

Teaching Integrated Themes In Grade 9 History And Geography Through STEAM-Based Experiential Learning Activities In The Context Of Digital Transformation

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Abstract:

STEAM education emphasizes the development of problem-solving abilities in real-life contexts and enhances learners' creativity. The article focuses on researching an overview of STEAM education and its application in teaching the integrated theme of History and Geography in Grade 9 through interdisciplinary integration and experiential learning in the context of digital transformation. The application of STEAM education in teaching the integrated theme of History and Geography in Grade 9 helps to foster students' competencies, improve the applicability of knowledge in addressing practical issues, and meet the requirements of the 2018 General Education Curriculum for History and Geography at the lower secondary level.

Keywords: Education, STEAM, integrated teaching, History and Geography subject, digital transformation.

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I. Introduction

The process of globalization and the development of the 4.0 industrial revolution have changed all areas, including education and training, leading to rapid changes in human resource's structure and quality in many countries. Currently, Vietnam is integrating into a strong integration trend of the region and the world. In order to be competitive in the regional and global economy, STEM/STEAM education needs to be nationally prioritized to form and develop learners - the human resources to tackle problems and creativeness capacity. Through STEM/STEAM activities, learners will know how to apply theoretical knowledge into practice and develop skills to adapt to new requirements in the 4.0 era.

The new school education curriculum (issued with the attached Circular NO. 32/2018 / TT-BGDDT of December 26, 2018, of the Minister of Education and Training) has paid great attention to STEM/STEAM education, demonstrating that STEM/STEAM topics in the program are integrated not only in the subjects of natural sciences but also in social sciences. For History and Geography (at secondary school level), the orientation of STEM/STEAM education is expressed through integrated interdisciplinary teaching of History - Geography, including subject-based integrated teaching to help students apply interdisciplinary knowledge to solve practical problems.

In Grade 9 History and Geography, there are three integrated themes: Urban Areas: History and Present; Civilizations of the Red River and Mekong River Deltas; Protecting the Sovereignty, Rights, and Legitimate Interests of Vietnam in the East Sea. The knowledge related to these themes has appeared, to some extent, in social sciences subjects, especially Geography and History, in the 2006 education curriculum. However, the fragmented acquisition of knowledge related to these common themes in each separate subject may make it difficult for students to gain an overall understanding of urban development in the world and in Vietnam; the cultural characteristics of the Red River and Mekong River Deltas as well as the impacts of climate change on these two deltas; the geographical location, natural conditions, historical struggles to defend sovereignty, and the legal foundations related to the protection of maritime sovereignty. For this reason, the History and Geography subject (at the lower secondary level) in the 2018 General Education Curriculum has been designed with interdisciplinary integrated themes. Research on applying STEM/STEAM education in teaching the Grade 9 History and Geography themes through interdisciplinary integration and experiential learning is of great practical significance, as it fosters students' competencies, enhances the applicability of knowledge in addressing practical issues such as sustainable urban development, climate change adaptation, and safeguarding the nation's maritime sovereignty, thereby meeting the requirements of the 2018 General Education Curriculum.

II. Material And Methods

This study focuses on the application of STEAM education in teaching the integrated theme of History and Geography at Grade 9. In terms of materials, the article employs theoretical and practical documents related to STEAM education, the 2018 General Education Curriculum, and the integrated themes of History and Geography at the lower secondary level. The systematic, practical, and competency-based approaches are adopted to identify the relationship between objectives, content, and teaching methods of the integrated History and Geography themes at Grade 9 in the orientation of STEAM education. Regarding the methods, the study synthesizes, analyzes, and compares theoretical documents, while also conducting a practical survey on the organization of History and Geography teaching through STEAM-based experiential activities.

Questionnaires were distributed to both teachers and students via Google Forms and direct on-site surveys.

For teachers, based on 40 survey responses:

- 100% of respondents considered STEAM education highly suitable for Geography in the context of digital transformation.
- Regarding teachers' understanding of STEAM-based experiential teaching: 10% reported a very clear understanding, 50% fairly clear, and 40% limited or vague.
- All teachers (100%) acknowledged the benefits of STEAM-based experiential teaching in developing students' competencies, connecting knowledge to real-life contexts, enhancing learning motivation, and fostering creativity.
- 40% of teachers had previously implemented STEAM-based experiential teaching, while 60% had not, citing limited knowledge, lack of resources, and reluctance to change teaching methods.
- Regarding teaching methods, 80% applied project-based learning, while 20% used discussion-based approaches.
- 40% reported applying STEAM-based experiential teaching occasionally in their teaching practice.
- All teachers (100%) expressed a strong desire for further professional development in STEAM teaching.

For students, based on 126 survey responses: All students (100%) reported high interest in learning Grade 9 History and Geography topics through STEAM-based experiential activities.

These findings indicate that, although teachers recognize the relevance and benefits of STEAM education, most have yet to implement it in practice due to limited expertise, insufficient resources, and hesitancy to adopt new teaching methods. In contrast, students demonstrate high engagement and interest, highlighting the positive impact of STEAM-oriented teaching on their learning experience.

III. Results And Discussion

1. STEAM education at high schools

Definition of STEAM Education

STEAM represents a multidimensional and interactive educational model that integrates Science, Technology, Engineering, Mathematics, and Art. The concept of STEAM originated from STEM - a term widely employed in discussions on national policies concerning the advancement of science, technology, engineering, and mathematics. STEAM was first proposed as a creative initiative by the Rhode Island School of Design and was subsequently adopted by educators as a novel pedagogical approach.

According to Arthur J. Stewart and colleagues (2020), STEAM education emphasizes the integration of ideas from multiple disciplines into specific lessons or thematic units within the curriculum. As a modern educational paradigm, STEAM encompasses diverse approaches, promoting a trend of learning beyond spatial limitations and incorporating project-based learning (Tim Needles, 2020). Teachers implement STEAM education through instructional activities that connect school-based knowledge with real-world contexts, address practical problems, enhance students' engagement, and foster the development of learners' competencies and personal qualities.

To this point, STEAM education is broad and relates to multiple areas with the following key features:

Firstly, it represents an interdisciplinary approach, which differs from teaching subjects separately. Although schools often teach many different disciplines, if the subjects are taught independently without integration and mutual support, it cannot be considered STEAM education.

Secondly, the integration of lessons with real-world contexts demonstrates the practicality and applicability of knowledge in solving everyday problems. Therefore, STEAM education programs are necessarily oriented toward hands-on activities, enabling learners to apply knowledge to create products or address real-life issues.

Thirdly, STEAM education fosters connections from schools to communities and global organizations. In the era of a flat world and the Fourth Industrial Revolution—where automation and remote control through

mobile electronic devices flourish via Internet connectivity - the process of STEAM education not only addresses local issues but also aligns with the global economic context and global trends.

Accordingly, STEAM education is not limited to the four fields of Science, Technology, Engineering, and Mathematics but can also be fully applied to other subjects such as History and Geography through interdisciplinary integration and experiential teaching. This helps develop students' competencies and enhances their ability to apply knowledge in solving practical problems.

STEAM education promotes learning methods based on practice and creative experiential activities. Flexible and progressive approaches such as project-based learning, theme-based learning, game-based learning, and practical learning are always integrated into STEAM-oriented courses.

Forms of Implementing STEAM Education in General Education Schools

According to STEAM education orientation at high schools of the Development program in Phase 2 (Ministry of Education and Training, 2020) and research by Nguyen Thanh Hai (Nguyen Thanh Hai, 2018), the applicable forms of STEAM education in general education schools include teaching subjects within the STEAM fields, engaging students in STEAM experiential activities, and conducting scientific research activities.

STEAM Education Methods in General Education Schools

STEAM education primarily employs learning methods based on hands-on practice and creative experiential activities. The most flexible and progressive educational approaches, such as project-based learning, theme-based learning, game-based learning, and practical learning, are consistently and thoroughly applied in STEAM-integrated subjects.

Moreover, digital transformation in education has become a global trend, creating opportunities to access vast repositories of knowledge, innovate teaching methodologies, and reform assessment practices. The integration of digital technologies into interdisciplinary teaching through STEAM-based experiential learning not only enhances educational effectiveness but also fosters the development of students' digital competencies, thereby meeting the demands of society in the era of Industry 4.0.

2. Teaching the integrated themes of grade 9 History and Geography through STEAM-based experiential activities in the context of digital transformation

Orientation of STEAM-Based Experiential Activities in Teaching the Integrated Themes of Grade 9 History and Geography

In the 2018 General Education Curriculum at the lower secondary level, History and Geography are no longer designed as two separate subjects but are instead combined into a single subject: History and Geography. This curriculum design reflects a shift toward an integrated approach. The lower secondary History and Geography curriculum demonstrates three levels of content integration: intra-disciplinary integration (among History contents and among Geography contents); integration of History content into relevant sections of Geography lessons and vice versa; and, particularly, interdisciplinary integration that links History and Geography knowledge to form common themes.

