82	0.25	High
4	Considers individual differences when selecting activities to meet diverse student needs.	2.79	0.20	High
5	Develops students' analytical thinking skills through analyzing geographic phenomena.	2.73	0.30	High
6	Regularly evaluates the effectiveness of teaching methods and adjusts them based on formative assessment results.	2.57	0.18	High
7	Creates a stimulating learning environment that encourages exploring geographic concepts innovatively.	2.48	0.33	High
8	Uses various activities that stimulate curiosity and discovery among students.	2.00	0.27	Moderate
9	Encourages students to apply geographic knowledge in daily life.	1.79	0.27	Moderate
Total		2.70	2.72	High
¹ To facilitate the interpretation of results, the following grading scale was adopted: High rating: if the mean is between 3.00 and 2.40; Medium rating: if the mean is between 2.39 and 1.50; Low rating: if the mean is less than 1.50				

The individual means show significant differences between the items. The items about promoting diverse teaching methods (2.90) and offering practical activities including interactive maps and field trips (2.87) received remarkably high ratings because teachers want to establish an interactive learning environment that combines theoretical and practical aspects. The diverse teaching methods help students stay focused while actively participating which leads to better understanding of geographic concepts. Conversely, items that encourage students to apply geographic knowledge in their daily lives (1.79) and use activities that stimulate curiosity and exploration (2.00) were rated at a moderate level, indicating a gap or challenges in effectively integrating these aspects into current teaching practices. This calls for focusing on developing strategies that strengthen students’ ability to connect theoretical knowledge with their practical everyday reality.

Based on these results, it is clear that geography teachers benefit from formative assessment in diversifying teaching methods and geographic activities to a good extent. However, it is important to emphasize enhancing the aspects related to applying knowledge in daily life and fostering curiosity and discovery among students. Strengthening these elements will contribute to deepening geographic understanding and stimulating critical thinking, which requires ongoing training efforts and systematic support to maximize the benefits of formative assessment in the educational process.

2. Second Dimension - Monitoring Students' Progress in Geographic Concepts

This dimension has nine items, which focus on the role of formative assessment in mitigating learners’ progress on geographic concepts with the intention of cultivating understanding. These items are presented in Figure 4 and encapsulated in Table 3. According to the data presented in Table 3, the overall mean score for the dimension of monitoring students’ progress in understanding geographic concepts is 2.55.

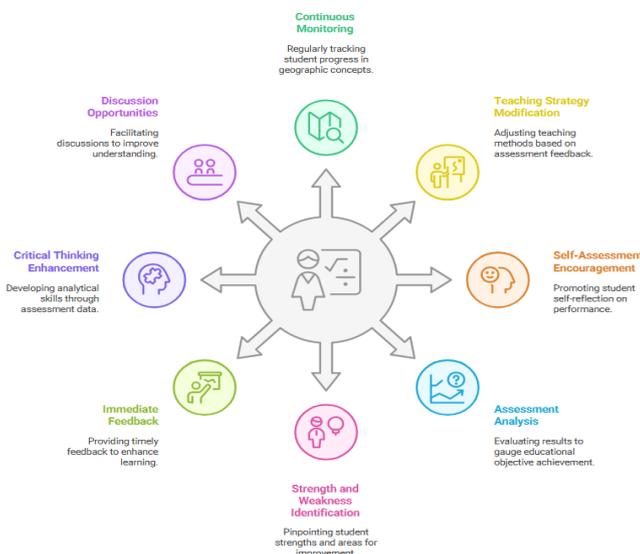


Figure 4. Monitoring Students' Progress in Geographic Concepts

This indicates an elevated level of attention and reliance on formative assessment among geography teachers. The consistently high scores across most items reflect teachers’ sustained efforts to track student progress, utilize assessment feedback to adapt instructional strategies, encourage student self-assessment, and analyze assessment results to guide instructional decision-making. However, item nine, phrased as “Continuously monitors students' progress in understanding different geographic concepts, but with limited tools,” received a low mean score of 1.48. This suggests that, while teachers are committed to continuous monitoring, there are notable limitations in the tools or methods being employed by some of them. This discrepancy highlights a gap that warrants attention. There is a clear need to equip teachers with more varied and comprehensive tools to support effective monitoring and follow-up. Addressing this issue may enhance the overall quality of formative assessment practices and enable more accurate and meaningful tracking of student learning in geography.

Table 3. Means and Standard Deviations for the Dimension of Monitoring Students' Progress in Geographic Concepts

No.	Items	Mean	St. Dev.	Rating
1	Continuously monitors students' progress in understanding different geographic concepts.	2.88	0.29	High
2	Uses assessment feedback to modify teaching strategies to meet student needs.	2.77	0.24	High
3	Encourages students to self-assess their performance in geographic activities.	2.67	0.20	High
4	Analyzes assessment results to determine the extent of achieving geographic educational objectives.	2.50	0.28	High
5	Identifies students' strengths and weaknesses through formative assessment.	2.50	0.27	High
6	Provides immediate feedback to students to enhance continuous learning.	2.48	0.29	High
7	Enhances critical thinking skills by analyzing assessment data.	2.45	0.30	High
8	Prepares opportunities for discussing formative assessment results with students to improve understanding.	2.39	0.22	Medium
9	Continuously monitors students' progress in understanding different geographic concepts, but with limited tools.	1.48	0.19	Low
Total		2.55	2.88	High

3. Third Dimension - Developing Geographic Thinking Skills

This dimension includes 7 selected items that address the extent to which teaching influences the development and improvement of learners’ geographic thinking skills. The details of these items are visually depicted in Figure 5 and comprehensively outlined in Table 4. Which is interpreted as emphasized suggestion by geography teachers as enhancing students’ critical and analytical skills in geography is a value they work on.

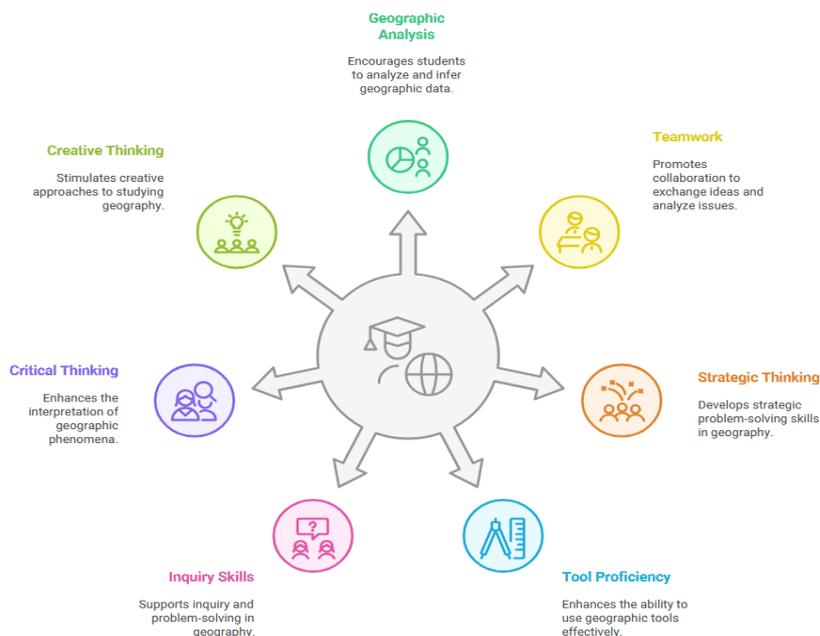


Figure 5. Developing Geographic Thinking Skills

This shows that they understand that the need goes beyond teaching to include the mastery of critical skills for understanding deep concepts including problem solving and strategic reasoning and active learning during the geography lessons.

Table 4. Means and Standard Deviations for the Dimension of Developing Geographic Thinking Skills

No.	Items	Mean	St. Dev.	Rating
1	Encourages students to develop geographic analysis and inference skills.	2.85	0.25	High
2	Encourages teamwork to exchange ideas and analyze geographic issues.	2.65	0.28	High
3	Provides practical opportunities to develop strategic thinking in solving geographic problems.	2.60	0.27	High
4	Enhances students' ability to use geographic tools effectively.	2.55	0.26	High
5	Supports the development of inquiry and problem-solving in geography.	2.38	0.20	Medium
6	Enhances students' ability to interpret geographic phenomena through critical thinking.	2.35	0.22	Medium
7	Uses teaching methods that stimulate creative thinking in studying geography.	2.33	0.30	Medium
Total		2.50	0.32	High

The results also show that teachers value teaching cognitive skills, especially skills of analysis and inference (mean = 2.85), the collaboration of students in discussion and analysis (2.65), and the practical teaching of strategic and problem-solving skills (2.60). These results show that an effort is made to enrich cooperative flexible environments that promote engagement and active participation to develop students as spatial thinkers, able to apply their knowledge in many different, practical situations. While developing thinking skills received adequate attention from teachers, items related to supporting inquiry and problem-solving (mean = 2.38), deepening critical interpretation of the geographic phenomenon (2.35), and stimulating teaching creativity (2.33) received average ratings.

This highlights an inconsistency in integrating inquiry along with creativity in the formative assessment practices. Addressing these issues provides a greater opportunity for students to apply critical thinking to the learning of geography and strengthen their ability to tackle complex geographical issues with confidence and creativity.

4. Fourth Dimension - Activating Effective Student Participation in Geography Lessons

This dimension includes nine carefully selected items that examine the way in which teachers' performance concentrates in activating effective student participation during geography lessons. These items are visually presented in Figure 6 and comprehensively detailed in Table 5.

Table 5. Means and Standard Deviations for the Dimension of Activating Effective Student Participation in Geography Lessons

No.	Items	Means	St. Dev.	Rating
1	Encourages students to actively participate in geographic classroom discussions.	2.90	0.25	High
2	Encourages students to ask questions that deepen understanding of concepts.	2.70	0.20	High
3	Motivates students to apply geographic knowledge in real-life situations.	2.67	0.26	High
4	Integrates group activities to enhance student interaction.	2.60	0.30	High
5	Uses formative assessment to encourage students' self-reflection.	2.53	0.19	High
6	Promotes cooperation and teamwork in studying geography.	2.50	0.27	High
7	Provides a supportive classroom environment for exchanging ideas and opinions.	2.43	0.28	High
8	Encourages students to express their geographical opinions clearly.	2.42	0.22	High
9	Provides opportunities for students to present and explain geographic topics.	1.89	0.21	Medium
Total		2.45	2.19	High

Table 5 reveals that the overall mean score for the dimension of activating effective student participation in geography lessons is 2.45, which falls within the high rating range according to the study's scale. This suggests that geography teachers place strong emphasis on encouraging active student engagement during lessons, recognizing the critical role that participation plays in deepening students' understanding and connection to geographic content. The individual item means that teachers most effectively promote active participation by encouraging students to engage in classroom discussions (mean = 2.90), ask insightful questions (2.70), and apply geographic knowledge to real-life situations (2.67). These findings highlight a positive teaching practice where students are not passive recipients but are actively involved in dialogue, inquiry, and practical application of their learning, which enhances both conceptual understanding and relevance. However, some areas show comparatively lower emphasis, such as providing students with opportunities to present and explain geographic topics (mean = 1.89), which received a medium rating. This points to a potential gap in fostering students' communication skills and confidence in sharing knowledge publicly. To further strengthen student participation, teachers might consider integrating more presentation and explanation opportunities, which could enhance students' articulation of geographic ideas and promote deeper cognitive engagement. Overall, the results reflect a commendable focus on student-centered teaching approaches, with room to expand on strategies that build students' confidence and active voice within the geography classroom.

