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Station Rotation Model "1 Lesson - 3 Roles": Integrating Virtual Reality (VR) And Digital Maps in Developing Natural and Social Inquiry Competencies for Primary School Students

Pham Thi Thuong
Luong The Vinh Primary School, Thuan An Ward, Ho Chi Minh City, Vietnam

Nguyen Minh Giam
Faculty of Education, Thu Dau Mot University, Ho Chi Minh City, Vietnam

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ABSTRACT: This study was conducted to evaluate the effectiveness of applying digital maps and Virtual Reality (VR) technology in developing natural and social inquiry competencies for 4th-grade students. Stemming from the fact that History and Geography knowledge is highly abstract, and students have few opportunities for practical experience—leading to a passive learning mentality—we designed and applied the Station Rotation Model "1 lesson - 3 roles" (Experience – Discussion – Creation). By dividing the class into groups and rotating continuously through learning stations, this model successfully addressed the barrier of insufficient synchronous digital equipment, while also thoroughly mitigating student distraction when interacting with technology. The pedagogical intervention process was also closely combined with the "Virtual Field Trip - Real Reflection Writing" activity and interdisciplinary art education orientation.

Data obtained from the experiment demonstrated a comprehensive transformation in both quantitative and qualitative aspects. Students' interest in the subject, confidence in presentation skills, and technological application capacity all recorded outstanding growth. All participating students learned how to operate and extract information from basic digital maps. Along with this, the vast majority of students demonstrated profound historical empathy and a love for cultural heritage through their personal reflection writings. The study affirms that integrating technology through the station rotation process is a superior pedagogical solution, which not only nurtures core learning competencies but also develops emotional intelligence, contributing to the formation of generations of digital citizens with a strong cultural identity.

KEYWORDS: Station Rotation Model, Virtual Reality (VR), Digital maps, Natural and social inquiry competencies, 4th-grade History and Geography

1. INTRODUCTION

In the context of the vigorous digital transformation taking place across all sectors, the application of technology in the classroom is not only a trend but has become a central task of the education sector. The 2018 General Education Program sets the requirement to transform teaching methods from passive knowledge transmission to the comprehensive development of learners' qualities and competencies (Ministry of Education and Training, 2018). At the same time, the sector's orientation strongly encourages the integration of technological platforms and digital learning materials into teaching to realize the goal of educational innovation (Ministry of Education and Training, 2021). To achieve this, the core of methodological innovation is to create conditions for students to apply, explore, and learn through practical experiences (Tran Ba Hoanh, 2017).

However, from the practical experience of teaching 4th-grade History and Geography, we observed that students often face many difficulties because the subject knowledge is highly abstract in terms of space and time. Traditional teaching methods primarily rely on lectures and static paper maps, making it difficult for students to visualize and causing a sense of disconnection from reality. A survey conducted at the beginning of the school year in the class managed by the author revealed a concerning reality: only about 45% of students were interested in the subject, 40% understood the lesson through visual images, and less than 30% were confident in presenting or sharing in front of the class. Numerous domestic studies have pointed out the potential of technology to solve this problem. Typically, the study by Nguyen Thi Thanh Huong (2022) affirmed that virtual reality (VR) technology offers a great opportunity to vividly recreate historical spaces, while Pham Van Cuong (2021) emphasized the role of digital maps in exploiting and developing geographic thinking for primary school students.

Nevertheless, when applying these tools in actual teaching, we faced a significant "gap" in methodology. If teachers merely distribute devices or VR links for students to view freely, they can easily fall into a state of "pure virtual tourism," becoming distracted by novel images and forgetting the task of acquiring knowledge. Furthermore, the budget required to synchronously equip VR headsets or tablets for all students at the same time is a major barrier, which is difficult to achieve given the current infrastructural conditions of many schools.

Prompted by the aforementioned concerns and gaps, we conducted this study to propose a pedagogical intervention process through the application of the Station Rotation Model "1 lesson - 3 roles" (Experience – Discussion – Creation). By dividing the class into groups and rotating them continuously through learning stations, this model is expected to thoroughly resolve the shortage of digital devices, while establishing a strict cognitive control process to ensure that technology truly serves the lesson's objectives. The core objective of this article is to measure and evaluate the effectiveness of integrating Virtual Reality (VR) technology and digital maps through the station rotation model, thereby demonstrating the development of natural and social inquiry competencies, as well as the cultivation of spatial thinking and emotional intelligence in primary school students.

2. THEORETICAL FOUNDATION AND LITERATURE REVIEW

2.1. Competency-based teaching perspective in History and Geography

Innovating teaching methods oriented towards the development of learners' qualities and competencies is the core focus of the current General Education Program (Ministry of Education and Training, 2018). Unlike traditional methods, which heavily rely on one-way knowledge transmission, the new orientation requires teachers to create conditions for students to apply, explore, and learn through practical experiences. According to Tran Ba Hoanh (2017), the "student-centered" principle requires learners to proactively access knowledge through multiple senses and various forms of learning, thereby developing self-study capacity and independent thinking.

Particularly for the History and Geography subjects at the primary school level (ages 9-10), vivid visual representation plays a prerequisite role. From the perspective of developmental psychology, children at the ages of 9 and 10 are in the "concrete operations phase" according to Jean Piaget's theory. At this stage, learning is only truly effective when it is rooted in practical and tangible experiences rather than abstract concepts (Junior et al., 2025). Therefore, the application of experiential learning through Virtual Reality (VR) technology allows students to "go back in time" to interact directly with historical contexts, thereby filling cognitive gaps caused by a lack of physical experiences (Junior et al., 2025).

The effectiveness of this experiential learning method for primary school students has been strongly evidenced on a global scale. A large-scale meta-analysis by Lara-Alvarez et al. (2023) on primary school students indicated that: students learning in virtual reality experiential environments achieve significantly higher scores and learning outcomes compared to those studying in traditional classrooms (Standardized Mean Difference [SMD] = 0.64, $p < 0.001$). This study affirms that the multisensory and immersive nature of VR technology acts as a catalyst, helping primary school students highly focus their attention and increase their interest, thereby significantly improving their capacity for knowledge acquisition.

Therefore, the application of the VR experiential model in 4th-grade History and Geography not only overcomes the barriers of spatial and temporal reasoning but also fully aligns with the most advanced educational methods in the world.

2.2. Utilizing digital maps in spatial-oriented education

In the development of geographic thinking, traditional static paper maps reveal numerous limitations regarding perspectives and the volume of information. The study by Pham Van Cuong (2021) indicated that utilizing digital maps brings significant advancements in teaching primary school Geography. Digitalized platforms not only allow students to observe multi-dimensional spaces but also enable them to perform direct operations such as measuring distances, exploring terrains, and making real-world connections. This stimulates natural and social inquiry competencies and ensures that knowledge is no longer disconnected from reality.

2.3. The role of Virtual Reality (VR) technology in recreating space and history

The explosion of digital transformation in education (Ministry of Education and Training, 2021) has promoted the introduction of advanced technologies into the classroom. According to Nguyen Thi Thanh Huong (2022), the application of VR technology in teaching primary school History opens up great opportunities to vividly recreate spaces, allowing students to "visit" historical monuments right in the classroom, thereby arousing strong interest.

However, from the perspective of educational psychology, the use of VR also comes with significant risks to the students' knowledge acquisition process. Recent studies indicate that virtual reality technology can hinder the learning process if it creates "extraneous cognitive load" by containing too many complex graphical details or elements unrelated to the lesson (Lawson & Mayer, 2024; Makransky et al., 2021). Particularly, Meyer et al. (2019) explained a common psychological phenomenon: when granted an excessive level of presence and autonomy in a virtual environment without proper guidance, students with a limited knowledge background often experience VR merely as an entertaining activity. As a consequence, they fall into a state of "pure virtual tourism," failing to select, organize, and integrate information into a coherent knowledge structure.

Furthermore, the study by Westhuizen et al., (2025) also warns about the double-edged "novelty effect" of VR. Although VR generates high excitement and interaction, this entertainment-oriented immersion easily overshadows the core content, causing students to consider this merely a "fun activity" rather than a learning experience, thereby reducing their long-term information retention capacity. This tool allows students to "visit" monuments and landmarks right in the classroom, thereby providing an engaging learning experience and arousing strong interest. However, studies also point out the challenges in managing and directing students' concentration when using this device in an educational environment.

2.4. Research gap and rationale for the station rotation model

To address the aforementioned cognitive risks, educational experts assert that school-based VR interventions only truly exert their academic effectiveness when accompanied by pedagogical scaffolds (scaffolding), feedback, and clear guiding strategies from teachers. These orienting elements serve to minimize extraneous cognitive load, helping learners focus on analyzing and deeply understanding the content (Conrad et al., 2024; Mayer et al., 2023).

In classroom practice, teachers lack a specific pedagogical process to simultaneously integrate both of these technologies in a single lesson under limited infrastructure conditions (insufficient equipment for 100% of students). Stemming from this theoretical and practical gap, we propose designing a 5-step process combined with the Station Rotation Model "1 lesson - 3 roles" (Experience - Discussion - Creation). This process is a flexible combination of technology (VR/digital map experience) with social interaction (Discussion) and individual capacity (Creation). This model not only resolves the barrier of equipment resources but also provides a direct, practical theoretical framework that helps optimize the effectiveness of EdTech in History and Geography.

3. RESEARCH METHODOLOGY

3.1. Research subjects and setting

We conducted this study directly on the students of class 4.1 at Luong The Vinh Primary School during the 2025 - 2026 academic year. The selection of 4th-grade History and Geography as the research scope stems from the specific characteristics of the lesson content according to the 4th-grade History and Geography Textbook, with Nguyen Minh Thuyet as the Editor-in-Chief (2020). This is the stage when students begin to encounter many highly abstract concepts of space, time, and cultural heritage.

3.2. Research design

This study is designed based on a combination of practical methods, aiming to measure the effectiveness before and after the pedagogical intervention:

Survey method: Students were surveyed using multiple-choice questionnaires combined with face-to-face interviews at the beginning of the school year and after the end of the experiment, aiming to assess changes in their level of interest, lesson comprehension, presentation confidence, and level of creativity.

Pedagogical experiment method: We directly designed and taught lessons applying the new process, comparing the students' learning outcomes in the class before and after the application to determine its effectiveness.

Observation and product analysis method: Observing students' behaviors and attitudes during lessons and analyzing practical products (mind maps, reflection writings, drawings) to evaluate their capacity to apply knowledge.

3.3. Teaching process integrating Virtual Reality (VR) and digital maps to develop natural and social inquiry competencies for primary school students

3.3.1. 5-step pedagogical framework integrating Virtual Reality (VR) and digital maps based on the 5E learning model

To address the superficial abuse of technology and optimize the effectiveness of the station rotation process, we designed a 5-step pedagogical framework. This framework is built on the foundation of the 5E Learning Model (Engagement - Exploration - Explanation - Elaboration - Evaluation) – a knowledge construction model that has been widely validated for its effectiveness in international education (Putra et al., 2018; Sarac, 2018; Dubach et al., 2025). This process acts as a strict system of "pedagogical scaffolds", helping to control cognitive load and guiding students from visual experience to profound comprehension:

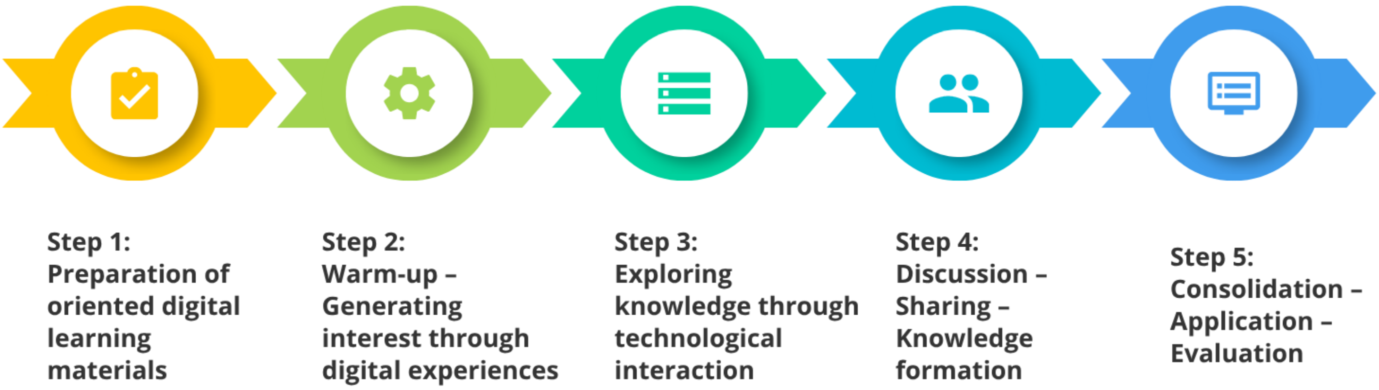

Figure 1. 5-step pedagogical framework integrating Virtual Reality (VR) and digital maps based on the 5E learning model

Step 1: Preparation of oriented digital learning materials: Instead of letting students use devices freely, we proactively selected and designed digital learning resources (Google Earth digital maps, VR360 images) closely aligned with the lesson objectives. In particular, we provided a system of "Observation-oriented worksheets" to establish clear cognitive objectives, ensuring that students approach technology purposefully, avoiding the phenomenon of "pure virtual tourism" for entertainment purposes.

Step 2: Warm-up – Generating interest through digital experiences: At the beginning of the lesson, we use 3D visual images from digital maps or VR to create a problem situation. This activity aims to trigger situational interest, arouse curiosity, and generate strong intrinsic learning motivation for students before officially entering the rotation stations.

Step 3: Exploring knowledge through technological interaction: At the "Exploration Expert" station, students are granted agency to directly manipulate digital devices (identifying locations, measuring distances, observing 3D spaces). Under specific task assignments, students transition from a state of passive reception to independently exploring geographical and historical spaces, making the most of the spatial presence provided by VR.

Step 4: Discussion – Sharing – Knowledge formation: At the "Junior Geographer/Researcher" station, students temporarily step away from technological devices to work in groups, discussing and analyzing the newly collected data. This is a crucial transitional step from "seeing" (sensory stimulation) to "understanding" (cognitive structuring). Through peer interaction and teacher feedback, students independently explain phenomena, thereby developing communication skills and critical thinking.

Step 5: Consolidation – Application – Evaluation: At the "Cultural Ambassador" station, students proceed to internalize knowledge through application and creative activities. They create practical products such as drawing mind maps, designing electronic postcards, or writing emotional diaries. This step not only helps teachers evaluate the degree to which learning outcomes are met but also transforms textbook knowledge into actual competencies and an attitude of cherishing heritage among students.

It can be affirmed that the combination of the practical 5-step process and the 5E learning model creates a comprehensive and scientific teaching cycle. This ensures that Virtual Reality and digital map tools are utilized as sharp means for knowledge construction, directly serving the competency development objectives of the 2018 General Education Program.

3.3.2. Station Rotation Model "1 lesson - 3 roles"

To realize the 5-step pedagogical framework under limited infrastructure conditions (insufficient digital devices for a 1-to-1 student-device ratio), we designed and applied the Station Rotation Model as the core classroom organization method. This mechanism is not merely a temporary solution to optimize equipment, but in essence, it is a cognitive control strategy that harmoniously intertwines technological interaction and social interaction.

Specifically, in one lesson (after the general Warm-up section), the class is divided into 3 large groups. The groups will take turns rotating through 3 independent learning stations, spending 5 to 7 minutes at each station. At each station, students are required to assume a specialized "role" to complete the learning cycle:

Station 1: Experience (Role: "Exploration Expert"): Here, students come into direct contact with technology. Guided by a system of orienting questions, they perform 3D interactive operations (rotating, zooming in, zooming out of digital maps, or observing through VR360 headsets) to collect visual data on topography and architecture. This activity provides a sense of "spatial presence," helping abstract historical and geographical concepts become tangible and authentic.

Station 2: Discussion (Role: "Junior Researcher/Geographer"): Students temporarily "disconnect" from digital devices to engage in peer interaction. Based on the worksheets, they collaboratively analyze and solve problem situations. The pedagogical breakthrough of this station lies in the flexibility of the cognitive process: For the group starting first at this station (when they have not yet experienced VR), students are required to make "Scientific Predictions" based on their background knowledge, thereby stimulating extreme cognitive curiosity before entering the virtual environment. For the groups that have already completed Station 1, this serves as a discussion step to cross-reference, explain, and validate knowledge.

Station 3: Creation (Role: "Cultural Ambassador"): This is a space dedicated to individual and group application activities. Students proceed to internalize the data they have just observed and discussed to create physical or digital products (such as quickly sketching an architectural detail, drawing a mind map, making a mini model, or designing an "electronic postcard"). This step ensures the transformation of knowledge from a form of passive reception to artistic expressions and concrete thinking.

Through this 3-station rotation mechanism, screen time is divided and reasonably controlled. This helps eliminate the phenomenon of "technological distraction" and prevent cognitive overload brought about by the virtual environment. At the same time, the model ensures that 100% of students take turns experiencing a personalized learning process with digital devices and social collaborative learning, helping to maximize the utilization of the school's existing infrastructural resources.

This intervention process is also supplemented by the "Virtual Field Trip - Real Reflection Writing" activity after each lesson. Specifically, students are required to write diaries and emotional paragraphs to transform their observational experiences into an attitude of appreciation and pride towards cultural heritage.

3.4. Data collection and analysis tools

To ensure the objectivity, comprehensiveness, and reliability of the research results, we apply a mixed-methods research approach (combining quantitative and qualitative methods). The measurement tool system is built based on the principle of "Data Triangulation" to cross-verify the obtained results, specifically including:

Learning attitude survey questionnaire (Quantitative): The survey questionnaire is designed (using a Likert scale) to measure indicators of students' interest level, presentation confidence, and technology use skills before and after the experiment. To ensure the reliability of the toolset for 4th-grade students, the wording in the questionnaire was adjusted to be simple and easy to understand, and it was subjected to professional feedback and peer review from teachers in the subject department before conducting the actual survey.

Competency Assessment Rubric and Validity: To quantify students' competencies during the station rotation process (maximum 20 points/student), we designed an Assessment Criteria Table (Rubric) based on the theoretical foundation of the revised taxonomy of educational objectives by Anderson et al. (2001). Accordingly, the criteria in the Rubric are established closely following the increasing cognitive levels, ensuring high content validity (content validity): from the acquisition of *factual knowledge* (Observing and recognizing from VR images), *conceptual knowledge* (Spatial thinking and real-world connection), to *procedural & metacognitive knowledge* (Group collaboration, product creation, and reflection through presentation). Strict alignment with this international theoretical framework ensures that the Rubric accurately measures the competencies that need to be developed according to the orientation of the 2018 General Education Program.

Learning Portfolio: To supplement and elucidate the reasons behind the quantitative data, we collected students' Learning Portfolios throughout the intervention process. This portfolio includes the "Student Emotion Notebook" (reflection diaries after experiencing VR) and the "Art Learning Resources Library" (mind maps, drawings). The data triangulation between the Rubric scores, survey results, and these qualitative products helps eliminate evaluator subjectivity, thereby firmly affirming the substantial transformation in the students' emotional intelligence and self-study capacity.

4. RESEARCH RESULTS

4.1. Development of cognitive competencies and skills

To accurately evaluate the development of students' competencies after one semester of applying the Station Rotation Model "1 lesson - 3 roles", we employed a pre- and post-experiment comparative survey method. Data were measured through the survey questionnaire and the Assessment Criteria Table (Rubric), which consists of 4 strict classification levels ranging from 1 to 4 points, focusing on 5 groups of competencies. The comparative data are detailed in Table 1.

Table 1: Comparison of the development of students' cognitive competencies and skills before and after the experiment

Measurement criteria (Competency / Skill)	Before the experiment	After the experiment	Growth rate / Transformation
1. Level of interest in History and Geography	45%	85%	Almost doubled (+40%), demonstrating the strong appeal of visual technology.
2. Ability to understand the lesson through visual images and spatial thinking	40%	> 90%	Outstanding growth. Students proactively observe digital maps and know how to cross-reference 3D spatial information with the Textbook.
3. Confidence in sharing and presenting in front of the class	< 30%	76%	Breaking the barrier of timidity, students boldly express their personal viewpoints.
4. "Digital Explorer" skills (Using basic digital map tools)		100%	100% of students know how to perform zooming in, zooming out, and 3D rotation operations to look up and identify geographical locations.

Looking at Table 1, it can be seen that all quantitative indicators recorded breakthrough growth. Before applying the initiative, the traditional method using paper maps was not truly engaging, as only 45% of students felt interested and less than 30% were confident in sharing in front of the class. However, after applying the station rotation model integrating VR and digital maps, the interest rate almost doubled (85%). Most notably, 100% of the students in the experimental class proficiently manipulated basic digital maps, and 76% were confident in presenting to an audience. They did not merely "look" for entertainment, but knew how to "read" geographical spaces, thereby forming the skills of true "digital explorers".

The breakthrough in this section is that we quantified inherently abstract elements (such as confidence and interest levels) into specific measurement indicators. At the same time, it provides practical evidence affirming that 4th-grade students (9-10 years old) have the full cognitive capacity to manipulate complex 3D spatial data if placed in a properly oriented process. This proves that, even with limited equipment resources in public schools, well-organized pedagogical processes can absolutely bring about competencies equivalent to learning in expensive smart classrooms.

4.2. Transformation in attitude and emotional intelligence

Besides numerical evidence, the effectiveness of the solution was also quantified by us through the profound transformation in students' attitudes, behaviors, and artistic thinking. These qualitative data were drawn from the Learning Portfolios, Emotion Notebooks, and actual observation processes, detailed in Table 2.

Table 2: Comparative matrix of the transformation in students' attitudes, behaviors, and emotional intelligence

Assessment criteria	Pre-experiment state (Traditional method)	Post-experiment state (Applying VR & Digital maps)
1. Historical empathy (Through reflection writing activities)	- Passively acquiring knowledge, memorizing events mechanically. - Lacking opportunities for practical experience, presentation style is often stereotyped.	- 100% of students completed reflection writings after the experience. - > 80% of the writings expressed genuine, profound emotions. - Students know how to put themselves in historical contexts, arousing pride and an awareness of conserving the homeland's heritage.
2. Transformation in learning behaviors	- Passively waiting for teachers to provide knowledge through lectures. - Many students are timid and hesitant when facing an audience.	- Proactive exploration: Vigorously debating the details observed on VR360. - Complete transformation in demeanor: Many inherently shy students (such as Thanh, Hung, Khang) proactively volunteered to go to the podium, manually operating 3D maps to present to the whole class.
3. Interdisciplinary creative capacity (History, Geography, Fine Arts, Music)	- Learning products mainly stop at answering Textbook questions. - Lacking space for students to manifest multisensory intelligence.	- 100% of students participated in at least 1 form of artistic creation. - The classroom transformed into an "Art Space" with diverse products: Painting Hoi An ancient town landscapes, making clay models of the Japanese Covered Bridge, designing electronic postcards, combining singing and dancing with lanterns.

Table 2 shows a fundamental shift from a "Passive - Mechanical" state to an "Active - Creative - Humanistic" one. This confidence is most clearly demonstrated through typical cases. Students who were inherently very timid in traditional lessons underwent an unexpected transformation after the station rotation process, as they bravely volunteered to go to the podium, manually operating the 3D map to present to the whole class.

Furthermore, the interdisciplinary connection at the "Cultural Ambassador" station helped the class build an incredibly rich "Art Learning Resources Library" (painting Hoi An ancient town, making clay models of the Japanese Covered Bridge...). More wonderfully, 100% of the students completed their reflection writings after the VR-integrated lessons, in which over 80% of the writings expressed genuine, profound emotions (such as embodying a student at Quoc Tu Giam or writing messages to protect the ancient capital of Hue).

We have eliminated the prejudice that "using too much technology will make students apathetic and mechanical." By connecting a highly technological activity (VR) with highly humanistic activities (Diary writing, Fine Arts, Music), we created a pedagogical "touchpoint," helping to internalize knowledge naturally. At the same time, we demonstrated the superiority of dividing the class into 3 stations, creating a safe space (small groups) that helps unleash the confidence of shy students.

5. DISCUSSION

5.1. Solving the problem of "technological distraction" and equipment barriers

One of the biggest challenges when introducing Virtual Reality (VR) technology into primary schools is that students can easily fall into a state of "pure virtual tourism." If teachers merely distribute devices or links for students to view freely, they will be attracted by novel visual elements and forget the task of acquiring historical and geographical knowledge.

Positive results from this study prove that the Station Rotation Model "1 lesson - 3 roles" is a perfect pedagogical framework for cognitive control. By limiting the experience time (5-7 minutes/station) and associating each station with a specific role (Exploration Expert, Junior Geographer, Cultural Ambassador), the model compels students to observe purposefully and immediately transform images into cognitive data.

Furthermore, dividing the class into 3 rotating groups helped us thoroughly resolve the problem of infrastructure shortages. Instead of needing to equip 30-40 VR headsets/tablets for all students simultaneously, the school only requires a number of devices equal to one-third of the class size, while still ensuring that 100% of the students experience the technology fairly and effectively.

The effectiveness of this station rotation is entirely consistent with the findings of Walstra (2023). This study indicated that, in the context of limited technological resources, having learners take turns sharing a VR headset in small groups not only overcomes the barrier of equipment costs but also yields unexpected cognitive benefits. Specifically, while waiting for their turn, students are compelled to observe, listen, and learn from the interactions of their group peers, which helps enhance attention and engagement, and deepens their learning experience.

Consequently, our research has dismantled the notion that "abundant financial resources and 1:1 equipment (one student - one device) are prerequisites for digital transformation." Through the art of classroom organization, we have optimized the existing common infrastructure, bringing advanced educational experiences to public school students. Simultaneously, this affirms that the station rotation mechanism is not merely a temporary infrastructural solution, but a truly superior pedagogical strategy that helps maintain high concentration in an integrated learning environment.

5.2. Transforming the cognitive process: A flexible "Knowledge Decoding" journey

The success of the model lies not only in the use of technology but also in the flexibility of organizing the cognitive process. Instead of passive, one-way learning as in traditional methods (where the teacher lectures, and students listen and look at static paper maps), students are placed at the center of the knowledge construction process.

A particularly interesting point we discovered during the station rotation experiment is the psychological effect on the groups starting at the Discussion Station (when they had not yet passed through the VR Station). Here, we required them to make "Scientific Predictions" based on their background knowledge. For instance, before viewing the VR images of the Hue Imperial Citadel, they had to discuss and predict: "Why did the ancients build the citadel near the Perfume River?". This prediction strongly stimulated their curiosity, generating immense motivation for them to observe more carefully when moving to the Digital Experience Station to seek the answer. