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Core Practices for Teaching Geographic Inquiry: The Delphi Study

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Abstract

Scholars have become increasingly interested in identifying a more effective set of core teaching practices for developing teacher education and professional development programs. Although they have conducted many investigations within this realm over the past two decades, these efforts have focused mainly upon science, language arts, math, and music. The existing body of academic literature contains only a few studies that examine the social studies context, and this deficiency ignores the field of geography. The current study addressed this gap in the literature by exploring the core practices of geographic inquiry. A Delphi method was used to identify the core practices for teaching geographic inquiry. The findings were derived from a three-round Delphi panel survey involving 27 experts in the geography education field, helping to build consensus around a set of core secondary school geography teaching practices. The results revealed that experts considered eight practices to be core for facilitating geographic inquiry: (1) use geographic questions; (2) explain geographic concepts, principles, and processes; (3) select and adapt geographic sources; (4) use geographic/spatial representation and geospatial technology tools; (5) develop geographic reasoning; (6) evaluate sources and employ geographic evidence; (7) construct geographic explanations and predictions; and (8) develop informed-geographic action. These eight core practices for facilitating geographic inquiry do not function separately; rather, they operate simultaneously and in an interconnected manner in which more than one practice works to facilitate inquiry.

Keywords: *Geography education, doing geography, Delphi study, spatial reasoning, geographic inquiry*

Introduction

Core practices are fundamental activities of teaching that are part of everyday teaching routines in the classroom. Core practices are important skills that new teachers can learn and begin to master in their profession (Grossman et al., 2009). Chu (2018) defined "Teaching practice" defined as activities/routines surrounding teacher-student interaction in a real classroom situation to improve pedagogical knowledge and skills over a period of time. Core teaching practices consist of "strategies, routines, and moves that can be unpacked and learned by students," (Grossman, 2018,

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p. 4). Essentially, the term refers to the most regularly performed classroom activities which help students to learn and improve their understanding for a subject (Grossman et al., 2009). For the present study, "core teaching practices" refers to the most commonly effective instructional strategies which teachers use to both boost student learning/engagement with geographical analysis and understanding for the major geographical concepts, principles, and processes. MacDonald et al. (2013) highlighted that the emphasis on core teaching practices aims to assist teachers incorporate important pedagogical knowledge with the ability to implement it effectively in their subjects within the classroom context. The goal is to help teachers adopt and implement high-quality, content-rich, and meaningful teaching to support student engagement and achievement.

In recent years, researchers have argued for the need to reform teacher education and professional development programs to improve both teaching and learning standards (Dinkelman & Cuenca, 2020; Grossman et al., 2009). Such reform, these scholars assert, should focus heavily upon promoting "core practices,"" signature pedagogies," and" high leverage teaching practices," (Grossman et al., 2009). Their rationale for this strategy is grounded in the ideal that effective teaching practices play a key role in bolstering student learning experiences, which can translate into better learning outcomes (Grossman et al., 2009). However, over the last two decades, the majority of research focusing on "core" teaching practices has primarily dealt with subjects such as mathematics, language arts, science, and music. In domain of social studies, there are relatively fewer studies compared to other subjects. On such example is the work of Khader (2012), whose case study explored teachers' pedagogical beliefs and their actual classroom practices in social studies instruction. Similarly, Russell (2012) conducted a quantitative study to examine the instructional methods and practices used to teach social studies in the 21st century. Dineklman (2020) reviewed the growing literature in the area of "core practices" to create conceptual and practice-based responses to social studies teacher education, while Fogo (2014) conducted a Delphi study to investigate core teaching practices in history education. Although these studies do hold significance in all sub-fields of social studies, they predominantly center on broader social studies or history education; few studies have delved into the core practices in geography education.

From the perspective of geography education, many studies assert that geographic inquiry is considered as a heart of effective teaching geography (Alazmi, 2020; Brooks, 2007; Kocalar & Demirkaya, 2017; Golightly, 2021). They argue that incorporating geographic inquiry engages students, encouraging them to develop their geographic reasoning by using valuable sources to investigate geographic content to reach informed decision. However, such work primarily has focused mainly on assessing the impact of geographic inquiry on student learning. For instance, Golightly (2021) investigates the effect of problem-based learning activities on students learning, and the assessment of teacher contributions. However, these were small case studies and did not provide a framework for "core" teaching practices for facilitating geographic inquiry. So far, few research publications have discussed the "core" practices for teaching geographic inquiry at a secondary school level.

The present study attempts to bridge this perceived gap in the literature (following the methodology which Windschitl et al. (2012) and Fogo (2014) employed) by addressing the following question: What core practices for facilitating geographic inquiry have been identified through a Delphi study? To answer this question, the researcher used the Delphi technique to build consensus around a set of core teaching practices for facilitating geographic inquiry from 27 experts in the geography education field. This study builds on Fogo's (2014) work for history education by proposing, for the first time, a core set of practices tailored towards geography education at a secondary school level, thus contributing to the body of research in social studies education.

Background Literature and Framework

The Connection between Inquiry-based Learning, Social Studies, and Geography

This part of the literature review aims to briefly describe inquiry-based learning pedagogies as a teaching approach widely employed in classrooms, and how this approach exhibits variation across subjects. Specifically, this section explores the interrelation between inquiry-based learning, social studies inquiry, and geographic inquiry, aiming to clarify the interconnectedness between them. A visual representation of these connections is shown in figure 1, which is further explicated in the subsequent text.

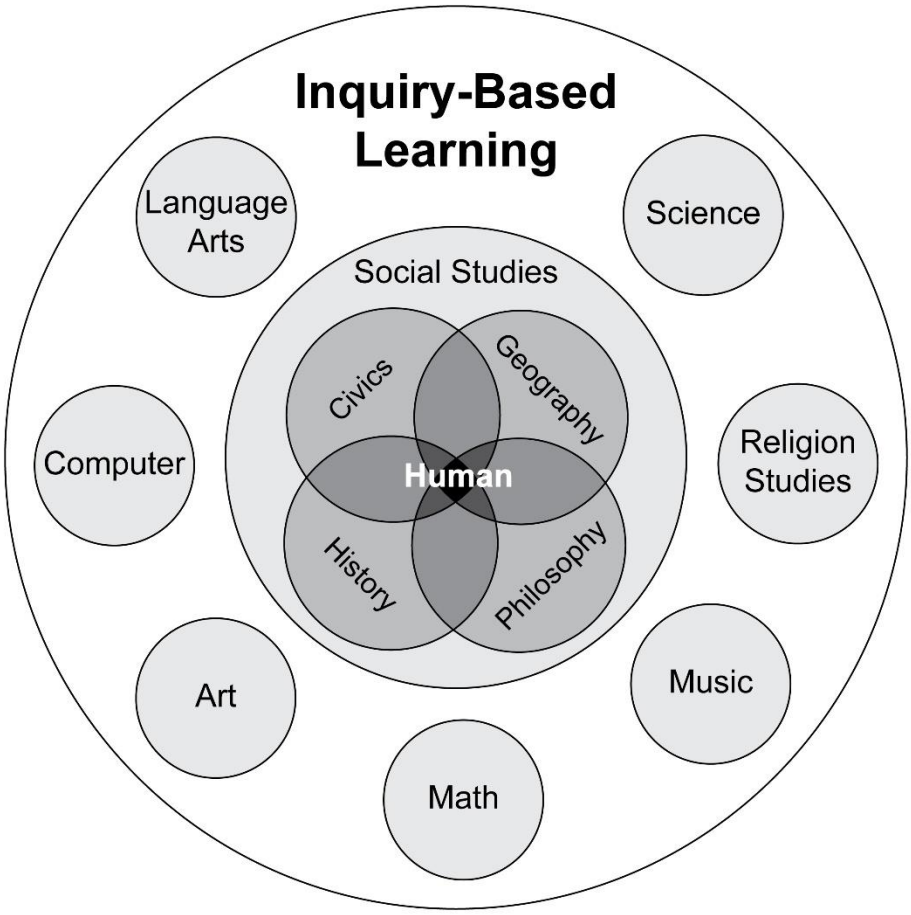


Figure 1. The connection between inquiry, social studies, and geography

Inquiry-based learning (IBL) is an effective approach that focuses on student-centered learning while fostering critical thinking skills and active engagement (Pedaste et al., 2015). IBL principles are rooted in constructivist theories of learning, focusing on encouraging students to construct knowledge by asking questions, collecting data, conducting investigations, and taking actions (Duffy & Raymer, 2010). Many studies argue the effectiveness of this approach in developing students' knowledge and skills (Barron & Darling-Hammond, 2010; Probine et al., 2023; Siphukhanyo & Olawale, 2024). Nunaki et al. (2019) argues that using IBL helps to promote deeper understanding of subject matter and improves skills such as critical thinking, collaboration, and self-directed learning. Moreover, this approach shifts the role of the teacher from knowledge transfer to a facilitator; in this way, the teacher guides students to formulate their own questions, investigate topics, collect and analyze data to actively reach conclusions (Dobber et al., 2017).

However, the application of inquiry varies across disciplines due the nature and content of subjects. For example, science inquiry often focuses on exploring natural phenomena, encouraging students to formulate their own hypotheses and investigations of cause-and-effect relationships. Kloser (2014) explains that scientific inquiry always focuses on hands-on experiences and encourages students to observe and conduct experiments to reach conclusions. In mathematics, inquiry often involves problem-solving and reasoning, focusing on exploring patterns and relationships (Alajmi, 2016). Instead of conducting experiments as in science, mathematical inquiry encourages students to ask questions, use abstract thinking about mathematical concepts and work to explore strategies to solve problems by identifying patterns and providing logical justifications. In language arts, inquiry focuses on questions about the meanings of texts, analyzing texts, expressing the major ideas and thoughts effectively, and understanding language (Beach et al., 2015). The primary goal of using inquiry in language arts is to improve students' communication skills, e.g., reading, writing, speaking, and listening.

In social studies, inquiry basically focuses on human culture, empathy, citizenship and social interaction (Alazmi, 2022; Al-Maamari, 2022). As social studies subject is a multidisciplinary subject, while all these disciplines focus on humans, each of them studies a different aspect. For example, historical inquiry often begins with questions that address historical events, cultural practices, and empathy (Alazmi & Alemtairy, 2024). As Fogo (2015) notes, students are encouraged to critically analyze primary and secondary sources, texts, and artifacts. They also evaluate historical evidence, assess the credibility of sources, and consider how different viewpoints affect historical interpretations. Fogo (2014) argues that inquiry in history mainly focuses on time, and students always aim to connect past events to present-day events to help them see the relevance and changes over time. In geography, inquiry often focuses on creating a connection between students' lives and global events, problems, and decisions that relate to their own lives. The National Geography Standards (NGS) clarifies that the geographic perspectives of inquiry are what distinguish inquiry in geography from that in other disciplines. A geographic perspective works as a frame of reference for asking questions, solving problems, and making decisions between alternatives. It is important to know what the geographic perspectives are, and how geographers study the world.