The development of common themes aims to integrate History and Geography based on content with close connections or intersections. In the Grade 9 History and Geography curriculum at the lower secondary level, selected themes include: Urban Areas: History and the Present (2); Civilizations of the Red River Delta and the Mekong River Delta (2); Protecting Vietnam's Sovereignty, Rights, and Legitimate Interests in the East Sea (2) (Ministry of Education and Training, 2018). Teaching these common themes creates a specialized learning space in which students can apply fundamental concepts of both History and Geography, while also exploring additional historical and geographical sources under teacher guidance, thereby fostering the development of both historical and geographical thinking.

The lower secondary History and Geography curriculum in general, and the Grade 9 program in particular, emphasizes the assessment of students' competencies in applying historical-geographical knowledge to address practical problems, connecting learning to present-day contexts, while at the same time laying the foundation for learners' autonomy and creativity. The program encourages students to participate in experiential and creative activities, with teachers acting as organizers, facilitators, and supporters to help students seek, collect, and analyze information and propose solutions. For example, students may engage in field trips, experiential activities, or group tasks to solve cognitive problems of varying complexity.

Thus, although History and Geography at the lower secondary level, and Grade 9 in particular, are not included among the four traditional STEM fields, the curriculum design has created opportunities for teaching these subjects within a STEM/STEAM orientation. Accordingly, the teaching of History and Geography at the lower secondary level should increasingly incorporate experiential learning activities, especially when implementing interdisciplinary themes. Experiential teaching not only brings lessons closer to students' real-life

experiences but also develops comprehensive thinking skills, enabling learners to connect historical and geographical knowledge to solve practical problems.

In the digital era, teaching integrated Grade 9 History and Geography themes through STEAM-based experiential learning should prioritize access to diverse digital resources (e.g., digital maps, online archives, AI tools), foster students' participation in interdisciplinary projects linking knowledge to real-world issues, and enhance critical thinking, collaboration, and creativity. Furthermore, learning spaces should extend beyond the classroom to include online environments, blended learning, and digitized experiential activities.

Forms of STEAM-oriented experiential activities in teaching Grade 9 History and Geography may include field trips, on-site surveys, clubs, forums, seminars, games, and social activities. To ensure the effectiveness of such activities, teachers need to select representative content from textbooks; identify appropriate locations and timing; carefully prepare the content, format, and organizational methods; flexibly apply appropriate teaching methods and pedagogical strategies; and finally, monitor and evaluate students' experiential learning outcomes through diverse forms of assessment.

The process of designing STEAM-based experiential activities in teaching the integrated themes of grade 9 Geography

To effectively implement experiential activities in teaching History and Geography, teachers must carefully select representative textbook content, identify appropriate locations and timing, prepare content and organizational methods, apply flexible pedagogical strategies, and evaluate student outcomes through diverse forms of assessment.

Accordingly, the design of STEAM-oriented experiential activities in secondary schools should follow three steps:

Step 1: Identifying needs. Based on subject objectives, textbook content, program distribution, local conditions, and students' needs and interests, teachers determine suitable themes aligned with subject requirements and learners' cognitive abilities.

Step 2: Planning activities. Teachers define the activity's title, objectives, content, and organizational form. Clear, concise, and accurate naming is essential to reflect the core content and attract students' interest. On this basis, teachers determine relevant knowledge, methods, means, and teaching techniques, ensuring that the plan is both scientifically structured and feasible.

Step 3: Organizing activities. This step translates plans into practice, testing the effectiveness and feasibility of proposed ideas. Successful implementation requires close collaboration among teachers, school administrators, and students. Auxiliary elements such as arts or sports may be integrated to enhance engagement and vitality.

3. Forms of STEAM-Oriented Experiential Activities in Teaching the Integrated Themes of Grade 9 History and Geography in the context of digital transformation

Organizing activities in clubs

Name of Experiential Activity: Club "*I Love my Homeland's Seas and Islands*".

The "*I Love my Homeland's Seas and Islands*" Club functions as an extracurricular activity for students interested in exploring Vietnam's maritime sovereignty and contributing through practical actions under the guidance of educators (teachers, parents, or scientists).

Objectives:

- Enhance students' understanding of the strategic role of Vietnam's seas and islands, the struggle to safeguard sovereignty, rights, and legitimate interests in the East Sea, as well as the importance of the maritime economy and marine environment in Vietnam's modern development.
- Create an intellectual and creative environment that develops key student skills, including communication, listening and expression, idea presentation, writing, photography, teamwork, cooperation, decision-making, and problem-solving.
- Foster a friendly and positive space for interaction among students, teachers, and other stakeholders, while promoting mutual support in learning and life.

Target Participants: While primarily for Grade 9 students, membership may be extended to students across the school and other individuals who share a passion and responsibility for safeguarding Vietnam's maritime sovereignty.

Content and Activities: Activities may include watching videos of soldiers' daily lives on Truong Sa Islands, collecting documents and images as evidence of sovereignty, creating paintings or models of Vietnam's seas and islands, visiting coastal and island locations, and organizing community support initiatives for soldiers and residents of Truong Sa.

Club activities may take various interactive forms such as quizzes, crosswords, discussions, and debates on maritime topics. The club can be organized into smaller groups based on members' interests and talents:

- *Hoang Sa Group*: artistic members responsible for painting and visual propaganda;
- *Truong Sa Group*: students with musical or theatrical talents who perform skits or shows;
- *Ngo Quyen Group*: members skilled in information technology tasked with poster design, filming, and photography;
- *Tran Hung Dao Group*: students with research abilities who collect documents and participate in essay competitions on maritime sovereignty.

Forum Activities

Activity Title: Forum "Students and the Urban Environment".

The "*Students and the Urban Environment*" forum provides a platform for students to actively express their opinions to peers, teachers, parents, and the wider community through presentations and discussions on current urban environmental issues.

Objectives:

- Raise students' awareness of urban environmental challenges such as air pollution, waste management, traffic congestion, and the shortage of green spaces.
- Develop students' ability to apply historical and geographical knowledge—particularly regarding urbanization, sustainable development, and environmental protection—to real-life contexts.
- Foster communication, critical thinking, listening, and idea expression skills.
- Strengthen students' sense of responsibility in protecting the urban environment and encourage them to share their knowledge with peers and families.

Target Participants: Grade 9 students.

Duration: 120 minutes, scheduled during the theme "*Urban Areas: History and the Present (2)*".

Content:

The forum focuses on:

- The role of urban areas in socio-economic development;
- The current state of local urban environments;
- Causes and consequences of urban environmental pollution, alongside local solutions;
- Student-led proposals for urban environmental protection (using STEAM thinking such as recycling models, technology applications, green-space planning, and community initiatives).

The forum may be organized to coincide with international and national events such as *Earth Day* (April 22), *World Cities Day* (October 31), and *Vietnam Urban Day* (November 8). To enhance engagement, artistic performances related to the urban environment can be integrated into the program.

STEAM-Oriented Campaign Activities

Name of Campaign: "We Clean Up the Sea"

Targets:

- Enhance students' understanding of marine environmental issues and increase their interest in protecting the seas.
- Encourage students to actively participate in solving social and environmental problems of national significance.
- Develop essential skills including design, collaboration, information collection, advocacy, evaluation, decision-making, and problem-solving.
- Foster awareness of environmental protection and encourage students to share and propagate knowledge about marine conservation with peers and community members.

Participants: Grade 9 students.

Duration: The campaign can be organized on a Sunday morning or a suitable date.

Content and Organization:

The campaign involves beach clean-up activities, raising awareness among tourists about protecting the marine environment, and engaging students in practical actions. Teachers coordinate with the Youth Union, subject teachers, and parents to guide and manage students throughout the campaign.

Students may also participate in complementary activities such as designing awareness posters, creating leaflets, writing articles, producing photo reports, and filming videos related to marine conservation. These activities provide diverse channels for students to actively engage, promote, and communicate the objectives of the campaign.

Field Survey Activities

Name of Field Survey: "Journey to Bach Dang Giang Relic"

Targets:

- Enable students to experience the historical site of Bach Dang Giang, thereby enhancing practical knowledge of Vietnam's maritime history and sovereignty.
- Develop students' communication, listening, presentation, writing, photography, collaboration, teamwork, decision-making, and problem-solving skills.
- Promote national traditions, including patriotism, solidarity, and love for the homeland and islands.
- Foster students' interest and appreciation for History and Geography.

Participants: Grade 9 students

Duration: One full day

Content of Survey:

The class is divided into groups, each focusing on specific topics:

- *Group 1:* Study the geographical location of Bach Dang Giang. Product: a diagram of Bach Dang in Northern Vietnam and a poster promoting the protection of the homeland's islands.
- *Group 2:* Study the 938 Bach Dang River victory. Product: a mind map detailing the battle.
- *Group 3:* Study the 1288 Bach Dang River victory. Product: a short acting scenario representing the historical event.
- *Group 4:* Explore contemporary student contributions to the protection of Vietnam's seas and islands. Product: a self-recorded video demonstrating student initiatives.

Organization:

Students conduct on-site observations at key locations such as the Bach Dang River piles, Bach Dang Museum, and the temple complex honoring historical figures (Trang Kenh Vong, Le Dai Hanh, Hung Dao Vuong Tran Quoc Tuan, Ngo Quyen, and Ho Chi Minh).

