NHIỀU TÁC GIẢ

HỘI THẢO KHOA HỌC QUỐC TẾ
VĂN HÓA VÀ GIÁO DỤC LẦN THỨ 6 - ICCE 2025

Văn hóa và Giáo dục trong kỷ nguyên số hướng tới phát triển bền vững

THE 6th INTERNATIONAL CONFERENCE
ON CULTURE AND EDUCATION - ICCE 2025

Culture and Education in the Digital Era towards Sustainable Development

6e COLLOQUE INTERNATIONAL
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Culture et éducation à l'ère numérique vers un développement durable

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ENHANCING THE EFFECTIVENESS OF TEACHING ORGANIZATION TO DEVELOP GEOGRAPHICAL SCIENTIFIC LITERACY IN 10TH-GRADE GEOGRAPHY

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Abstract: *The 2018 General Education Program mandates the development of students' Geographical Scientific Cognitive Competence (GSCC) as a core objective of the Geography subject (Bộ Giáo dục và Đào tạo, 2018). However, many educators continue to face difficulties in systematically and effectively organizing learning activities to foster this competence. This study is aimed at: (1) systematizing the theoretical basis of GSCC and its manifestations within the Grade 10 Geography curriculum; and (2) proposing specific, feasible pedagogical interventions. The article introduces three primary groups of measures: applying active teaching methodologies and techniques; integrating Information and Communication Technology (ICT) into learning activity organization; and innovating assessment and evaluation toward competence development. These measures are synthesized into a unified procedural framework, supported by a conceptual model designed to enhance both theoretical coherence and classroom applicability. This framework provides educators with a structured, theoretically grounded approach to designing and deploying Grade 10 Geography lessons, thereby contributing to the sustainable development of students' GSCC and meeting the requirements of the new curriculum.*

Keywords: *Teaching organization, geographical scientific cognitive competence, competence development, geography education, Grade 10 Geography.*

1. INTRODUCTION

In the 21st century, rapid scientific-technological advances and global educational shifts have catalyzed a strong movement from content-based curricula toward competency-based approaches (CBE). In Vietnam, the implementation of the 2018 General Education Program is fundamentally aimed at cultivating essential qualities and competencies in students (Bộ Giáo dục và Đào tạo, 2018). Within the subject of Geography, Geographical Scientific Cognitive Competence (GSCC) is identified as a core disciplinary competence that the curriculum is required to develop (Bộ Giáo dục và Đào tạo, 2018; Lambert & Balderstone, 2009).

However, pedagogical practice reveals that many high school educators still face significant challenges in systematically and effectively organizing learning activities to foster GSCC. The key issue extends beyond merely selecting active teaching methods; it resides in the absence of a unified procedural framework and a comprehensive conceptual model that can seamlessly integrate disparate instructional methods into a cohesive sequence of pedagogical actions. This deficiency often results in teaching

methods being applied in isolation, which diminishes the overall theoretical coherence and comprehensive classroom applicability of the instruction. Furthermore, to solidify the theoretical underpinning of this research, it is essential to expand the literature review to include more extensive and recent international studies, thereby enhancing scholarly rigor and currency.

Addressing these research gaps, this article focuses on the central research question: How should instructional organization be structured to effectively develop Geographical Scientific Cognitive Competence in 10th-grade students?

The specific objectives of this study are to: (1) Systematize the theoretical basis of GSCC and its manifestations within the Grade 10 Geography curriculum; (2) Propose three groups of specific, feasible pedagogical interventions (comprising active teaching methods, ICT integration, and innovative assessment); (3) Construct a synthesized conceptual model to integrate these proposed interventions into a coherent teaching process, thereby enhancing theoretical robustness and practical applicability in the classroom.

This study holds significant theoretical and practical implications: it clarifies the process of competency-based instructional organization and provides educators with an integrated teaching model, along with reference materials and useful tools, for designing effective and systematic Grade 10 Geography lessons.

2. CONTENT

2.1. The Structure of Geographic Scientific Cognition Competency: Components and Manifestations

The Geographic Scientific Cognition Competency is constituted by two fundamental components:

- First, the competency to perceive the world from a spatial perspective, which is manifested in the ability to identify geographical objects, phenomena, and processes in relation to specific territories (Lambert & Morgan, 2010). This component enables students to answer the core questions of geographical thinking: *What? Where?* and *How?*

- Second, the competency to explain geographical phenomena and processes, which is demonstrated through the ability to analyze and clarify the causal and interactive relationships among natural geographical phenomena and processes (Dược & Phúc, 2010); among socio-economic geographical phenomena and processes; as well as between the natural and socio-economic systems. The integration of these two components forms the foundation for students to develop geographic scientific thinking, thereby allowing them to understand and explain spatial issues in practice.