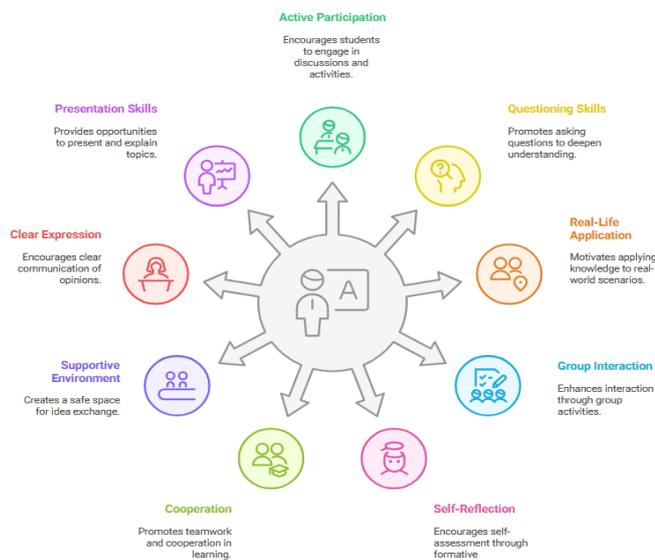


Figure 6. Activating Effective Student Participation in Geography Lessons

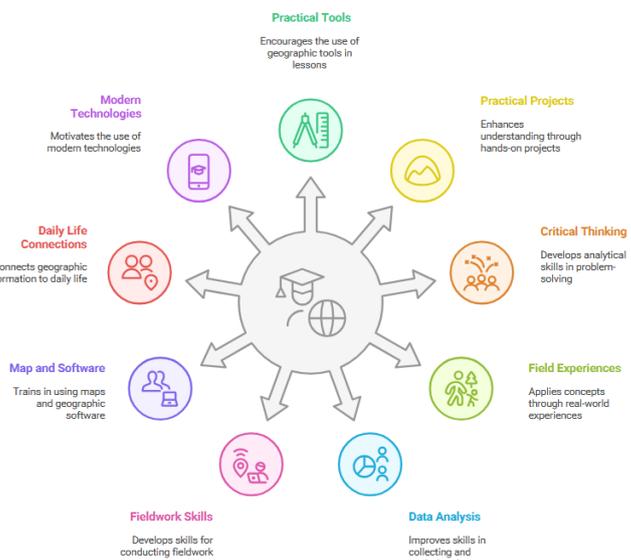


Figure 7. Enhancing Practical Skills in Geography

5. Fifth Dimension - Enhancing Practical Skills in Geography

This dimension comprises nine thoughtfully chosen items that investigate how teachers' performance focuses on enhancing students' practical skills in geography. The representation of these items is provided in Figure 7, with a detailed summary available in Table 6.

Table 6. Means and Standard Deviations for the Dimension of Enhancing Practical Skills in Geography

No.	Items	Means	St. Dev.	Rating
1	Encourages the use of practical geographic tools during lessons.	2.05	0.23	Medium
2	Encourages implementing practical projects to enhance understanding of concepts.	2.00	0.18	Medium
3	Encourages critical thinking when analyzing practical geographic problems.	1.80	0.26	Medium
4	Integrates field experiences to apply geographic concepts.	1.45	0.28	Low
5	Enhances skills in collecting and analyzing geographic data.	1.25	0.30	Low
6	Provides opportunities for students to develop fieldwork skills.	1.45	0.20	Low
7	Trains students to effectively use maps and geographic software.	1.43	0.25	Low
8	Enhances students' ability to connect geographic information to their daily lives.	1.40	0.27	Low
9	Motivates students to use modern technologies in studying geography.	1.34	0.22	Low
Total		1.48	0.22	Low

Table 6 reveals a concerning trend regarding the enhancement of practical skills in geography, with an overall mean score of 1.48, which falls into the low rating category according to the study's criteria. This indicates that geography teachers' performance in fostering practical skills among students is limited and requires significant improvement.

Given the vital role that practical competencies play in understanding and applying geographic knowledge, this finding highlights a critical area of weakness within the current teaching practices. Considering the individual item means further depicts this problem. Some items, such as encouraging the use of geographic tools and implementing projects, were moderately rated (2.05 and 2.00 respectively), but all items concerning direct experiences like integrating fieldwork, skill development in data collection and analysis, teaching map and geographic software usage, and modern technology motivation were rated lower than 1.50. This indicates a big discrepancy between the theoretical teaching of geography and the practical aspects of its application, which restricts students from actively engaging with actual geographic phenomena. The reason field experiences, and modern technological tools are not integrated into the curriculum is disturbing, given the importance of these skills in nurturing students' critical thinking, problem solving, and readiness for sophisticated geographic study or careers. This is attributed to the absence of equipment, poorly developed pedagogical skills, or narrowly defined syllabuses framed around rote memorization.

Accordingly, involving educational leaders in professional learning, provision of technological and field equipment, revision of syllabuses towards more practical application, and greater inter-disciplinary integration would go a long way in bridging this gap, enriching the learning of geographic competencies, and inspiring the learners towards practical applications.

DISCUSSION

1. Discussion of the First Dimension

The results revealed that geography teachers prioritize promoting understanding among their learners and work on building relationship with their student based on understanding and mutual trust, which suggests that they possess the culture of communication and interactive teaching. This shift in pedagogic geography practice can be attributed to geography teachers' appreciation of formative assessments in learning rather than concentrating solely on the goals of learning. Because learning geography requires both theory and practice, teachers are more likely to use flexible and student-centered approaches through integrating the use of maps, appropriate reading materials, kinesthetic activities discussions, and fieldwork to encourage students to learn at deeper levels of comprehension, analysis, and inference.

These results are consistent with global educational frameworks that consider formative assessment as pivotally, fundamental in teaching and learning systems. Al-Barakat et al. (2023) emphasizes that formative assessment improves quality of education, as teaching effectiveness is strengthened by teaching with consideration to learners' developmental stages. Çam & Koç, 2024; Campbell et al., 2020; Chang & Kidman, 2024; Chin et al., 2025 highlight the importance of varying instructional strategies in promoting students' spatial awareness and geographical thinking, especially when coupled with constructive guided feedback. The results are also consistent with constructivist learning theory which posits that knowledge is constructed by learners through the experiences and interaction with the environment, and socio-cognitive theory that focuses on learning by observation and active participation with others. Using diverse instructional strategies and integrating formative assessment combines these theories in practice to enhance engagement of learners.

A troubling paradox in the results is that even when there is a greater variety of teaching methods, teachers consistently scored much lower regarding the teaching of practical geography. This lack of practical geography skills, for instance, map reading, data interpretation, and field observing, suggests that geography learners are not offered the necessary authentic experiential learning opportunities, even though they participate in discussions and other interactive methods. This indicates that while learners may engage in discussions and interactive tasks, they often do it without the authentic experience opportunities that are vital for developing practical skills in geography.

The introduction of formative assessments in conjunction with authentic geographic tasks would help address this imbalance. This approach not only deepens applied understanding and inquiry-driven exploration but also reinforces critical spatial thinking, which are all vital outcomes in geography education.

2. Discussion of the second Dimension

The results show that geography teachers dedicate formative assessments to supervise students' grasp of geographical concepts. The dimension's overall mean score ($M = 2.55$) indicates that teachers routinely monitor student progress, provide timely feedback, stimulate self-evaluation, and adjust teaching based on the assessment result.

This illustrates a positive shift toward formative monitoring, where teaching is dynamically adjusted in response to student learning (Al-Barakat et al., 2026; Chung et al., 2020; Civi's Zaragoza et al., 2021; Davies, 2019). Incorporating formative assessment is becoming more prevalent because of educational trends that focus on gap recognition using ongoing assessment to engage students (Al-Barakat, 2023; Buonsenso et al., 2021; Çam & Koç, 2024).

This practice promotes students' metacognitive skills and academic responsibility, as they are prompted to think about their learning and assume control over their growth (Campbell et al., 2020).

Nevertheless, the result presents a considerable lack of consistency within this dimension. Item nine—'Continuously monitors students' progress in understanding different geographic concepts, but with limited tools'—was scored remarkably low ($M = 1.48$). This indicates that, while teachers attempt to continuously monitor understanding, they are lacking in tools and methods. This gap points to an issue that needs to be addressed. The gap may be due to the basic monitoring methods, a lack of training in various assessment techniques, or administrative frameworks that restrict the implementation of more advanced monitoring strategies. It could also indicate that teachers theoretically understand formative assessment more deeply than practical application, particularly in settings that lack professional support and development.

There is a need for providing teachers with more monitoring tools and tracking abilities such as formative assessments, digital tracking systems, self and peer assessments, and more professional development opportunities. In addition, school policies must provide resources and support to promote the routine and continuous use of formative assessment systems. This issue calls for urgent attention to enhance the quality of education and improve student learning outcomes.

3. Discussion of the Third Dimension

The results revealed that geography teachers are committed to developing geographic critical and analytical thinking skills in learners by employing formative assessment strategies designed to achieve that goal. This increased attention is due to teachers' understanding that higher-order thinking skill instruction goes beyond rote knowledge and encompasses deep understanding and practical challenges relating to geography problem solving. This result demonstrates that teachers place on the diagnostic and pedagogical purpose of formative assessment, which develops analytical and inferential competencies, encourages co-operative work, and situates the development of strategic thinking within practical contexts. This indicates a shift in the teachers' and learners' practices towards a more active teaching and learning environment which considers the learners' constructive engagement with the content and aims to build their spatial reasoning skills in a range of contexts (Khasawneh et al., 2022; Khasawneh et al., 2023; Knecht et al., 2020; Krajiňáková et al., 2024; Labianca, 2021; Méndez et al., 2023).

This is consistent with contemporary global education trends, as articulated by multiple researchers (Aslan & Zhu, 2017; Baysan & Cetin, 2021; Birgin et al., 2020), which emphasized that formative assessment is a core component of teaching that supports the re-alignment of teaching to learners' readiness. It is also consistent with Al-Barakat et al. (2024) which investigated the use of formative assessment to support learner's autonomy and control over his learning, as well as effective and sustained self-directed learning

4. Discussion of the Fourth Dimension

Because effective student participation is crucial for improving understanding and creating meaningful connections with geographic content, the fourth dimension's results show that geography teachers place a lot of emphasis on this issue, as they encourage students to actively participate in class discussions through posing and responding to questions and relating geographic concepts to real-world situations. This represents a change in contemporary teaching approaches where students are given the chance to act independently and participate in the lesson rather than just passively absorbing information. Students who actively participate are better able to understand concepts, think critically, and solve geographic problems.

Teachers' understanding that achieving higher level of students' active engagement requires more sophisticated social reasoning capabilities urged them to shift towards focusing on participation. Self-development student-centered learning environments help students develop skills of critical thinking, effective communication, collaboration, and real-world problem solving. Relating to these findings, Al-Barakat et al. (2023) cited that current global educational trend focus on formative assessments and seamlessly incorporating student engagement into lesson objectives. In addition, Wilmot et al. (2025) reported that student engagement in the learning process results in increased motivation, autonomous learning, and decision-making, thus the acquisition of self-directed learning, academic independence, and leadership skills.

Regarding social-constructivist approaches, modern educational theories acknowledge the role of interaction and collaboration, which is also supported by the results of this research. The social cognitive theory also addresses the role of discussion and feedback in promoting active engagement and self-awareness among students.

The research also highlighted the students' need to be provided with more opportunities to self-construct explanations of geographic themes and topics, which emphasizes the necessity of improving communication abilities, which are essential for self-assurance, critical thinking, and creativity. These require ongoing professional development aimed at interactive teaching strategies for the practitioners, and supportive policies at the school level to increase student's active participation in presentations. Such approaches would enhance the effectiveness and engagement of geography teaching and learning, making education more responsive to varied student needs and potential.

5. Discussion of the Fifth Dimension

The findings related to the fifth dimension, which focuses on the application of practical skills in geography teaching, reveal a significant weakness in teachers' ability to foster these essential competencies. As shown in Table 6, the overall mean score for this dimension was 1.48, indicating a low level of performance according to the study's criteria. This suggests that students rarely have opportunities to actively engage in direct activities such as fieldwork, data collection and analysis, use of geographic tools, and integration of modern technologies. The pronounced gap between theoretical knowledge and practical application poses a considerable challenge to developing the geographic skills necessary for understanding and addressing real-world geographic issues. The discrepancy between moderately rated items, such as encouraging the use of geographic tools ($M = 2.05$) and project implementation ($M = 2.00$), and the lower ratings for experiential activities like fieldwork, skill development in data collection, use of mapping software, and motivation to employ modern technologies underscores a critical imbalance instructional practice. While some practical components are introduced, the overall approach falls short of fully embedding experiential learning. Although training, resources, and curriculum design shortcomings are understandable, they are not the only factors accounting for these outcomes. The lack of fieldwork and technology use mentioned align with what literature reviews in other contexts describe as implementation issues related to budgets and technological infrastructure that prevent the use of more expensive educational methods (Al-Barakat et al., 2023; Bataineh et al., 2025). Furthermore, the persistence of the theory-practice gap suggests that teacher preparation and professional development poorly addresses the integration of geographic technology and fieldwork into everyday practice. This theoretical perspective requires the alignment of educational objectives to the realities of the classroom. Experiential learning theory posits that cognitive development requires reflective processes linked to specific experiences (Al-Barakat et al., 2026). Social constructivist theory requires students' engagement in authentic, collaborative tasks (Bataineh et al., 2013; Miao et al., 2022). The inadequate development of practical skills not only alienates students but also violates fundamental principles of pedagogy that are essential for fostering deep, lasting learning. Strengthening professional development around direct activities that integrates technology would be a starting point to overcome these obstacles, as well as a meaningful reform that adds practical learning as a core component of all curricula.

It is also necessary to invest in infrastructure that supports meaningful direct learning, like GIS technology and field tools. To conclude, low practical skill development vastly reflects underlying systemic issues, while the response to address the situation must draw from integrated policy work, innovative and disentangled curricula, focused professional development for teachers, and redistribution of current resources, geography education should prepare students with not only the knowledge, but the essential practical skills, to address and resolve difficult geographic issues.

CONCLUSIONS

The findings illustrate how geography teachers understand and employ formative assessments as a teaching strategy and a way to actively involve students. This reference point moves away from monotonous transactions to a more robust practice to incorporate constructive approaches within the discipline and the students to assess and develop learners' critical thinking and deeper conceptual grasp. The study findings also highlight the importance of integrating formative assessments that help progress students' learning systematically and documents learning gaps. This is critical for problem-centered instruction to be responsive to the diverse learner's needs and promote educational self-initiatives and accountability. The study also illustrates teacher responsiveness to develop higher order thinking skills in geography in terms of analysis, educational planning, and constructivist collaborative learning centered on deeper and practical educational outcomes. Finally, the importance of students' active participation through questioning, discussion, and real-world application of the geographical concepts being taught is a positive observation despite the notable gap of their ability to articulate and communicate ideas in a presentation format, which calls for prompt action.

The research points out a lack of practical geography skills, such as fieldwork, technology application, and using geographic tools. This inability to apply knowledge in practice, which is a major drawback, is likely due to a lack of professional development for teachers, insubstantial resources, and curriculum structures that overemphasize theory. Constructive teacher-student assessment dialogue is still insubstantial, indicating a need for improvement in that skill.

Addressing these challenges requires a thorough, diverse approach. Training the teachers needs more emphasis on experiential teaching and technology integration, so that they can gain the necessary skills and confidence for successful implementation. Besides, revision of the curriculum need to consider the practical skills for the learners and place them as a learning objective rather than a secondary optional goal. Educational policies should support allocation of sustainably provided direct learning facilities that support geo-spatial technology, field tools, and digital learning resources.

Overall, the results points at a low practical skills outcome, which is a systemic problem that calls for a systemic solution. Geography education can advance by integrating practical application with theory. Finally, critical thinking and problem-solving must be promoted to equip learners for the geographical challenges of the real world.

Limitations and Future Research Directions

This study's scope was limited to the Eastern and Western regions in the Kingdom of Saudi Arabia. Additionally, the study utilized only classroom observations as the sole technique for gathering data, so, the findings may not be applicable to other educational settings or models of instruction. Accordingly, future research should aim to include a wider selection of regions in Saudi Arabia and other data collection techniques, such as semi-structured interviews, teacher surveys, and document analysis, combined with classroom observations so that richer insights into the implementation of formative assessment and differentiated pedagogical approaches in geography teaching could be achieved.

Moreover, future research could deal with the other issues that were not resolved in this study, especially the gap between theoretical component and the practical geographic skills. Understanding issues such as the lack of resources, unproductive professional development and restrictive curricula will lead to effective educational interventions.

Specific directions for future research include the following:

- Investigating the impact of sustained professional development on teachers' ability to implement formative assessment effectively and deliver a more student-centered, practice-based geography curriculum.
- Exploring the role of educational technology and digital tools in enhancing student engagement, supporting fieldwork simulations, and developing geographic competencies at the primary level.
- Analyzing the relationship between the use of diversified instructional methods and the development of critical thinking, communication, and problem-solving among students, thereby improving the quality and relevance of geography education in line with modern educational demands.

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