The NGS indicates that teaching geography focuses on incorporating two perspectives: the spatial perspective and the ecological perspective. The spatial perspective is considered the basis of

geography; therefore, teaching geography always focuses on "space" (Jo & Bednarz, 2009; Puttick, 2013). Gersmehl (2014) argues that teaching geography focuses on "locations of things, conditions in particular places, and the connections among places. They key questions in geographic inquiry usually begin with where" (p. 12). For example, history looks at phenomena over time, and the key historical inquiry starts with "when," while geography focuses on space and the key geo-inquiry starts with "where" (Gersmehl, 2014). The central focus in geography is on space, and geographers are always spatial thinkers (Al-Azmi, 2021). They ask questions about where phenomena are located, and why they are there. Regarding the ecological perspective, this emphasizes gaining understanding for the earth by investigating the complex interactions between living and nonliving elements (Heffron & Downs, 2012). Students live upon the earth and must therefore interact with other people and physical resources (e.g., food, soil, water etc.) Human activity affects the physical environment, both locally and globally. To navigate their lives successfully, students must gain an understanding of the world they live in, and this demands that they inquire about the relationships and connections amongst whatever dwells around them.

Geographic Inquiry

For decades, both educational researchers and stakeholders have paid attention to the best methods for teaching geography in secondary schools; according to the literature, this always requires that students address geographic questions by acquiring, organizing, and analyzing geographic data, geographic argumentation, solving real-world problems, and taking informed action (Fisher & Binns, 2016; Dhakal, 2019; Kocalar & Demirkaya, 2017; Golightly, 2021; Lambert & Morgan, 2010; Mkhize, 2023a; Mikhize, 2023b). "Traditional" learning methods for geography education have isolated the teacher solely as a source of information, with a heavy reliance on textbooks accompanied by lengthy lectures, in which students take copious notes and focus on both memorizing and recalling information (Chang et al., 2018; Al-Nofli, 2013). A more effective geography instruction method, however, makes a significant pivot away from the aforementioned "traditional" techniques, focusing instead upon student-centered learning. Here the learning responsibilities shift from teachers to students; the goal being to develop student knowledge, skills, and perspectives via autonomous and independent learning. Despite the significant superiority of the latter approach, "traditional" geography learning and teaching remain pervasive across much of the world (Alajmi, 2021; Milson et al., 2012).

A number of significant initiatives have endeavored to create a framework for teaching and learning geography over the years. The National Council for Geography Education (NCGE) and Association of American Geographers collaborated in one such major effort, publishing *Geography for Life: National Geographic Standards* in 1994. This document built a conceptual understanding for 'place', which geographic education has as a core curriculum. Furthermore, it created guidelines for integrating spatial thinking within K-12 curriculum through formulation of the five essential geographical themes: (1) location (i.e. a position), (2) place (i.e. a location's physical and human features), (3) human-environment interaction (i.e. the interconnectedness between humans and their environment), (4) movement (i.e. migratory patterns and population distribution), and (5) regions (i.e. the attributes of places). These guidelines were designed for K-12 geography teachers to help them provide content-pedagogical knowledge for delivering powerful instruction to achieve geographic literacy.

Nearly three decades later, in 2012, the NCGE updated their original book with a second edition to reflect the effects of ever-more-rapid global change while also meeting a new generation's needs. These revised NGS were designed to "enable students to become geographically informed through knowledge and mastery of three things (1) factual knowledge, (2) mental maps and tools, and (3) ways of thinking," (Heffron & Downs, 2012, p.7). Students must have a sufficient geographic knowledge base, using maps to put everything in human and physical context, so they can understand the how, why and where behind the details of a specific place or situation. The updated standards have become more exhaustive and powerful, seeking to capture the major ideas in geography which educators, teachers, and policymakers must work towards. They developed 18 standards, grouped under the following six essential elements to guide K-12 geography education: (1) the world in spatial terms, (2) places and regions, (3) physical systems, (4) human systems, (5) environment and society, and (6) the uses of geography. These standards were designed to both determine what knowledge students must acquire through their geography education and to provide guidance for teachers, helping them select the most authentic teaching strategies to illustrate the power and value of geography.

In addition to the NCGE's publication of their revised NGS, 2012 also marked the release of *A Road Map for 21st Century Geography Education* (Bednarz et al., 2012; Edelson et al., 2013). These reports drew a pathway for coordinating reform efforts to achieve NGS goals, providing a comprehensive plan for understanding both what geography education needs in order to improve

and how this can be accomplished. The plan focused on four areas: (1) instructional materials; (2) professional development; (3) assessment, and; (4) geography education research. The recommendations these reports provided centered around a common goal; an approach to geography education which balances "*knowing*" with" *doing*" (Edelson et al., 2013). However, the *Road Map* project's committee observed that while focusing upon NGS themes could lead to a depth of understanding for geography *content* (i.e. *knowing*) it didn't pay sufficient attention to the *doing* of geography. As a result, the committee sought to ensure that reform efforts do more to balance "knowing geography" with" doing geography," (Edelson et al., 2013).

Essentially, the *Road Map* report emphasizes the need for integrating geographic knowledge with geographic practice *during* its instruction, rather than working on each aspect in isolation. Geographic inquiry is a means for achieving this, as students engage with geographic facts, concepts and reasoning to answer questions. Working towards that goal, the *Road Map* described the basic components for *doing* geography, identifying three stages of geographic inquiry: (1) asking questions; (2) acquiring, organizing, and analyzing data; and (3) answering questions, and communicating information. These categories encompass the key practices which enable students to engage in geographic inquiry.

The NGS Standards argue that geography education must prepare students with essential geographical knowledge, skills, and perspectives to "do geography" (Biddulph et al., 2015; Demirci, 2009). Many studies argue that to "do geography," geography instruction must emphasize engaging students with the use of geographic thinking and data to solve real-world problems and make informed decisions (Pawson et al., 2006; Silviariza & Handoyo, 2021). The inquiry approach is considered one of the best strategies to facilitate "doing geography" in classrooms (Harte & Reitano, 2016; Kuisma, 2018; Oberle, 2020). The National Council for Social Studies (2013) indicated that 'doing geography' is an active inquiry process where students use geographic knowledge, skills, and perspectives to take action while considering themselves, and other people, cultures, and environments. Researchers argue that the "doing" of geography may take many forms of inquiry, such as solving problems or conducting geo-research, projects, and fieldwork (Klein, 1995; Spronken-Smith, 2005; Kinder, 2013).

Many studies argue the critical role which meaningful instruction plays in facilitating the effective teaching of geography (Gersmehl, 2014; Jain & Getis, 2003); it involves students with an inquiry-

based approach where they engage with geographic data and reasoning to solve spatial problems or make informed decisions (Gersmehl, 2014). However, Tapsfield (2016) noted that very few geography teachers have sufficient knowledge and experience to employ meaningful geographic inquiry, arguing for the need to focus on a simple question:" W*hat does meaningful, powerful, effective geographic inquiry teaching practice entail?"* Despite, the significant efforts involved with creating both *Geography for Life: The NGS,* and *A Road Map for 21st Century Geography Education,* these documents did not address teaching strategies, practices, or routines to facilitate geographic inquiry which might be used to effectuate the learning goals within; the emphasis being placed on desired student outcomes regarding learning, skills, and understanding.

Thus, the present study addresses this perceived gap in the literature by addressing "core" teaching practices facilitate geographic inquiry. This work will contribute to a larger body of work which seeks to identify the core teaching practices involved with separate subject areas, such as history (Fogo, 2014), science (Kloser, 2014), music (Millican & Forrester, 2018), and other disciplines. In particular, this study will contribute to social studies educational literature; it builds specifically upon the work Fogo (2014) executed in determining core history teaching practices by now addressing related issues for geography education. The present study's objective was to develop professional consensus (via Delphi survey) for a set of core teaching practices for facilitating geographic inquiry practices complete with associated descriptions.

Method

Research Design

As already noted, the researcher selected the Delphi survey method to conduct this study, adapting it from earlier research into core teaching practices for science (Kloser, 2014), and history (Fogo, 2014). The Delphi technique requires a group of knowledgeable, content-expert contributors to respond individually to a set of questions or items, using an anonymous survey format (Hsu & Sandford, 2007). The experts are asked to score the questionnaire items or problems based upon a set of specific criteria, such as the likelihood of an occurrence or its importance (Uhl, 1983). After these experts complete their initial questionnaire, their scoring is submitted to a coordinator who processes their contributions, looking for central and extreme tendencies, and the justifications

underlying them. These results are then fed back to the experts who revise and resubmit their views and suggestions. This process continues, anonymously, until the coordinator/researcher observes a consensus emerging. The Delphi method is simply an iterative technique for informed consensus-building within a group of experts (Donohoe et al., 2012). It allows experts to freely revise their views and formulate their opinions to form a group agreement regarding the issues under investigation.

The increasing number of educational researchers using the Delphi method testifies to its strength (Fogo, 2014; Kloser, 2014). First, it allows for distance communication among participants, with the help of a mediator (the researcher), which enables the linking together of existing areas of agreement/disagreement while avoiding the direct confrontation between experts on the matter (Dalkey and Helmer, 1963). Second, the individual anonymity in this distance communication allows each expert to freely express their own, independent thoughts, which eliminates any need to conform to a prevailing, dominant viewpoint (Donohoe et al., 2012). Third, the Delphi technique allows experts to contribute their thinking via several iterations of review; this provides them with the opportunity to reassess their initial judgements from previous rounds, which supports the validity of the data, and allows for the results to become accepted (Hsu and Sandford, 2007). Finally, the Delphi method usually combines quantitative and qualitative methods, using several analysis techniques for interpreting data which helps provide a more complete picture regarding the phenomena under investigation (Iqbal and Pipon-Young, 2009). However, despite its strengths, the Delphi technique does have some weaknesses. For example, this method's time-consuming nature, for both participants and researchers, sometimes leads participants to drop out prematurely (Donohoe et al., 2012). As such, Donohoe and Needham (2009) noted how some studies have issued financial remuneration to participants to reduce dropout rates, but such practice may induce bias in the results. Moreover, a Delphi study's results depend upon the quality of received feedback, not to mention the researcher's ability to accurately analyze such data (Dalkey and Helmer, 1963).

Population and Sample/ Study Group/Participants

The researcher used the purposive sampling method to identify and select appropriate Delphi panel participants; each of them had expertise within the geography education field. Purposive sampling is based upon "the assumption that a researcher's knowledge about the population can be used to handpick the cases to be included in the sample," (Polit & Hungler 1997, p. 229). The experts

participating in this study were either (1) master high school geography teachers, or (2) geography teacher-educators with scholarly research in the geography education field. In all, twenty-seven panelists took part, split almost evenly between geography teachers and geography teacher-educator/researchers. The researcher selected geography teachers via the following criteria: each must have at least fifteen years of experience teaching geography at a high school level. Likewise, the teacher-educator/researcher participants had to have extensive experience teaching geography education courses at a university level, while also having significant academic research experience in the field and a strong record of relevant, scholarly publications.

All potential participants were e-mailed a description of the study (i.e. the study's purpose and details regarding the Delphi procedure); study participation was completely voluntary. Following initial contact, 14 of the 17 geography teachers agreed to participate, while all 13 university faculty members agreed. Of the geography teachers, 8 were female and 6 were male; they came from six different Kuwaiti high schools. They averaged 16.23 years of experience teaching high school geography courses. Ten of these teachers had earned a bachelor's degree in geography education, while four had a master's degree in education. Each teacher involved in this study was considered highly qualified in their profession, based upon their received awards and excellent annual teaching reports for the previous five years (see Table 1).

Table 1

Demographic Data for Master Geography Teachers

Gender		Mean HS Teaching	Number of teachers who taught each subject			Highest Degree Earned		
M	F		Arab World Grade 10	Basics of Geography Grade 11	Contemporary Environmental Issues Grade 12	B.A.	M.A.	Ph.D.
6	8	16.23	10	14	12	10	4	-

The teacher-educators participating in this study included eight men and six women, selected from faculties at several different universities. Each expert held a doctorate in the education field and specialized in social studies/geography education. Furthermore, they all possessed significant teaching experience and had authored high quality publications in the geography education field. Amongst this group, nine were full professors, three were associate professors, with one being an

assistant professor. Their group mean experience level numbered 32 years in teaching geography/social studies educators at a university/college level (see Table 2).

Table 2

Demographics Data for the Geography-Educator Participants (University Faculty)

Gender		Mean Years University Faculty	Mean years Geography/Social Studies teacher education	Highest university rank		
M	F			Assistant Professor	Associate Professor	Full Professor
7	6	35	32	1	3	9

Data Collection Tools

Instrument. The study used a two-part survey developed to assess various practices for teaching geographic inquiry. The first part of the survey included close-ended questions covering 10 practices for teaching geographic inquiry crafted from extant literature as described in the Delphi study procedure. Experts rated each of these practices on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to determine whether they believed it belonged in a core set of geography education practices. The second part included open-ended questions to gather more insights about the core practices to facilitate geographic inquiry. These questions asked experts to provide feedback in three areas: (1) justification for each score, (2) comments about each practice, and (3) suggestions for additional practices not included on the list.

Data Collection

As mentioned in the Delphi study procedure, data were collected via a structured survey. The survey was repeatedly administrated via email across three rounds to a panel of 27 experts to build consensus around a set of core secondary school geography teaching practices. Ultimately, 81 surveys were collected from the 27 experts in the three rounds: 27 surveys in each round. The same survey questions were utilized in each round to assess and revise the proposed core practices of teaching geo-inquiry based on expert feedback. After each round, based on expert feedback and responses, the researcher revised the core practices and sent them back to the experts for further assessment. This iterative process ensured that all experts were given the chance to have an impact on the final consensus. All experts were asked to respond within a two-week timeframe for each round, with reminders sent by the researcher to facilitate timely participation.

Data Analysis

The researcher began the data analysis process immediately after receiving the first survey submission, employing basic descriptive statistics and an independent samples t-test. The descriptive analysis allowed the researcher to calculate the mean, standard deviation, and mode from the collection of numerical Likert-scale responses gathered for each practice listed on the survey, thereby highlighting the differences between them using formal mathematical logic (Morrell & Carrol, 2010). The independent samples t-test compared the mean for each teaching practice between master geography teachers and faculty (teacher-educators). The aim of using the independent samples t-test is to confirm that no difference exists in the mean ratings of each practice between master geography teachers and geography-teacher educators. In the Delphi study, the goal is to reach consensus among experts on core practices to facilitate geographic inquiry. Ensuring that no significant difference exists in the ratings of each practice between geography teachers and geography-teacher educators enhances the reliability of the study's results. It further helps reach a consensus that is not biased by differences in perspective between geography teachers and geography-teacher educators.

For the Delphi technique, consensus is achieved when the average score for each item under debate exceeds a certain cut score or minimum rating. However, as Osborne et al. (2003) indicated, there are no standard cut scores in a Delphi study; they vary between research efforts. For this study, the researcher agreed with Fogo's (2014) rationale for determining an appropriate cut score and followed his decision to discard practices that scored below an average of 3.5 in the Round 1 analysis from the Round 2 review. Similarly for Round 2, the researcher used a cut score of 4.00 to discard practices from further review in Round 3. The rationale behind these decisions arose because 3.5 represented the group's tendency of acceptance for the proposed core teaching practices reviewed in Round 1 whereas 4.00 indicated a high tendency of acceptance; the latter was expected given the revisions and incorporated expert suggestions derived from Round 1. The standard deviations and mode scores were included to represent the levels of agreement between participants.

Moreover, the survey included open-ended questions asking experts to provide their insights into (1) justifications of each score, (2) existing practices on the list, and (3) suggestions for more practices, as appropriate. The researcher then used a basic content analysis approach to analyze

participant feedback (i.e., justifications for their Likert-scale valuations, suggested revisions, and recommended additional core practices). In the first step, the researcher read the data from each expert and wrote their individual comments, as appropriate, in three main columns in Excel: (1) justifications, (2) revisions, and (3) suggested new practices. In the second step, the researcher compared the data derived from one expert with relevant data from others, which helped define the similarities and differences between experts. For the third step, the researcher grouped similar data or insights together to revise some practices and generate the new core practices for geographic inquiry.

The Delphi Study Procedures

Survey Round 1: All participants received an e-mail containing an instructions file which defined the study's objectives and the procedures for developing core geography teaching practices; an included link directed them to the web-based survey. The researcher used Google Forms software to design the survey; participants were asked to read the instructions file carefully before starting the survey. Round 1 of the survey consisted of three parts.

In part 1, participants identified personal demographic data, such as gender, years of teaching experience, highest degree awarded, and university rank.

In part 2, participants were presented with a list of 10 geography teaching practices and their descriptions (see Appendix A). Using a 5-point Likert scale (1 = strongly disagree; 3 = neither agree nor disagree; 5 = strongly agree), participants then had to rate each practice, registering their level of agreement regarding whether it belonged in a" core" set of geography education practices.

In part 3, participants were asked to provide justifications for each rating; they also had an opportunity to provide suggestions/comments regarding revisions to the practice title or description, adding valuable feedback to the research.

The ten teaching practices listed in Round 1 of the survey (See Appendix A) were crafted from a geography education academic literature review which addressed some practices as being commonplace/ambitious (Casinader & Kidman, 2019; Irawan et al., 2021; Jongwon, 2020; Klein, 1995; Kuisma, 2018; Lambert, 1999; Seow et al., 2019; Ezeudu et al., 2014; Kerawalla et al., 2013; Kidman, 2012; Lee et al., 2022; Maddox et al., 2018; Michaeli el al., 2014; Oberle, 2020;

Schlemper et al., 2019; Utami & Zain, 2018; Xuan et al., 2019; Yeung, 2010). A systematic literature review was conducted to identify core teaching practices for geographic inquiry in secondary schools. In this stage, the researcher followed clear steps to search for and select appropriate studies that met the purpose of this study (see figure 2). First, the researcher used EBSCOhost to identify online databases for the education field—namely, ERIC, Google Scholar and Teacher Reference Center—to find an initial set of articles to examine. The researcher then searched for literature manually, consulting reference lists from relevant primary studies to ensure all relevant studies were identified. Second, the research purpose was broken down into individual factors: teaching practices, geography, and secondary school. A list of synonyms, abbreviations, and alternate spellings was developed in order to construct complex search strings using boolean ANDs and ORs. The major search terms used in this SLR were "teaching practices," "geography," and "secondary school." The resulting search string was as follows: (teaching practices OR instructional practices OR teaching strategies OR inquiry OR geo-inquiry) AND (geography OR GIS OR geospatial) AND (secondary school OR middle school OR high school).

The initial search using the identified terms yielded more than 41 articles. The list included some articles that did not address the research objective directly or were published in multiple sources. In such cases, the article titles and abstracts were carefully reviewed and the appropriate articles were selected that met the following inclusion criteria: 1. reported an empirical study; 2. Reported within the scope of education for middle and secondary school (i.e., grades 6 through 12); 3. Published in English, peer-reviewed, full-text-accessible resources. Eighteen articles met these inclusion criteria. Reviewing these articles' abstracts, the researcher noticed that several discussed teachers' education, or focusing on instrument development or at the undergraduate level. These studies did not address the research purpose and were excluded. Upon careful review of each article, 18 articles met the inclusion and exclusion criteria. These articles were used to identify the initial core practices list (see APPENDIX B).

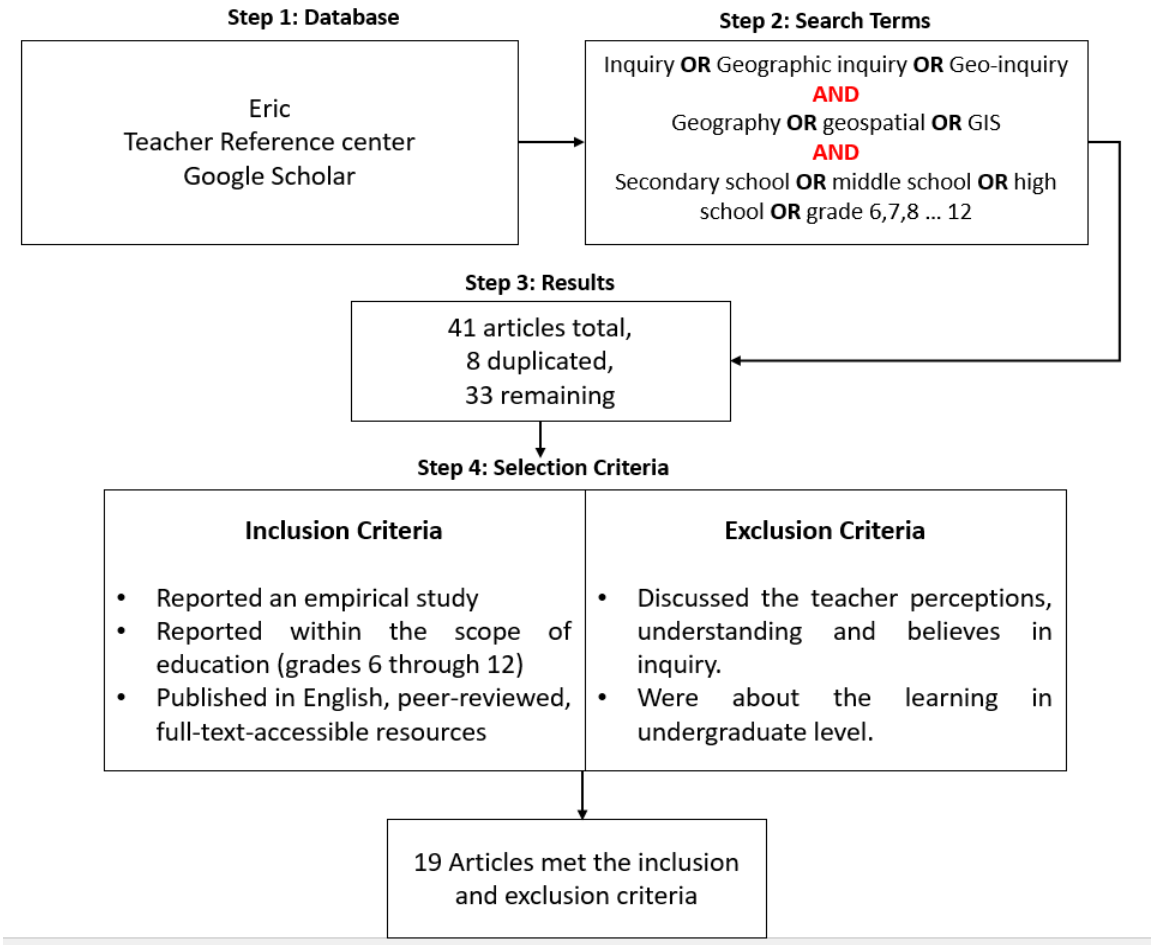
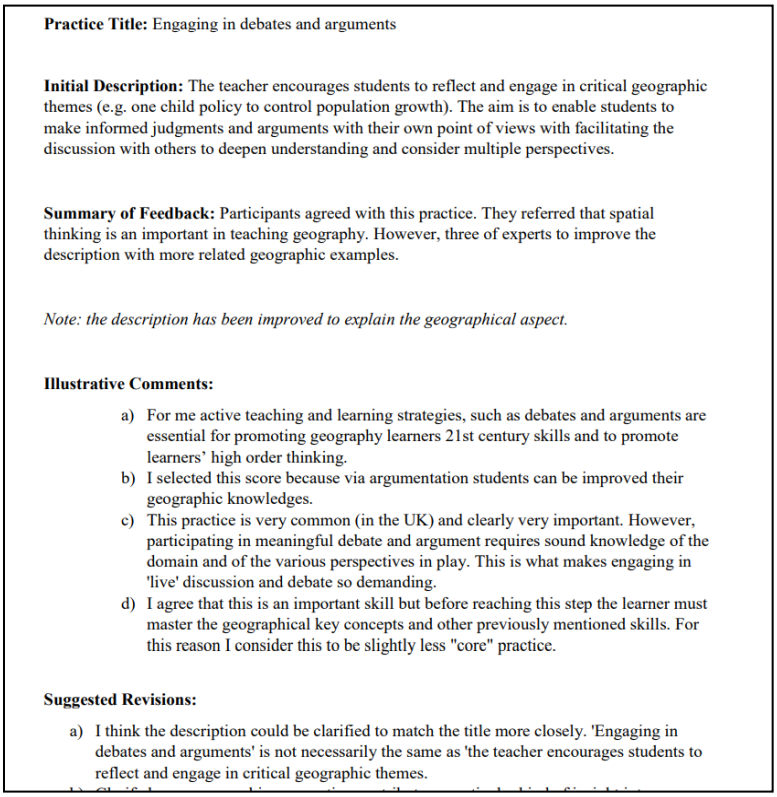


Figure 2. A systematic literature review procedure

Following this, the researcher used narrative synthesis (Popay et al., 2006) to analyze and summarize the findings from the studies. Narrative synthesis is a qualitative method that allows for the integration and interpretation of textual data from diverse sources to generate a coherent and comprehensive summary of the research evidence. In this approach, each article was summarized by including the key information related to the research objective, such as author(s)' name, year, study objective, inquiry process, and findings. Second, the researcher used thematic analysis to identify the core practices across the studies, and their descriptions. Coding was used to organize the data into meaningful groups based on common practices and their meanings in each article. In the last step, the researcher interpreted data to draw meaningful conclusions related to the research objective by identifying the core practices and their descriptions.

The researcher conducted a pilot survey to help construct the instrument's validity prior to its formal application, asking sex geography teachers and four assistant professors in social studies education to review and complete the initial list of geography teaching practices. All pilot study participants had at least ten years 'of geography teaching experience. They completed the survey within a week, providing feedback to help improve its content and design. Five minor revisions resulted, with four of them addressing typographical mistakes and description clarification, while the fifth focused upon visual design issues such as font size and background color.

Survey Round 2: Once the author had completed data analysis from Round 1 and created a revised set of proposed "core" teaching practices for Round 2 review (See appendix C), the updated survey was distributed electronically to participants requesting their input. It provided a summary of the Round 1 data analysis, with a link directing experts to a PDF file containing the basic descriptive statistics and 12 pages filled with the qualitative summaries of participant feedback (see Figure 3). Participants were asked to review the Round 1 data analysis before beginning the Round 2 survey. As in Round 1, participants had to evaluate each proposed "core" teaching practice, offer feedback, and suggestions.



Practice Title: Engaging in debates and arguments

Initial Description: The teacher encourages students to reflect and engage in critical geographic themes (e.g. one child policy to control population growth). The aim is to enable students to make informed judgments and arguments with their own point of views with facilitating the discussion with others to deepen understanding and consider multiple perspectives.

Summary of Feedback: Participants agreed with this practice. They referred that spatial thinking is an important in teaching geography. However, three of experts to improve the description with more related geographic examples.

Note: the description has been improved to explain the geographical aspect.

Illustrative Comments:

a) For me active teaching and learning strategies, such as debates and arguments are essential for promoting geography learners 21st century skills and to promote learners' high order thinking.
b) I selected this score because via argumentation students can be improved their geographic knowledges.
c) This practice is very common (in the UK) and clearly very important. However, participating in meaningful debate and argument requires sound knowledge of the domain and of the various perspectives in play. This is what makes engaging in 'live' discussion and debate so demanding.
d) I agree that this is an important skill but before reaching this step the learner must master the geographical key concepts and other previously mentioned skills. For this reason I consider this to be slightly less "core" practice.

Suggested Revisions:

a) I think the description could be clarified to match the title more closely. 'Engaging in debates and arguments' is not necessarily the same as 'the teacher encourages students to reflect and engage in critical geographic themes.

Figure 3. Sample of Comments, and Suggestions Provided to Participants after Round 1

Survey Round 3: Once the researcher had completed Round 2 data analysis and revised the list of proposed core teaching practices for Round 3 (see Appendix D), the updated survey was distributed to the same participants from earlier rounds. As in Round 2, the Round 3 survey comprised four parts. The first provided an overview of Round 2 data analysis, which included the descriptive statistics results along with comments, suggestions, and revision feedback. Participants were asked to review these analyses before proceeding to part 2, where they would rate the Round 3 teaching practices (via 5-point Likert scale) and have the opportunity to add comments regarding each practice.

Findings

To answer the research question "What core practices for facilitating geographic inquiry have been identified through a Delphi study?", a data analysis was incorporated throughout the execution of this Delphi study. Result summaries are therefore provided for each survey round (see figure 4).

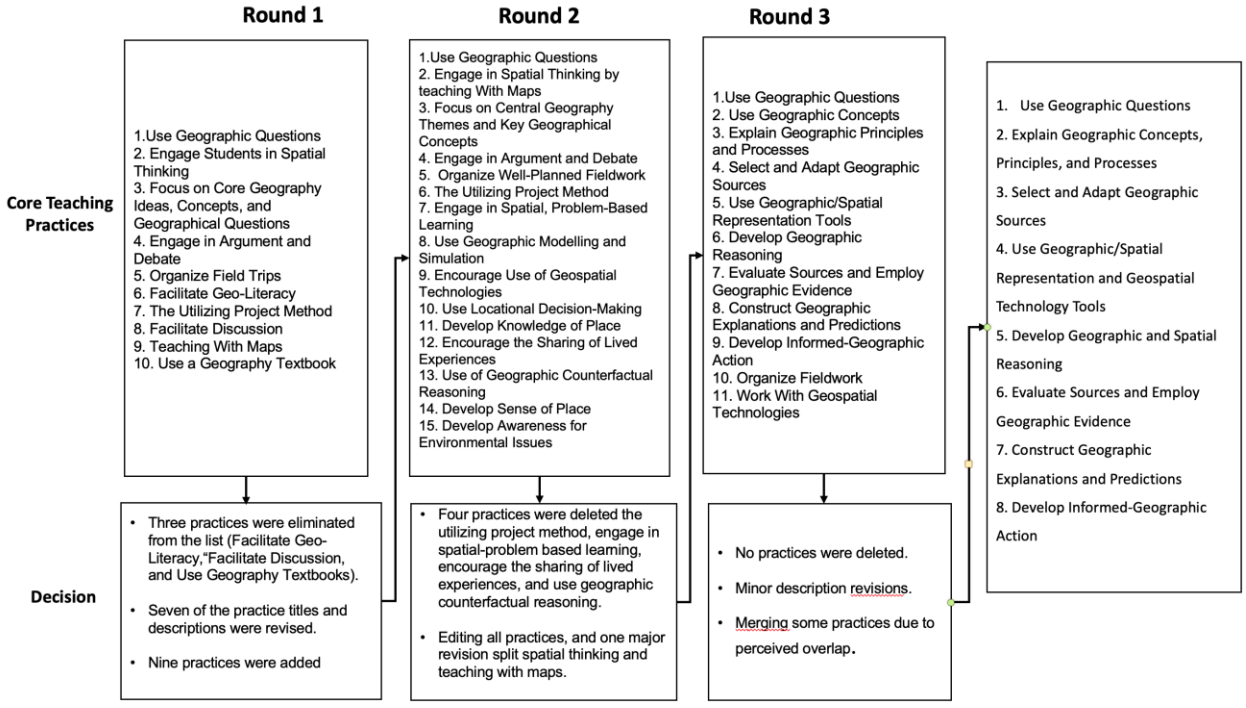


Figure 4. the overview of Delphi study results

Round 1

The participants provided valuable feedback regarding the 10 "core" teaching practices for geography education proposed in Round 1 of the Delphi survey. Table 3 shows the basic descriptive statistics for Round 1. In this round, any practice which scored an average of at least 3.5 on a 5-point Likert scale assured its retention for reevaluation in the following round, while those below 3.5 were discarded. Seven practices recorded average scores of at least 3.5 (with mode scores of 4 and 5). Five of these practices scored above a 4.00 average, with mode scores of 5 and standard deviations below 1.00 (see Table 3). Due to their insufficient scoring levels, three practices were eliminated from the list of practices for Round 2 evaluation, these being" Facilitate Geo-Literacy", "Facilitate Discussion", and "Use Geography Textbooks". Independent samples t-test analysis results revealed no significant statistical differences (all p-values > .05) between Master Geography Teachers and Teacher-Educators scores for all practices previously evaluated.