2.2. Proposed pedagogical measures to develop geographical scientific cognitive competence for 10th-grade high school students

The proposed pedagogical measures are based on the principles of active teaching and learning (Cường & Meier, 2012; Đức & Hằng, 2012).

2.2.1. Applying active teaching methods and techniques.

*** Socratic questioning method**

The Socratic questioning method is a teaching approach in which the teacher uses a series of leading, open-ended questions to guide students step-by-step in exploring and solving a major problem (Cường & Meier, 2012). By answering the smaller questions, students gradually complete the answer to the main question, thereby acquiring knowledge actively and profoundly.

Implementation Procedure

+ Step 1: Define lesson objectives and content. The teacher must clearly identify the knowledge and competencies to be developed. These objectives are then transformed into a sequence of leading and open-ended questions tailored to the students.

+ Step 2: Prepare the questioning framework and anticipate scenarios. Anticipate the questions, the timing, and their logical sequence (where each question builds upon the previous one). Concurrently, the teacher should predict students' potential answers, common difficulties, and mistakes, and prepare follow-up questions for timely support.

+ Step 3: Implement and adapt during the lesson. The teacher uses the prepared questions in the teaching activity, flexibly adjusting them to suit individual students and paying close attention to their feedback.

Example: Organizing instruction to develop geographical scientific cognitive competence (Lesson 4: Major geographical consequences of Earth's movements) (Thông et al., 2022).

The lesson content focuses on analyzing the consequences of the Earth's movement around the Sun.

Step 1: Define lesson objectives.

+ Knowledge objectives: Students are able to analyze the geographical consequences of Earth's movement around the Sun and relate these phenomena to local reality (such as the seasons and the variation in day and night length).

+ Competence objectives: Students develop geographical scientific cognitive competence by:

- Perceiving the world from a spatial perspective: Using a geographical video to identify the orbit and the consequences of the movement.

- Explaining geographical phenomena and processes: Detecting and explaining the consequences of the movements.

+ Guiding question: The above objectives are converted into an open-ended question, for example: "Analyze the consequences of Earth's movement around the Sun."

Step 2: Implement the learning activities.

The teacher has students observe a video about the consequences of Earth's movement around the Sun (combined with information from the textbook) and poses the following open-ended questions:

+ Describe the Earth's orbit and direction of movement around the Sun. What are the characteristics of Earth's axis during this movement?

+ Define the seasons. What causes the seasons? What are the start and end dates of the seasons in the Northern and Southern Hemispheres according to the solar calendar? How do the seasons occur in Vietnam?

+ When/during which season is the day longer than the night in the Northern Hemisphere and shorter in the Southern Hemisphere? Why?

+ When/during which season is the day shorter than the night in the Northern Hemisphere and longer in the Southern Hemisphere? Why?

+ On which specific days is the day length equal to the night length everywhere on Earth? Why?

+ Which locations on Earth have equal day and night length throughout the year? Why?

Step 3: Conclude and evaluate: Based on students' answers, the teacher makes adjustments, supplements knowledge, or poses additional follow-up questions to clarify the issue and standardize the knowledge.

*** Problem-posing and problem-solving method.**

The problem-solving teaching method is a pedagogical approach based on the principles of creative knowledge acquisition, simulating the process of scientific inquiry (Dược & Phúc, 2010). The essence of this method is to build a series of "problem situations" or "learning situations" to guide students toward a solution. As a result, students not only gain a firm grasp of knowledge but also develop creative thinking and form a scientific worldview.

Implementation Procedure

- Step 1: Establish problem situations. The teacher creates and presents problem situations, helping students identify and clearly define the issues to be solved.

- Step 2: Solve the problem. Students propose hypotheses, develop a plan, and execute it to find a solution.

- Step 3: Conclude and evaluate. Based on the results obtained, students analyze and evaluate them, thereby proving or refuting the initial hypotheses. Finally, they draw accurate conclusions and may even discover new problems.

Example: Organizing instruction to develop geographical scientific cognitive competence (Lesson 7: Atmosphere. Air Temperature)

The lesson content focuses on the distribution of air temperature on Earth.

- Step 1: Establish problem situations.

The teacher poses challenging problem situations to stimulate students' thinking, such as:

+ Why is the highest solar angle at the equator, but the average annual temperature there is lower than at the tropics?

+ Why does the highest temperature of the day often occur around 1 p.m. instead of at noon?

+ Why do locations at the same 48°N latitude in Figure 7.1 have different temperatures in January and July, even though the average annual temperature typically varies with latitude?

- Step 2: Solve the problems.

After presenting the above problems, the teacher guides students toward a solution by prompting them to apply their previously learned knowledge about the factors influencing air temperature to find the answers.

- Step 3: Synthesize and conclude.

The teacher guides students to analyze and evaluate their arguments, leading them to a final conclusion for each problem that was presented.

*** Group discussion method**

The group teaching method (also known as group discussion) is a pedagogical approach that places students in a learning environment within small groups (Dự án Việt - Bỉ, 2010). The main purpose of this method is to encourage interaction, exchange, and the development of collaborative skills among students.

Implementation procedure

- Step 1: Introduction and task assignment: The teacher presents the problem and clearly defines the learning tasks for the students. The class is then divided into groups, and specific tasks are assigned. The groups may either work on the same task or different ones. The teacher also needs to instruct students on how to effectively carry out the group tasks.

- Step 2: Group work. The student groups actively discuss, exchange, analyze, and deliberate to complete the assigned tasks. During this process, the teacher observes and makes adjustments to ensure the discussion stays on track. The teacher does not directly answer questions or provide immediate feedback but instead acts as a facilitator, posing open-ended questions and supporting students in their search for necessary materials. Finally, a group representative is chosen to present the results.

- Step 3: Present and evaluate the results.

+ The groups present their results under the teacher's guidance (presentation formats may include the market, fair, or gallery walk methods). Other groups pose questions, provide comments, and give feedback.

+ Result evaluation: The teacher provides feedback, highlights key findings, clarifies core knowledge, adds missing information, or corrects any misconceptions.

Example: Organizing group instruction to develop geographical scientific cognitive competence (Lesson 8: Atmospheric Pressure, Winds, and Rain)

The lesson content focuses on studying some of the major wind types on Earth.

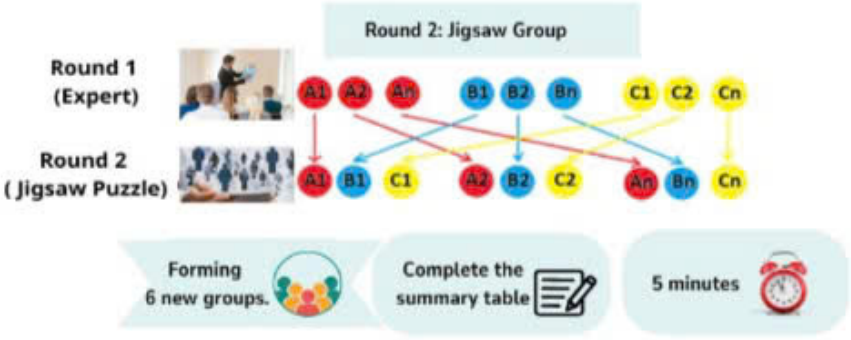
- Lesson objectives: Students are able to present the characteristics of the major wind types on Earth, including trade winds, westerlies, and monsoons.

- Geographical scientific cognitive competence:

+ Perceiving the world from a spatial perspective: Students use a map to identify the trade wind and westerlie belts. Additionally, they identify and explain the formation and activity of the main wind types (trade winds, westerlies, and monsoons).

+ Explaining geographical phenomena and processes: Students discover and explain the formation and characteristics of the major wind types on Earth.

- Step 1: Introduction and task assignment: The teacher divides the class into 6 groups, with each group receiving a specific task to study one major wind type, including aspects such as its origin, direction, period and area of activity, and properties.



COMPLETE THE SYNTHESIS TABLE

Characteristics	Origin	Scope of operation	Wind direction	Operating time	Properties
Trade winds					
Westerlies					
Monsoon					
Which wind systems influence Vietnam, and what are the reasons for their impact?					

- Step 2: Students work in groups.