Activities include:

- Field observations and mapping using compasses.
- Photography and video documentation of relevant content.
- Interviews with guides, local authorities, and residents to gather information.

This structured approach enables students to engage in experiential learning, integrating historical knowledge with practical skills while fostering an understanding of national sovereignty. Following the field survey, teachers should organize one or two class sessions for students to present reports on their group's outputs.

Evaluation of the Survey: Students are assessed based on their performance in completing experiential tasks and the quality of their group products. Teachers evaluate not only the accuracy and depth of knowledge but also students' creativity, aesthetic sense, presentation skills, and ability to perform or communicate their findings effectively.

Table no1: Suggested Criteria for Evaluating the Experiential Activity: Journey to Bach Dang Giang Relic

Experiential activity's contents	Experiential activity's objectives	Experiential activity's products	Evaluation Criteria
Learning the geographical position of Bach Dang Giang	- Determine on the diagram of the Bach Dang estuary's location. - Presenting the meanings of the landmark of Bach Dang estuary	Diagram of Bach Dang's location in the Bac Bo region on A1 paper. Propaganda poster on the homeland's seas and islands	- The schema must ensure accuracy, intuitive, aesthetic - The picture must show the propaganda content to protect the homeland's seas and islands - The picture must ensure aesthetic and intuitive. - The persuasive presentation must be correct and excellent
Learning the victory on the Bach Dang	Mastering the context, happenings,	Mind map of the battle on the Bach Dang	- The diagram must ensure accuracy, science, and be

River in 938	results and historical significance of the battle of Bach Dang in 938.	River in 938.	systematic. - The diagram must ensure visual and aesthetic. - Presenting must be proper, good, clear.
Learning the victory on the Bach Dang River in 1288 Understand	Understand the context, developments, outcomes, and historical significance of the Bach Dang battle in 1288.	Acting script about the victory of Bach Dang in 1288.	- The script's content shows the context, happenings, results and historical significance of the Bach Dang battle in 1288. - Good acting, appropriate costumes with the context.
High school students engaging with the issue of protecting the homeland's seas and islands..	Students analyze their contributions to the protection of the nation's seas and island.	Student-recorded video demonstrating their contributions to the protection of the homeland's seas and islands.	video script shows propaganda to protect the homeland's seas and islands. - The images are related to the script content and meaningful. - The image is clear, diverse, the sound is lively, suitable to the script content. - The diverse effects attract viewers.

Since this is a voluntary' activity, the organization of the so-called experiential activities "Journey to the Bach Dang Giang Relic" needs coordination between teachers of History and Geography with the School Board, Youth Union and parents of students in human resources, financial fund and time.

IV. Conclusion

The 2018 General Education Curriculum, with significant innovations ranging from the number of subjects and lessons to teaching and assessment methods, has created opportunities for Vietnamese education to adopt STEAM approaches. STEAM education is not confined to natural sciences but should also be extended to social sciences, including Grade 9 History and Geography at the lower secondary level. In the context of digital transformation, History and Geography teaching in Grade 9 needs to increasingly integrate STEAM-oriented experiential learning, particularly through interdisciplinary themes. Such an approach not only brings lessons closer to students' real-life experiences but also fosters comprehensive thinking skills, enabling learners to connect historical and geographical knowledge in addressing practical problems.

For interdisciplinary themes in the Grade 9 History and Geography curriculum, studying STEAM-oriented experiential teaching under digital transformation holds particular significance. Integrated teaching should ensure access to diverse digital learning resources (digital maps, online materials, AI-based learning tools), engage students in interdisciplinary projects linking History and Geography to real-world problem-solving, and enhance critical thinking, collaboration, and creativity. Moreover, learning spaces should expand beyond the classroom through online platforms, blended learning, and digital experiential activities. Examples include the club "I Love My Homeland's Seas and Islands", the forum "Students and the Urban Environment", the campaign "We Clean Up the Sea", and field trips to coastal and island areas. These activities aim to develop students' competencies and strengthen the application of knowledge to address real-world challenges such as urban environmental protection and safeguarding maritime sovereignty, in alignment with the 2018 General Education Curriculum.

To effectively implement STEAM education in lower secondary History and Geography teaching, and particularly in interdisciplinary Grade 9 themes, teachers must actively cultivate digital competence and skills in designing STEAM experiential activities, maintain strong pedagogical capacity, and flexibly apply innovative methods, tools, and techniques. Through this, subject quality will be enhanced, contributing to the goals of comprehensive reform in Vietnam's education system.

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