Table 3

Basic Descriptive Statistics for Round 1

#	Geography Teaching Practice	Mean	Mode	SD
1	Use Geographic Questions	4.57	5	0.75
2	Engage Students in Spatial Thinking	4.63	5	0.49
3	Focus On Core Geography Ideas, and Concepts	3.80	4	0.63
4	Engage in Argument and Debate	3.73	4	0.82
5	Organize Field Trips	4.38	5	0.63
6	Facilitate Geo-Literacy	3.34	3	1.06
7	The Utilizing Project Method	4.15	5	0.74
8	Facilitate Discussion	3.38	3	0.85
9	Teach With Maps	4.61	5	0.57
10	Use a Geography Textbook	2.76	3	1.10

Moreover, participants provided textual feedback within three boxes; (1) justification for each score, (2) comments about each practice, and (3) suggestions of additional practices not included in Round 1. Regarding their justifications and comments about the 10 practices evaluated in Round 1, participants provided valuable feedback which lead to an improved list for review in Round 2.

Comments on the seven highest scoring teaching practices were, in general, both positive and constructive. Participants contributed their views and ideas for improving these practices. These suggestions included re-titling some practices and re-writing/expanding previous descriptions. The following section discusses each practice and what (if any) revisions were made to improve it.

Use Geographic Questions: Each expert (N=27) agreed that this practice should be considered central to geographic inquiry practices. Three participants, however, indicated that its description needed improvement. They suggested that the description should focus on the geographical lens, and that teachers and students should realize the differences between geographic question and non-geographic questions.

Engage Students in Spatial Thinking: Two experts recommended refining the description to provide greater depth, arguing. However, nine experts felt that this practice overlapped "Teach with Maps", with one of them suggesting that they could be combined into a single practice as he stated "Teaching with maps is somewhat close to core practice 2 engaging students in spatial thinking. Could these two be combined?"

Focus on Core Geography Ideas, and Concepts: Most participants agreed that this practice is important for teaching geographic inquiry, although some felt it needed revision. For instance, four participants said that the title needed modifying. One participant felt that the word "core" may cause confusion, as the term is already used within the" core practices" list. He suggested swapping "core" for a synonym such as "central" or "key". Moreover, four participants argued that the description needed clarification.

Engage in Argument and Debate: Some experts suggested that the description needed improvement, that it was too generic as originally stated and could apply to almost any educational field rather than specifically to geography.

Organize Field Trips: Some participants argued that its title and description needed revision. He suggested replacing "field trip" with "fieldwork," as the latter term implies something more participatory and purposeful than what one might infer from the former. They also recommended revising the description to discuss the type of fieldwork which must be involved and how it could be achieved.

The Utilizing Project Method: Four experts argued that the description needed improving to both reflect how the method could be effectively applied in geography education, and how its application in this field differs from other disciplines. Furthermore, they found that this method should not be for solving problems, but rather to generate new knowledge. They also argued that a project is more practical, since students work to produce an artifact to demonstrate content, while for problem-based learning, students present solutions for defined issues.

As a result of the above feedback, the researcher revised seven of the practice titles and descriptions. One significant revision involved combining Practice 2 "Engage Students in Spatial Thinking" with Practice 9 "Teaching with Maps". The merged practice became "Engage Students in Spatial Thinking by Teaching with Maps." The remaining revisions mostly involved adding geographical examples and explanations, editing each description to become more geography specific, and rewording some of the practice titles. For example, "Focus on core geography ideas, concepts, and geographical questions" became" Focus on central geography themes and key geographical concepts," and" Organize Field Trips" became" Organize Well-Planned Fieldwork."

Since feedback regarding the three lowest-rated geography teaching practices listed on the initial survey was, in general, quite negative, they were not included on the list submitted during Round 2. While participants had recommended deleting three of the practices from the initial list, they also suggested adding some that were missing from Round 1. Indeed, the researcher received suggestions for 33 practices to include in the Round 2 survey, which could be consolidated into 18 new geography teaching practices (see Table 4). In order to establish a structured and analytical methodology for consolidating practices, a thorough assessment of the suggested methodologies was undertaken. Employing the principles of inductive analysis, the researcher aimed to unearth insights and discern patterns from the amassed data. This procedure unfolded as follows: (1) Data compilation: initially, all suggested practices (N=33) were meticulously examined, with each practice recorded on paper. (2) Categorization: similar practices were systematically categorized, facilitating the identification of emergent practices (N=18). For instance, practices such as "utilizing GIS," "engaging with digital maps," "employing satellites or aerial imagery," and "utilizing geospatial applications and web platforms" were collectively grouped under the category "encourage working with geospatial technologies." Of these practices, those which at least two experts had suggested underwent development for Round 2; this resulted in nine practices being

added to the seven surviving from Round 1. It should be noted that "spatial-problem based learning" received the greatest support, being suggested by 5 participants.

Table 4

Round 1 Suggested New Teaching Practices and Frequency

#	New Practice Title	Frequency (N=36)
1	Engage in Spatial-Problem Based Learning	5
2	Use Geographic Modelling and Simulation	4
3	Encourage Working With Geospatial Technologies	4
4	Use Locational Decision-Making	3
5	Develop Place Knowledge	2
6	Develop Sense of Place	2
7	Encourage Sharing Lived Experiences	2
8	Use Geographic Counterfactual Reasoning	2
9	Develop Awareness for Environmental Issues	3
10	Make Connections Between State, Regional and Global-level Scales	1
11	Encourage Geographic Observation	1
12	Use Historiography	1
13	Role Play	1
14	Use of Integrative Assessment	1
15	Use of Technology	1
16	Present Multiple Perspectives	1
17	Engage With Controversial Geographical Issues	1
18	Constructing the Demonstration	1

Note. New geography teaching practices receiving ≥ 2 expert suggestions were included in Round 2.

Round 2

Participants provided valuable feedback on 15 teaching practices in Round 2; Table 5 shows the descriptive statistics. For this round, a practice receiving a mean score ≥ 4.00 guaranteed its retention for evaluation in the succeeding round. The following four practices fell below that level, failing to qualify for further review: (1) "the utilizing project method," (2) "engage in spatial-problem based learning," (3) "encourage the sharing of lived experiences," and (4) "use geographic counterfactual reasoning." Of the other practices, five had mean ratings exceeding 4.50, while five

of the six revised practices from Round 1 recorded rating rises. Again, independent samples t-test analysis results for all practices in Round 2 revealed no significant statistical differences (all p-values > .05) in scoring between Master Geography Teachers and Teacher Educators.

Table 5

Descriptive Statistics for Round 2

#	Geography teaching practice	M	Mode	SD	Round 1 M	Δ M
1	Use Geographic Questions	4.65	5	0.62	4.57	+0.08
2	Engage Students in Spatial Thinking by Teaching With Maps	4.64	5	0.49	4.63	+0.01
3	Focus on central geography themes and key geographical concepts	4.53	5	0.64	3.80	+0.73
4	Engage in Argument and Debate	4.23	4	0.96	3.73	+0.50
5	Organize Well-Planned field trips	4.84	5	0.36	4.38	+0.46
6	The Utilizing Project Method	3.84	4	1.15	4.15	-0.31
7	Engage in Spatial-Problem Based Learning	3.76	4	0.90	-	
8	Use Geographic Modelling and Simulations	4.15	4	0.67	-	
9	Encourage Work with Geospatial Technologies	4.30	5	0.83	-	
10	Use Locational Decision-Making	4.07	4	0.91	-	
11	Develop Place Knowledge	4.30	5	0.93	-	
12	Encourage the Sharing of Lived Experiences	2.71	3	1.14	-	
13	Use Geographic Counterfactual Reasoning	2.76	3	1.33	-	
14	Develop Sense of Place	4.07	4	0.93	-	
15	Develop Awareness for Environmental Issues	4.53	5	0.64	-	

For this round, participants again provided feedback regarding edits/additions to increase practices effectiveness. There were fewer practice revision suggestions this time, and a greater level of positive feedback, indicating that a consensus of opinions was beginning to coalesce. The feedback centered mainly on whether to merge/split some practices and proposed edits to practice titles and/or descriptions. Major revisions were made to “Engage in Spatial Thinking” during this round.

Six participants stressed the building of practices, arguing for the need to construct inquiry-based on skills. As one participant suggested;“ think to build your list around geographic inquiry skills rather than general practice’.” This feedback prompted the author to build a model fundamentally based on geographic inquiry skills.

Engage in Spatial Thinking: Despite a high level of agreement amongst the experts regarding this practice's core status, they did make several comments about it. Six participants found its description too vague and broad. One participant indicated their belief that spatial thinking actually combines three components in its description (concepts, representation tools, and geographic reasoning), noting that each of these could be listed as a separate practice. He suggested as geographic concepts was already included in the list, the researcher replaced "Spatial Thinking" with "Use Geographic Representation Tools," and "Develop Geographic Reasoning."

Focus on central geography themes, and key geographical concepts and **Develop Place Knowledge:** While participants affirmed the importance of these practices, nine experts saw significant overlap between them, noting that students will learn about a place when they study its geographical concepts and themes. Moreover, three participants suggested bifurcating the first practice into "Geographic Concepts" and "Geographic Themes/Principles." Another participant suggested adding "geographic process" to the title, as they saw a need to build the relationship between 'concepts' and 'principles'. Taking these suggestions into account, the researcher revised these practices to become:" Use Geographic Concepts" and "Explain Geographic Principles and Processes."

Engage in Argument and Debate: Two participants suggested revising this practice to become more specifically related to geographic skills. One stated:" I think there is scope to reframe this as a distinctively geographical practice, for example, by making it about selecting and evaluating sources, and using geographical evidence," while the other summarized the reasoning behind their qualms as follows "Students have to learn to make decisions using sources and evidence. It does not necessarily have to be a debate or argument". As a result, the researcher split this practice to become "Select, and Adapt Geographic Sources" and "Evaluate Sources and Employ Geographic Evidence."

Organize Well-Planned Fieldwork: Four participants suggested removing "well-planned" from the title.

Use Geographic Modelling and Simulation: Five of participants argued that despite its great potential for enhancing student learning, it should not be considered a" core" practice. To mitigate this issue, one participant stated:" You could revise this practice to [become] 'Geographic

Explanations and Predictions,' and think of low-tech ways to engage students in geographic inquiry." As a result, the researcher reworded the practice title as" Construct Geographic Explanations and Predictions."

Encourage Work with Geospatial Technologies: Five participants argued for the need to revise the title. one stating:" I don't think 'encourage...' fits with the ways in which other categories are presented." As a result, the researcher changed the title to become" Work with Geospatial Technologies."

Locational Decision-Making: Participants stressed the importance of improving the title to more clearly involve geographic issues. Therefore, the researcher revised it to become" Develop Informed Geographic Action."

Develop Awareness for Environmental Issues: While seven participants saw the importance of this practice, they felt that it did not fit within the "core" list.

Round 3

In the final round, strong support emerged around the eleven "core" practices described on the list. Each of them received median scores above 4.6, with six exceeding 4.8 (see Table 6). Furthermore, standard deviation levels decreased from previous list iterations. The ratings for six practices increased over the levels recorded in Round 2, while one stayed the same; the others were new to Round 3, so produced no ratings changes, for obvious reasons. "Develop Informed Geographic Action,"" Construct Geographic Explanations and Predictions," and "Work With Geospatial Technologies" recorded the most significant increases from Round 2 to Round 3, with their mean ratings rising by 0.72, 0.54, and 0.5 respectively. Again, independent samples t-test analysis revealed no significant differences between Geography Teachers and Teacher-Educators.

Table 6

Descriptive Statistics for Round 3

#	Geography Teaching Practice	M	Mode	SD	Round 1 M	Δ M	Round 2 M	Δ M
1	Use Geographic Questions	4.96	5	0.19	-	-	-	-
2	Use Geographic Concepts	4.92	5	0.27	3.80	+0.73	4.53	+0.39
3	Explain Geographic Principles and Processes	4.61	5	0.69	-	-	-	-
4	Select and Adapt Geographic Sources	4.73	5	0.66	-	-	-	-

5	Use Geographic/Spatial Representation Tools	4.92	5	0.19	-	-	-	-
6	Develop Geographic Reasoning	4.80	5	0.49	4.63	+0.01	4.64	+0.16
7	Evaluate Sources and Employ Geographic Evidence	4.69	5	0.73	3.73	+0.96	4.23	+0.46
8	Construct Geographic Explanations and Predictions	4.61	5	0.80	-	-	4.15	+0.54
9	Develop Informed Geographic Action	4.65	5	0.79	-	-	4.07	+0.72
10	Organize Fieldwork	4.84	5	0.46	4.38	+0.46	4.84	0.00
11	Work with Geospatial Technologies	4.80	5	0.40	-	-	4.30	+0.50

In general, the third round precipitated fewer participant comments and suggestions, and these primarily involved either (1) minor description revisions, or (2) merging some practices due to perceived overlap. Regarding the former, participants indicated that "Develop Geographic Reasoning" needed revisions to its description. Three participants argued that geographic reasoning does not require the use of geographic concepts or geographic representations, As a result, the description for "Develop Geographic Reasoning" underwent revision to comply with the experts 'suggestions.

With respect to merging some practices, participants argued that three practices overlapped with others to some degree. For" Explain Geographic Principles and Processes," six participants felt that there may be some confusion between this practice and "Use Geographic Concepts." They recommended merging the two, one participant stating:" I think this category is confused with the previous one… If teachers are 'using geographic concepts' then I take it as read that they are also making decisions about linking these concepts, ideas, principles to the subject matter of the lesson. I'm therefore unsure why this category exists separately." As a result, the researcher merged these practices and revised the cumulative description.

Participants also recommended integrating" Organize Fieldwork" with "Select and Adapt Geographic Sources" because, as one expert indicated, teachers use fieldwork as a source of geographical data, so fieldwork should come under the geographic sources practice. As result, the researcher subsumed" Organize Fieldwork" within "Select and Adapt Geographic Resources", revising the combined description accordingly.

And for “Work with Geospatial Technologies”, three participants argued for the need to merge this with “Use Geographic/Spatial Representation Tools," since they felt, as one participant stated: “Geospatial technologies are a type of spatial representation of geographic data.” Therefore, the researcher integrated these two practices under a single, new title with a combined description in the final list (See table 7).

Participants made no comments or suggestion about“ Use Geographic Questions,”“ Evaluate Sources and Employ Geographic Evidence,”“ Construct Geographic Explanations and Predictions,” or“ Develop Informed Geographic Action” during Round 3. As a result, none of these four practices underwent revision. The finial list of core teaching practices presented in the following table:

Table 7

The Final List of Teaching Practices for Geography Inquiry

#	**Core Practice**	**Description**
1	Use Geographic Questions	The teacher plans lessons and units around geographical questions. To organize instruction, they focus on the use of geographical questions which have driven critical thinking and debate in the field. These questions, such as “How do boundaries shape who we are?” or “How does the Peninsula Desert influence climate in the Arabian Gulf?” focus on critical geographic analysis. This enhances student critical thinking and understanding, while also raising questions in response to their ideas; this, in turn, provides students with the opportunity to develop their own geographic questions.
2	Explain Geographic Concepts, Principles, and Processes	The teacher plans lessons and units which focus on key geographic concepts (e.g. place, space, location, scale, spatial pattern, distribution, region, etc.). The teacher illustrates how the geographical content explored in class connects with geographic concepts and processes. The teacher engages students in inquiries which require them to explore how geographic processes (both physical and human) shape and influence a place (e.g. how erosion shapes the terrain, how population movement and/or migration influence a place). This practice provides students with opportunities to engage in conceptual analysis and gain understanding for geographic themes, sources, and processes.
3	Select and Adapt Geographic Sources	The teacher centers instruction upon appropriate, engaging geographic sources which could include text, maps, atlases, globes, satellite images, diagrams and landscapes. Sources should involve both primary and secondary texts. They must also be of high quality, achieve learning objectives, examine multiple perspectives and be accessible to students. The practice must also focus on how a teacher engages students with sources; for instance, they could design source-oriented activities or apply scaffolding questions. This practice also creates opportunities for students to gather and use various types of geographic sources. The teacher could organize and engage students with well-planned field trips to gather data from the field. Such fieldwork helps students to experience a “space”; they can investigate the landscape’s physical and human features and how such aspects are associated

		with the space. This practice provides rich learning opportunities for students by creating authentic experiences.
4	Use Geographic/Spatial Representation and Geospatial Technology Tools	The teacher uses various types of spatial representation tools which include maps, atlases, globes, landscapes, diagrams, satellite images, aerial images, etc. They should work with geospatial technologies, such as Geographic Information Systems (GIS), Remote Sensing (RS), and/or the Global Positioning System (GPS), to construct student understanding for geographic topics. The teacher also applies geographic tools, including symbols, legends, scales, compass roses, and grid systems, to both construct and interpret maps. This practice gives students opportunities to choose the most appropriate maps and graphics, or to employ technologies, such as Google Earth, ArcGIS Online, or QGIS to answer specific questions about geographic issues. The students also design and draw maps, diagrams, and other graphics (e.g. sketch maps and mental maps) to present geographic information.
5	Develop Geographic and Spatial Reasoning	The teacher plans lessons and units which focus instruction on developing spatial reasoning. The teacher creates opportunities for students to analyze, understand, and interpret spatial relationships, patterns, and distributions (e.g. by analyzing how migration and population growth influence settlement patterns). Furthermore, this practice involves spatial scale analysis to help improve student geographic identity and sense of place while also presenting multiple perspectives (e.g. by observing and analyzing geographic phenomena via local, regional, national, and/or global lenses). This practice also relies upon the teacher's ability to prepare scaffolding questions which enhance student spatial reasoning skills.
6	Evaluate Sources and Employ Geographic Evidence	The teacher shows students how to use evidence to both address geographical questions, and develop and evaluate geographic claims. This practice can either involve a teacher asking students to find appropriate data themselves, or see the teacher provide them with geographic sources from which to select the relevant information. This practice focuses on how a teacher helps students to evaluate multiple forms of sources (e.g. primary and secondary texts, visuals, maps, graphs, etc.) to find and select relevant data to support and develop claims. Essentially, the teacher develops student ability to evaluate sources and understand the connections between evidence and claims.
7	Construct Geographic Explanations and Predictions	The teacher creates opportunities for students to conduct and communicate geographical analysis via constructed explanations and predictions. This practice focuses on how a teacher designs activities which help students to use explanations and predictions to undergird their arguments and claims, and then take informed-action. For instance, students could analyze traffic patterns in specific areas in order to predict how they might change in the future, constructing explanations for their ideas as part of the process. Students develop explanations and predictions via written text, which may also include numbers, graphs, pictures, and maps.
8	Develop Informed-Geographic Action	The teacher creates opportunities for students to take-informed action about geographic problems and issues. (For example, students could take action regarding the best potential locations for building a new airport.) This practice focuses on employing and communicating reasoning, geographic explanations and using evidence through taking informed action. Here, decisions are made based upon combining the application of critical spatial reasoning with the most relevant, available geographic evidence.

Discussion

Geographic inquiry is one of the most effective teaching approaches, where students make informed decisions about the complex interactions between human and natural systems (Brooks, 2013; Biddulph et al., 2015; Demirci, 2009; Heffron & Downs, 2012). Research asserts that the application of an inquiry-based teaching approach offers a critical lens through which to analyze and better understand the concept of place and the interconnection between the physical and human world from geographic perspectives (Harte & Reitano, 2016; Kuisma, 2018; Oberle, 2020). As already noted, the results from the present study systematically generated a list of eight core teaching practices to facilitate geographic inquiry through a Delphi study. Each practice is considered a fundamental component to significantly enhance geographic inquiry in secondary classrooms.

The present study attempts to address the following question: *What core practices for facilitating geographic inquiry have been identified through a Delphi study?* The results revealed that the use of geographic questions is the first and major practice to facilitate geographic inquiry. Engaging in geographic inquiry plays a vital role in facilitating geographic inquiry, guiding teachers and students to explore and engage with geographic content. By formulating well-structured questions, this approach simulates students' curiosity and engages them in exploring content and thinking critically to answer questions (Probine et al., 2023). However, the use of geographic questions is not similar to using mathematics questions, scientific questions, or even questions in history (another social studies subject). In geography, the formulation of questions involves "where" or "why-to-where" to explore spatial relationships, distribution patterns, and spatial interconnectedness. As Gersmehl (2014) indicated that the key questions within geographic inquiry usually begin with "where?" Simultaneously, the results revealed that "explaining geographic concepts, principles, and process" is a core component of geographic inquiry. Effective geographic inquiry must enhance students to explain the geographic concepts, principles, and process. This practice provides students with opportunities to engage in conceptual analysis and gain an in-depth understanding of geographic themes, concepts, and processes. Thus, geographic inquiry should focus on presenting critical questions about geographic issues and problems to address (Michell, 2013).

Moreover, the results revealed select and adapt geographic sources to be a core practice to facilitate geographic inquiry. Geographic inquiry instruction should engage students with source-oriented activities in which teachers apply scaffolding questions to encourage students to use and/or collect multiple sources (e.g., text, maps, atlases, satellite images, and graphs) to explore multiple perspectives and reach a conclusion. Moreover, geographic inquiry encourages teachers to organize and engage students with well-planned field trips to gather data from the field. Field trips are considered an important geographic source because they help students experience a space; they can investigate the landscape's physical and human features and how such aspects are associated with the space (Lambert & Morgan, 2010). Extant research demonstrates that using fieldwork or field trips facilitates "doing" geography by providing rich learning opportunities for students through the creation of authentic experiences (Kinder, 2013; Klein, 1995; Spronken-Smith, 2005). In addition, to facilitate geographic inquiry, the use of geographic/spatial representation and geospatial technology tools is another core practice. Teachers can use various types of spatial representation tools and work with geospatial technologies, such as Geographic Information Systems (GIS), Remote Sensing (RS), and/or the Global Positioning System (GPS), to construct students' understanding of geographic topics. In recent years, many studies have argued the importance of using geospatial technology tools as an inquiry tool to investigate geographic issues and answer questions (Alazmi, 2020; Heffron & Downs, 2012). For instance, the revised National Geography Standards focus on the importance of using representation tools and geospatial technologies to facilitate inquiry (Heffron & Downs, 2012).

In addition, the results highlighted developing geographic reasoning as one of the core practices for facilitating geographic inquiry. Teachers must prepare scaffolding questions that enhance students' spatial reasoning skills, such as analyzing, understanding, and interpreting spatial relationships, patterns, and distributions (Al-Azmi, 2021). Through geographic inquiry, students must interpret, analyze, synthesize, and evaluate geographic data to better understand the Earth's landscape. This practice confirms Gersmehl's (2014) view that geographic inquiry must engage students with geographic data and reasoning to understand the world around them and enable them to solve spatial problems or make informed decisions. Moreover, geographic inquiry must encourage students to evaluate sources and employ geographic evidence. Students must not only use sources, but also be enabled to evaluate sources and employ evidence to support their answers.

This practice can either involve a teacher asking students to find appropriate data themselves or providing them with geographic sources from which to select the relevant information. Hicks et al. (2012) indicated that an inquiry-based learning approach is a systematic approach that helps support students' understanding via evidence-based explanations. This practice develops student ability to evaluate sources and understand the connections between evidence and claims.

Furthermore, one of the core practices for facilitating geographic inquiry is constructing geographic explanations and predictions. In this practice, the teacher creates opportunities for students to conduct and communicate geographical analyses via constructed explanations and predictions. This practice focuses on how a teacher designs activities that help students use explanations and predictions to undergird their arguments and claims and then enable them to develop informed-geographic action. For example, students can analyze geographic data to predict how phenomena might change in the future, constructing explanations for their ideas as part of the process. Students can also develop explanations and predictions via written text, which may include numbers, graphs, pictures, and maps. Another practice for facilitating geographic inquiry is enabling students to develop informed-geographic action. The teacher must create opportunities for students to take informed action about geographic problems and issues. Many studies argue that geographic inquiry should engage students in addressing geographic questions by acquiring, organizing, and analyzing geographic data and geographic argumentation; solving real-world problems; and taking informed action (Dhakal, 2019; Fisher & Binns, 2016; Golightly, 2021; Kocalar & Demirkaya, 2017). Taking informed-geographic action focuses on employing and communicating reasoning and geographic explanations and using evidence by taking informed action. The decision should be made based upon a combination of the application of critical spatial reasoning with the most relevant available geographic evidence.

It is important to clarify that the eight core practices identified for facilitating geographic inquiry do not function separately; rather, they operate simultaneously and interconnectedly, with multiple practices coming into play during geographic inquiry. For example, teachers can use geographic questions to engage students in using geographic sources and spatial reasoning skills to investigate geographic concepts and principles. It could involve more than practice to support geographic inquiry. Kocalar and Demirkaya (2017) indicated that inquiry begins with a critical question or problem that requires students to engage with multiple practices via a series of methodical steps to

reach a solution or conclusion. The findings of the present study reinforce the objectives stated in *A Road Map for 21st Century Geography Education*, which highlights the essential components of conducting geography through three stages of inquiry: (1) asking questions; (2) acquiring, organizing, and analyzing data; and (3) answering questions and communicating information. These categories encompass the key practices that enable students to engage in geographic inquiry, aligning with the results of the present study.

Conclusion

This study attempted to address a deficiency in the literature by creating a set of core practices for teaching geography based upon professional consensus. The set of practices that emerged from this study also provide a clear description regarding how each practice could be achieved in the classroom.

Practical implications: Regarding this study's practical implications, the study offered significant insights into "how" and "why" it is important to integrate geographic inquiry in secondary-level geography classrooms. The results indicate a need to raise awareness among educational stakeholders and curriculum developers regarding the importance of incorporating these core practices into the geography curriculum. Future curricula standards must include the core practices to facilitate geographic inquiry and provide resources to cultivate a more effective geographic inquiry environment. Moreover, the study clarified how these practices could be used by teachers in classrooms. The researcher thus recommends developing training courses and workshops to encourage teachers to integrate these practices into teaching geography. Training teachers to formulate well-structured questions and guide students toward informed actions would enhance the overall quality of teaching geography.

Limitations and Future Research: Although this study provides a clear list and descriptions of core practices to facilitate geographic inquiry, the researcher acknowledges some limitations. First, the study's results are based on the consensus of 27 experts, including geography teachers and geography-teacher educators in Kuwait. The selected experts may not represent the full opinions in the field of geography education. Thus, future research could expand the number of experts and diversity to include a wider range of geographic locations, educational backgrounds, and

professional expertise to enhance the representativeness of findings. Second, the present study provides a list of core practices to facilitate inquiry; indeed, it is not measuring its effectiveness on students' learning. Thus, future research could investigate the effects of these practices on students' achievement and learning. Future research could use an experimental approach to examine the effectiveness of these practices on students' learning. Finally, the current study provides guidance for teachers to use these practices in classrooms, but it does not address the challenges and difficulties they may face when applying these practices. Thus, future research could focus on the practical implementation of these practices to explore how teachers adopt them and what challenges they may face. The suggested future research insights would help explicate the effectiveness of the practices while also identifying areas for improvement in teaching strategies and curriculum design.

References

Al-Azmi, H. S. (2021). Middle School Social Studies Teachers Experiences in Teaching Spatial Thinking in Social Studies Classrooms in Kuwait: An Exploratory Study. *Journal of Education*/Al Mejlh Altrbwyh, (141).

Al-Maamari, S. N. (2022). Developing global citizenship through geography education in Oman: exploring the perceptions of in-service teachers. *International Research in Geographical and Environmental Education, 31*(1), 22-37

Al-Nofli, M. A. (2013). The state of geography in basic education schools in Muscat, Oman. *International Research in Geographical and Environmental Education, 22*(2), 109-119.

Alajmi, A. H. (2016). Algebraic generalization strategies used by Kuwaiti pre-service teachers. *International journal of science and mathematics education, 14*, 1517-1534.

Alajmi, M. (2021). The effect of blended learning on the degree of students' acquisition of geography skills for the eleventh level at the secondary stage in Kuwait. *Journal of Social Studies Education Research, 12*(4), 93-120.

Alazmi, H. S. (2020). *The development of GIS instructional model facilitate authentic intellectual work in secondary social studies classrooms in Kuwait.* Virginia Polytechnic Institute and State University.

Alazmi, H. S. (2022). Leveraging international experts' perspectives to reframe citizenship in Social Studies Curriculum during the globalisation era: shifting to a global citizenship education. Globalisation, *Societies and Education, 20*(3), 291-309.

Alazmi, H. S., & Alemtairy, G. M. (2024). The effects of immersive virtual reality field trips upon student academic achievement, cognitive load, and multimodal presence in a social studies educational context. *Education and Information Technologies*, 1-23.

Barron, B., & Darling-Hammond, L. (2010). Prospects and challenges for inquiry-based approaches to learning. The nature of learning: Using research to inspire practice, 199-225.

Beach, R., Webb, A., & Thein, A. H. (2015). Teaching to exceed the English Language Arts Common Core State Standards: A critical inquiry approach for 6-12 classrooms. Routledge.

Bednarz, S., Heffron, S., & Huynh, N. (2012). A road map for 21st century geography education. *Washington, DC: Association of American Geographers*.

Biddulph, M., Lambert, D., & Balderstone, D. (2015). *Learning to teach geography in the secondary school: A companion to school experience*. Routledge.

Casinader, N., & Kidman, G. (2018). Fieldwork, sustainability, and environmental education: The centrality of geographical inquiry. *Australian Journal of Environmental Education, 34*(1), 1-17.

Chang, C. H., Wu, B. S., Seow, T., & Irvine, K. (Eds.). (2018). *Learning geography beyond the traditional classroom*. Springer Singapore.

Chu, A. M. Teaching Practice & the Effectiveness of Geography Teaching: Appraisal of Secondary Schools in Anglophone Cameroon. (2018). *International Journal for Scientific Research & Development,* 6 (03), 116-122

Demirci, A. (2009). How do teachers approach new technologies: Geography teachers' attitudes towards Geographic Information Systems (GIS). *European Journal of Educational Studies*, *1*(1), 43-53.

Dhakal, K. R. (2019). Teaching Geography in Secondary School: Teachers Perceptions and Experiences. *The Geographic Base*, *6*, 32-41.

Dinkelman, T., & Cuenca, A. (2020). A turn to practice: Core practices in social studies teacher education. *Theory & Research in Social Education*, *48*(4), 583-610.

Dobber, M., Zwart, R., Tanis, M., & van Oers, B. (2017). Literature review: The role of the teacher in inquiry-based education. *Educational Research Review, 22*, 194-214.

Donohoe, H., Stellefson, M., & Tennant, B. (2012). Advantages and limitations of the e-Delphi technique: Implications for health education researchers. *American Journal of Health Education, 43*(1), 38-46.

Duffy, T. M., & Raymer, P. L. (2010). A practical guide and a constructivist rationale for inquiry based learning. *Educational Technology*, 3-15.

Edelson, D. C., Wertheim, J. A., Schell, E. M., & The Leadership Team of the Road Map for Geography Education Project. (2013). Creating a road map for 21st century geography education: Project overview. *The Geography Teacher*, *10*(1), 1-5.

Ezeudu, S. A., Gbendu, G. O., & Joshua, E. U. (2014). School location versus academic achievement in Geography: Does reflective inquiry instructional technique has effect. *Indian Journal of Research, 3*(9), 209-216.

Fisher, C., & Binns, T. (2016). *Issues in geography teaching*. Routledge.

Fogo, B. (2014). Core practices for teaching history: The results of a Delphi panel survey. *Theory & Research in Social Education*, *42*(2), 151-196.

Gersmehl, P. (2014). *Teaching geography*. Guilford Publications.

Golightly, A. (2021). Self-and peer assessment of preservice geography teachers' contribution in problem-based learning activities in geography education. *International Research in Geographical and Environmental Education, 30*(1), 75-90.

Grossman, P. (Ed.). (2018). Teaching core practices in teacher education. Harvard Education Press.

Grossman, P., Compton, C., Igra, D., Ronfeldt, M., Shahan, E., & Williamson, P. (2009). Teaching practice: A cross-professional perspective. *Teachers College Record, 111*(9), 2055–2100. https:// www.tcrecord.org/Content.asp?ContentId=15018

Harte, W., & Reitano, P. (2016). "Doing Geography": Evaluating an Independent Geographic Inquiry Assessment Task in an Initial Teacher Education Program. *Journal of Geography*, *115*(6), 233-243.

Heffron, S. M., & Downs, R. M. (Eds.). (2012). *Geography for life: National geography standards*. National Council for Geographic Education.

Hsu, C. C., & Sandford, B. A. (2007). The Delphi technique: making sense of consensus. *Practical assessment, research, and evaluation, 12*(1), 10.

Irawan, R. A., Maryani, E., & Ruhimat, M. (2021, March). Geographical inquiry skills on implementation of participants at geography in high school at bandung city. In IOP

Conference Series: *Earth and Environmental Science* (Vol. 683, No. 1, p. 012035). IOP Publishing.

Jain, C., & Getis, A. (2003). The effectiveness of internet-based instruction: An experiment in physical geography. *Journal of Geography in Higher Education*, *27*(2), 153-167.

Jo, I., & Bednarz, S. W. (2009). Evaluating geography textbook questions from a spatial perspective: Using concepts of space, tools of representation, and cognitive processes to evaluate spatiality. *Journal of Geography*, *108*(1), 4-13.

Jongwon, L. E. E. (2020). Designing an inquiry-based fieldwork project for students using mobile technology and its effects on students' experience. *Review of International Geographical Education Online*, *10*(1 (Special Issue)), 14-39.

Kerawalla, L., Littleton, K., Scanlon, E., Jones, A., Gaved, M., Collins, T., ... & Petrou, M. (2013). Personal inquiry learning trajectories in geography: Technological support across contexts. *Interactive learning environments*, *21*(6), 497-515.

Kidman, G. (2012). Geographical inquiry in Australian schools: A retrospective analysis. International Research in Geographical and Environmental Education, 21(4), 311-319.

Kinder, A. (2013). What is the contribution of fi eldwork to school geography?. In *Debates in geography education* (pp. 196-208). Routledge.

Klein, P. (1995). Using inquiry to enhance the learning and appreciation of geography. *Journal of Geography*, *94*(2), 358-367.

Kloser, M. (2014). Identifying a core set of science teaching practices: A Delphi expert panel approach. *Journal of Research in Science Teaching*, *51*(9), 1185-1217.

Kocalar, A. O., & Demirkaya, H. (2017). Geography teachers' views on effective geography teaching. *Review of International Geographical Education Online*, *7*(3), 332-346.

Kuisma, M. (2018). Narratives of inquiry learning in middle-school geographic inquiry class. *International Research in Geographical and Environmental Education*, *27*(1), 85-98.

Lambert, D. (1999). Exploring the use of textbooks in Key Stage 3 geography classrooms: a small‐scale study. *Curriculum Journal*, *10*(1), 85-105.

Lambert, D., & Morgan, J. (2010). *EBOOK: Teaching Geography 11-18: A Conceptual Approach*. McGraw-Hill Education (UK).

Lee, S. J., Kriewaldt, J., & Roberts, M. (2022). Cross‐national comparisons of inquiry learning in secondary geography curricula. *The Curriculum Journal*, *33*(1), 42-60.

Maddox, L. E., Howell, J. B., & Saye, J. W. (2018). Designing geographic inquiry: Preparing secondary students for citizenship. *Journal of Geography*, *117*(6), 254-268.

McDonald, M., Kazemi, E., & Kavanagh, S. S. (2013). Core practices and pedagogies of teacher education: A call for a common language and collective activity. *Journal of teacher education*, *64*(5), 378-386.

Michaeli, E., Madziková, A., & Solár, V. (2014). Inquiry-based learning as a new way of teaching geography in Slovak schools. In 14th INTERNATIONAL MULTIDISCIPLINARY SCIENTIFIC GEOCONFERENCE SGEM 2014 (pp. 641-646).

Millican, J. S., & Forrester, S. H. (2018). Core practices in music teaching: A Delphi expert panel survey. *Journal of Music Teacher Education*, *27*(3), 51-64.

Milson, A. J., Demirci, A., & Kerski, J. J. (Eds.). (2012). *International perspectives on teaching and learning with GIS in secondary schools* (p. 315). New York: Springer.

Mkhize, T. (2023a). Experiences of the Geography Subject Advisors in the Implementation of Geographic Information Systems in KwaZulu-Natal Province. *Research in Social Sciences and Technology, 8*(1), 63-73. https://doi.org/10.46303/ressat.2023.5

Mkhize, T. (2023b). Teachers' Perceptions of Paper-Based GIS Implementation in The Rural Learning Ecology. *Journal of Curriculum Studies Research, 5*(2), 118-135. https://doi.org/10.46303/jcsr.2023.20

Morrell, P. D., & Carroll, J. B. (2010). *Conducting educational research: A primer for teachers and administrators*. Brill.

National Council for the Social Studies. (2013). The college, career and civic life (C3) framework for social studies state standards: Guidance for enhancing the rigor of K-12 civics, economics, geography and history. https://www.socialstudies. org/standards/c3

Nunaki, J., Damopolli, I., Kandowangko, N., & Nusantri, E. (2019). The effectiveness of inquiry-based learning to train the students' metacognitive skills based on gender diffeSrences.

Oberle, A. (2020). Advancing students' abilities through the geo-inquiry process. *Journal of Geography*, *119*(2), 43-54.

Osborne, J., Collins, S., Ratcliffe, M., Millar, R., & Duschl, R. (2003). What "ideas-about-science" should be taught in school science? A Delphi study of the expert community. *Journal of research in science teaching*, *40*(7), 692-720.

Pawson, E., Fournier, E., Haigh, M., Muniz, O., Trafford, J., & Vajoczki, S. (2006). Problem-based learning in geography: Towards a critical assessment of its purposes, benefits and risks. *Journal of geography in higher education*, *30*(1), 103-116.

Pedaste, M., Mäeots, M., Siiman, L. A., De Jong, T., Van Riesen, S. A., Kamp, E. T., ... & Tsourlidaki, E. (2015). Phases of inquiry-based learning: Definitions and the inquiry cycle. *Educational research review*, *14*, 47-61.

Polit, D. F., & Hungler, B. P. (1997). *Study guide to accompany essentials of nursing research: Methods, appraisal, and utilization*. Lippincott.

Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., ... & Duffy, S. (2006). Guidance on the conduct of narrative synthesis in systematic reviews. A product from the ESRC methods programme Version, 1(1), b92.

Probine, S., Perry, J., Burke, R., Alderson, J., & McAlevey, F. (2023). An Examination of Inquiry-Based Project Learning in Early Childhood Settings in Aotearoa/New Zealand. *Early Childhood Education Journal*, *1*-11.

Puttick, S. (2013). Looking at and looking along: a conceptual framework for teaching different perspectives in geography. *International Research in Geographical and Environmental Education*, *22*(4), 353-366.

Schlemper, M. B., Athreya, B., Czajkowski, K., Stewart, V. C., & Shetty, S. (2019). Teaching spatial thinking and geospatial technologies through citizen mapping and problem-based inquiry in grades 7-12. Journal of Geography, 118(1), 21-34.

Seow, T., Chang, J., & Neil Irvine, K. (2019). Field-based inquiry as a signature pedagogy for geography in Singapore. Journal of Geography, 118(6), 227-237.

Silviariza, W. Y., & Handoyo, B. (2021). Improving Critical Thinking Skills of Geography Students with Spatial-Problem Based Learning (SPBL). *International Journal of Instruction*, *14*(3), 133-152.

Siphukhanyo, L., & Olawale, B. (2024). Chronicling the Experiences of Life Sciences Teachers and Learners on the Usage of Enquiry-Based Learning in Enhancing Learners' Academic Performance. *Journal of Culture and Values in Education*, *7*(1), 19-36. https://doi.org/10.46303/jcve.2024.2

Spronken-Smith, R. (2005). Implementing a problem-based learning approach for teaching research methods in geography. *Journal of Geography in Higher Education*, *29*(2), 203-221.

Tapsfield, A. (2016). Teacher education and the supply of geography teachers in England. *Geography*, *101*(2), 105-109.

Uhl, N. P. (1983). Using the Delphi technique in institutional planning. *New directions for institutional research*, *1983*(37), 81-94.

Utami, W. S., & Zain, I. M. (2018). Geography literacy can develop Geography skills for high school students: is it true?. In IOP Conference Series: Materials Science and Engineering (Vol. 296, No. 1, p. 012032). IOP Publishing.

Windschitl, M., Thompson, J., Braaten, M., & Stroupe, D. (2012). Proposing a core set of instructional practices and tools for teachers of science. *Science education*, *96*(5), 878-903.

Xuan, X., Jin, Q., Jo, I., Duan, Y., & Kim, M. (2019). The potential contribution of geography curriculum to scientific literacy. Journal of Geography, 118(5), 185-196.

Yeung, S. (2010). Problem-based learning for promoting student learning in high school geography. Journal of Geography, 109(5), 190-200.