The groups proceed with discussions, information exchange, and analysis. The process is carried out using the jigsaw technique as follows:

+ Round 1 (Expert Groups): The expert groups discuss to gain an in-depth understanding of the characteristics of each assigned wind type.

+ Round 2 (Jigsaw Groups): Students from the initial expert groups will regroup to form new, complete groups. In these new groups, they will share and collectively learn about all the major wind types, and then complete a summary table on A0 paper.

Throughout this process, the teacher plays the role of an observer and facilitator, ensuring the discussions stay on track and are effective.

- Step 3: Presenting results and providing peer-evaluation: The groups hang their products on the classroom walls. The teacher then has the groups provide feedback on and peer-evaluate their classmates' work, using a checklist as the assessment tool.

Item No	Criteria	Met	Note	Notes
1	Identify the correct origin of the three wind types			
2	Identify the correct scope of operation of the three wind types			
3	Identify the correct wind direction of the three wind types			
4	Identify the correct operating time of the three wind types			
5	Identify the correct properties of the three wind types			
6	Relates to the Vietnamese context			

The teacher provides feedback, ensures factual accuracy, and supplements any missing information or corrects any misconceptions

*** Experiential learning**

David A. Kolb defines experiential learning as the process of acquiring

knowledge and skills through personal experiences, linking emotions and learning (Trung & Hội, 2016). This method stimulates interest, creative thinking, soft skills, and self-confidence, while developing both general and specific skills such as observation, analysis, synthesis, and presentation. Experiential learning enhances Geographic Scientific Cognition Competency and the ability to apply geographic knowledge in practice. It can be flexibly implemented inside the classroom (experiments, communication, visual aids) and outside (field trips, local studies, educational games).

Implementation Process

- Step 1: Preparation for the Experiential Learning Activity.

This is the foundational phase to ensure the activity's success. The tasks to be performed include:

+ Identifying objectives and selecting a topic: Based on the learning objectives, the teacher selects an appropriate topic and determines the learning format for the students.

+ Designing tasks and content: Developing the content and specific tasks that students will perform during the experiential learning activity.

+ Creating a detailed plan: Developing a specific plan for organizing the ELA, including assigning tasks, preparing facilities, and other necessary resources.

- Step 2: Conducting the Experiential Learning Activity.

This phase focuses on implementing the plan developed in Step 1. This is when students directly perform the assigned tasks at the designated location to gather information, solve problems, and form new knowledge and skills.

Figure 1. David A. Kolb's Experiential Learning Model (1984)

According to David A. Kolb's model, the process of experiential learning unfolds in a continuous, closed cycle of four stages. While the sequence of the cycle must be followed, learners can begin at any point.

- The Concrete Experience (CE) Stage:

This is the stage where learners directly engage in real-world activities and specific tasks. These activities generate initial experiences, which serve as crucial "raw material" for the entire learning process that follows.

- The Reflective Observation (RO) Stage:

After the experience, students observe, process information, and reflect on the events that have occurred. Based on their existing knowledge and experience, students evaluate the reasonableness of the events, compare them with their personal experiences, and share their thoughts with others.

- The Abstract Conceptualization (AC) Stage:

Students analyze their observations and reflections to draw general conclusions about the problem. This is a key step that helps transform experiences into systematic personal knowledge. This stage allows learners to build theoretical models or abstract concepts.

- The Active Experimentation (AE) Stage:

Having drawn conclusions from the previous stages, students will apply the newly acquired knowledge to new contexts, situations, or objects. This experimentation not only helps to verify the validity of the synthesized theories but also creates new experiences, which completes a cycle and initiates the next learning cycle.

- Step 3. Evaluating the Results of the Experiential Activity.

This step involves: evaluating the organizational process, assessing the product, and measuring the competencies students have achieved after the activity. Finally, propose measures to improve the results.

Example: Organizing Experiential Learning.

Subject: Geography 10 (Cánh Diều Textbook).

Lesson: Lesson 4. Geographical Consequences of the Earth's Main Movements.

Content: Exploring the geographical consequences of the Earth's rotation on its axis - The alternation of day and night.

Process for Organizing the Experiential Activity

- Step 1: Preparing the Experiential Activity.

The teacher prepares the necessary materials and tools for the hands-on, exploratory activity. In this case, the teacher needs to prepare a globe model and a flashlight for students to experience directly.

- Step 2: Organizing the Experiential Activity.

+ Setting up the experiment: The teacher places the globe and flashlight in a dark room. The flashlight represents the Sun, and the globe represents the Earth.

+ Conducting observation: The teacher asks students to mark a random point 'A'

on the globe and then slowly rotate the globe in the direction of the Earth's rotation.

+ Data collection: Students are instructed to observe point 'A' as it moves into and out of the illuminated area (daytime) and the shaded area (nighttime).

+ Discussion and analysis: Based on their observations, students answer the questions on a worksheet, thereby drawing conclusions about the cause and mechanism of the alternation of day and night on Earth.

WORKSHEET

No	Question	Answer
1	Is point A always illuminated?	
2	When is point A illuminated? In that case, is the hemisphere containing point A experiencing day or night?	
3	When is point A not illuminated? In that case, is the hemisphere containing point A experiencing day or night?	
4	What causes the phenomenon of day and night?	
5	Explain the reason why every location on Earth experiences an alternating cycle of day and night?	

Students work individually, and the teacher calls on one student to describe the experiment on the Earth's rotation on its axis and answer the questions on the worksheet. The students then exchange their worksheets with a partner and grade each other's work.

FEEDBACK

No	Question	Answer	Score
1	Is point A always illuminated?	No	2,0
2	When is point A illuminated? In that case, is the hemisphere containing point A experiencing day or night?	When the hemisphere containing point A faces the flashlight, the illuminated hemisphere is day..	2,0
3	When is point A not illuminated? In that case, is the hemisphere containing point A experiencing day or night?	When the hemisphere containing point A is not facing the flashlight, the un-illuminated hemisphere is night.	2,0
4	What causes the phenomenon of day and night?	Due to the Earth's spherical shape	2,0
5	Explain the reason why every location on Earth experiences an alternating cycle of day and night?	Due to the Earth's rotation on its axis from west to east	2,0

- Step 3: Evaluation of the Experiential Learning Activity (ELA) Results.

In this phase, the teacher performs a comprehensive evaluation of the students' learning process. The assessment focuses not only on the final results but also on the implementation process itself:

+ Observing and evaluating the process: The teacher observes and provides feedback on students' attitudes, engagement, and communication and presentation skills.

+ Evaluating learning outcomes: The final results are assessed through the completion of the worksheet. The teacher can encourage students by awarding bonus points to proactive individuals or groups.

+ Checking for knowledge standards: Ensuring students meet the knowledge standards set for the lesson.

Through direct observation and by describing the experiment, students independently acquire new knowledge, understand, and can explain the cause of the alternating day and night phenomenon on Earth. Consequently, this method contributes effectively to the formation and development of geographical scientific literacy in students.

*** Project-based learning**

Project-based learning is a method in which students complete practical tasks under teacher guidance, closely integrating theory and practice. Students are highly autonomous throughout the process - from planning and implementation to evaluation - with teamwork at its core. This approach links theory to practice, develops competencies and soft skills, enhances problem-solving, and promotes collaboration and self-assessment. It enables students to build general competencies such as autonomy, communication, teamwork, and creative problem-solving, while developing Geography-specific competencies including Geographic Scientific Cognition, geographic inquiry, and the application of geographic knowledge and skills.

Implementation Process

- Step 1: Selecting a Project Topic and Determining its Purpose.

The teacher and students collaboratively propose and discuss to identify the project topic and objectives. The selected topic needs to be highly practical, contain a problem that needs to be solved, and be appropriate for the students' abilities. The project's content must link academic knowledge with a social context. The teacher can suggest a few topic directions for students to reference and choose from.

- Step 2: Developing an Implementation Plan.

The teacher guides students in developing an outline and a detailed plan for the project. This plan needs to clearly define the tasks to be carried out, the estimated timeline, resources (materials, budget), the methodology, and specific task assignments for each group member. Additionally, the teacher also develops and distributes evaluation checklists for the product criteria and the work process, providing students with clear guidance during the implementation.

Step 3: Project Implementation.

Group members assign tasks and proceed to execute the proposed plan. In this phase, theoretical and practical activities are interwoven, supporting each other. Students collect, synthesize, and analyze data from various sources to accumulate new knowledge while creating the final product of the project.

Step 4: Reporting and Presenting Results.

Project results can be presented in diverse formats such as a report, publication (newsletter, poster), video clip, or PowerPoint presentation. Students, either in groups or individually, are given maximum opportunity to present their product and the new knowledge they have acquired through the project process.

Step 5: Evaluating Results.

The teacher and students collaboratively evaluate the project's process and results based on the established criteria. The evaluation focuses on the quality of the product, the logic and creativity of the presentation, and the group's implementation methodology. From this, the teacher and students learn from the experience to improve for subsequent projects.

Example: When teaching Lesson 21: Geography of Agriculture, Forestry, and Fisheries - Cánh Diều Textbook, the teacher uses the project-based learning method.

- Project Name: Agriculture, Forestry, and Fisheries and their Role in Socio-economic Development.

- Products: PowerPoint presentation / Photo poster / A0 paper, etc.

- Project Objectives:

Specific Competencies:

+ Present the role and characteristics of the agriculture (crop farming, animal husbandry), forestry, and fisheries sectors.

+ Present and explain the distribution of some major crops and livestock worldwide.

+ Apply learned knowledge to explain the current state of agricultural, forestry, and fisheries production in the local area.

+ Proficiently use maps, process and analyze statistical data, and draw charts on agriculture, forestry, and fisheries.

General Competencies: Communication and collaboration competencies; Problem-solving and creative competencies; Self-control and self-directed learning competencies.

Implementation Steps

- Dividing Topics and Executing the Project The teacher divides the class into 4 groups and has students randomly draw lots to choose one of the following four topics:

+ Topic 1: Crop Farming. Requires presenting the role, characteristics, and distribution of some major crops worldwide. Relate this to the current state of major crops in the local area.

+ Topic 2: Animal Husbandry. Requires presenting the role, characteristics, and distribution of some major livestock worldwide. Relate this to the forms and directions of local animal husbandry.

+ Topic 3: Forestry. Requires presenting the role and characteristics of the forestry sector, providing specific examples, and explaining the importance of reforestation and its relevance to the local area.

+ Topic 4: Fisheries. Requires presenting the role and characteristics of the fisheries sector and the development status of the fishing and aquaculture industries worldwide. Relate this to the types of aquatic products being farmed in the local area.

After receiving the topic, the groups assign specific tasks to each member, proceed to gather materials, discuss, brainstorm ideas, and finalize the learning product (PowerPoint presentation, poster, or product on A0 paper).

- Reporting the Product.

The groups designate representatives to present their group's product. The report products include:

+ The full text of the project.

+ A summary report (in the form of a PowerPoint presentation, poster, or on A0 paper).

+ Accompanying illustrative products (data tables, images, video clips).

- Evaluation.

The teacher organizes for groups to peer-evaluate each other based on the previously provided criteria. Subsequently, the teacher summarizes and provides final feedback and evaluation on the products as well as the groups' work processes.

2.2.2. Application of information technology

The rapid development of information technology (IT) has brought transformative changes to education, becoming an essential tool for both teachers and students (Cường & Meier, 2012). IT assists teachers in searching for resources, designing engaging lessons, innovating teaching methods, and diversifying assessments. For students, IT promotes autonomous learning, expands learning spaces, and makes learning more flexible and engaging. These applications enhance teaching effectiveness and create an interactive, appealing environment, especially in Geography education:

Searching for Teaching Materials

The development of information technology (IT) has helped teachers easily find teaching materials from various sources on the internet. Through search engines like Google and Cốc Cốc, teachers can access and store a rich repository of resources including information, images, and videos about natural and socio-economic geographical phenomena and processes. Updating new data and current issues also helps to enhance the appeal and practicality of lectures.

Designing Lectures with IT Applications

In addition to using the visual aids available in textbooks, IT allows teachers to design new teaching materials themselves. Specialized software like MapInfo can be

used to design maps, while the Microsoft Office suite (Word, Excel, PowerPoint) supports the creation of diagrams, charts, data tables, and presentations. To create video clips, teachers can use software such as Editor, Video Converter, or HTV Video. Furthermore, graphics software like Photoshop and Paint help edit images and diagrams, increasing the visual appeal and effectiveness of the lecture.

Applying IT in Teaching Activities

The development of technology allows teachers to overcome the limitations of space and time in Geography teaching. The use of illustrative images and videos helps the learning objects become more visual, vivid, and up-to-date. Information technology also creates favorable conditions for teachers to organize cognitive activities using various modern teaching methods and techniques.

In review and reinforcement activities, teachers can apply multiple-choice exercises, mind maps, or educational games to create a dynamic, comfortable class atmosphere and help students deeply engrain knowledge.

Additionally, teachers can select and use specialized software like Google Maps and Google Earth to visualize geographical locations and phenomena; Google Forms to design surveys and tests; or Padlet and Quizizz to create effective interactive activities and assessments.

Applying IT in Testing and Evaluation

Information technology is also effectively applied in designing and implementing tests and evaluations. The integration of images, maps, charts, and data tables into test questions helps to reduce pressure, creating a more comfortable and interesting atmosphere for students.

For example, teachers can use online tools such as Google Forms or Quizizz to design tests, surveys, or review games, thereby assessing students' competencies in a flexible and objective manner.

Guiding Students in Self-study and Homework

Teachers can use technology to create conditions for flexible self-study. By uploading E-learning lectures to online platforms or designing WebQuests, students can easily access materials and complete learning tasks anytime, anywhere, with just an Internet-connected device.

Furthermore, students can also proactively use information technology to search for materials, process information, and carry out learning tasks under the teacher's guidance.

Thus, the application of information technology in teaching not only contributes to innovating teaching methods and improving learning effectiveness, but also plays an important role in stimulating students' interest and learning motivation. Through this, the method promotes the development of geographical competencies in general and geographical scientific literacy in particular.

2.2.3. Innovations in assessment

Competency assessment is the process of measuring a student's ability to apply learned knowledge and skills to solve problems in their studies and in real-life situations (Khanh et al., 2014). The assessment results are determined based on the level of task and exercise completion, thereby reflecting the different levels of students' competency development. The scale in competency assessment is not limited to whether a student has achieved a certain learning content but also focuses on the development of competencies at each level.

To accurately assess students' qualities and competencies, teachers need to diversify assessment forms and tools. The basis for assessment consists of the required qualities and competencies stipulated in the overall high school curriculum and the 10th-grade Geography curriculum. The scope of assessment includes the entire content and required outcomes of this subject's curriculum. Below are some assessment forms commonly used in 10th-grade Geography teaching:

Tests

Students' knowledge and skills are primarily assessed through written and oral tests. These assessment forms include both essay questions and objective-type questions.

- Essay Questions:

Essay questions are a form of assessment with open-ended questions that require students to present their own perspectives or arguments to solve a problem. This form is particularly effective in evaluating students' expression, thinking, and problem-solving competencies.

Essay questions help teachers assess students' cognitive levels, from knowledge and comprehension to application. To evaluate geographical scientific literacy competencies, essay questions should be built around practical contexts or situations, requiring students to apply their knowledge to complete the task.

+ Questions to Reinforce and Consolidate Knowledge:

These questions are intended to review and consolidate students' basic knowledge.

Example: Why is the soil in tropical and subtropical regions the oldest, while the soil in polar and temperate regions is the youngest?

Example: Why do different types of soil have different types of vegetation?

These questions require students to apply their learned knowledge to explain geographical phenomena, thereby strengthening their understanding of the relationships among natural components on Earth.

+ Questions Applying Knowledge:

Example: Why is Tam Đảo a popular tourist destination in the summer?

- Multiple-Choice Questions

Multiple-choice questions are a form of assessment that includes many questions, each presenting a problem along with the necessary information, requiring

students to choose the correct answer concisely. To evaluate geographical scientific literacy competencies, multiple-choice questions should be designed at a cognitive level of comprehension or higher, according to Bloom's taxonomy.

This means that students must engage in genuine cognitive operations, rather than simply memorizing or making random selections, to choose the correct answer. As a result, multiple-choice questions can effectively assess students' thinking and ability to apply knowledge.

+ Multiple-Choice Questions:

Example: Circle the letter in front of the correct answer.

Question 1. Which of the following factors has the most significant influence on the difference in air temperature between the eastern and western coasts of a continent?

A. Warm ocean current, Cold ocean current

B. Cold ocean current, Topographic elevation.

C. Topographic elevation, latitudes.

D. Latitudes, Warm ocean current

Question 2. The further inland one goes:

A. summer temperatures decrease.

B. winter temperatures increase

C. the temperature range is greater.

D. the angle of incidence is smaller

*** True-false questions and correcting false statements:**

Example: Check the appropriate box in the T (True) or F (False) column.

Statements	T	F
1. The amount of solar energy reaching the Earth's surface always changes with the thickness of the atmosphere.		
2. The equator is the region with the highest average annual temperature in the world.		
3. The location with the lowest average annual temperature in the world is at the two poles.		

Answer: 1 - T; 2 - F; 3 - F

Observing Classroom Learning Activities

The teacher can assess students by observing their in-class activities, such as contributing to lesson development, answering questions, and performing tasks assigned to individuals, pairs, or groups.

Through this observation process, the teacher can evaluate:

- The students' level of knowledge retention.

- Specific geographical competencies, especially geographical inquiry competencies.

- General competencies, including self-control and self-directed learning competencies (when students work individually), and communication and collaboration competencies (when working in groups).

- Qualities, such as diligence and responsibility towards the living environment (demonstrated through their awareness and willingness to participate in environmental protection activities).

Suitable assessment tools in this case include observation checklists, rating scales, rubrics, logbooks, or other supporting tools like notebooks, audio recorders, and video cameras to collect evidence in a timely and objective manner.

Assessing Student Learning Products

Students' competencies are demonstrated not only through the final results but also throughout the entire process of creating their learning products. These products are very diverse and can be answers, worksheets, group work reports, short written passages, or collected information and images.

Depending on the assessment objectives, the teacher can use qualitative methods (feedback), quantitative methods (scores), or a combination of both.

To evaluate effectively, the teacher can use various tools such as:

- Questions and exercises with corresponding answer keys and scoring scales.

- Rubrics to determine the levels of competency.

- Checklists to evaluate the level of task completion.

3. CONCLUSION AND FUTURE DIRECTIONS

Geographical scientific literacy is one of the important specific competencies of the Geography subject (Bộ Giáo dục và Đào tạo, 2018). This competency enables students to describe the characteristics of a territory, identify and explain geographical phenomena and processes by analyzing spatial and temporal relationships and the connections among natural, socio-economic factors.

Therefore, to develop this competency, teachers need to flexibly apply various teaching methods and organize diverse learning activities to encourage students to search for information, exchange ideas, discuss, and apply their knowledge and experience. It is essential to combine the use of visual aids, cognitive exercises, and information technology applications in teaching. Specifically, it is crucial to focus on innovating assessment towards process-based evaluation to guide the development of students' competencies in line with the curriculum requirements.

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NÂNG CAO HIỆU QUẢ TỔ CHỨC DẠY HỌC NHẰM PHÁT TRIỂN NĂNG LỰC NHẬN THỨC KHOA HỌC ĐỊA LÝ TRONG MÔN ĐỊA LÝ LỚP 10

Tóm tắt: *Chương trình Giáo dục phổ thông 2018 xác định phát triển năng lực nhận thức khoa học Địa lý (GSCC) là mục tiêu trọng tâm của môn Địa lý (Bộ Giáo dục và Đào tạo, 2018). Tuy nhiên, nhiều giáo viên vẫn gặp khó khăn trong việc tổ chức hoạt động học tập nhằm hình thành năng lực này một cách hệ thống và hiệu quả. Nghiên cứu này nhằm: (1) hệ thống hóa cơ sở lý luận về GSCC và các biểu hiện của nó trong chương trình Địa lý lớp 10; và (2) đề xuất các biện pháp sư phạm cụ thể, khả thi. Bài báo đề xuất ba nhóm biện pháp can thiệp chính: vận dụng các phương pháp và kỹ thuật dạy học tích cực; ứng dụng công nghệ thông tin (ICT) trong tổ chức hoạt động học tập; và đổi mới kiểm tra, đánh giá theo định hướng phát triển năng lực. Các biện pháp này được tổng hợp thành một khung quy trình thống nhất, được củng cố bằng một mô hình khái niệm nhằm tăng cường tính chặt chẽ về lý thuyết và khả năng áp dụng trong lớp học. Khung quy trình này cung cấp cho giáo viên một cách tiếp cận có cấu trúc và nền tảng lý luận vững chắc để thiết kế và triển khai bài học Địa lý 10, góp phần phát triển bền vững năng lực nhận thức khoa học địa lý của học sinh.*

Từ khóa: *Tổ chức dạy học, năng lực nhận thức khoa học địa lý, phát triển năng lực, giáo dục địa lý, Địa lý 10.*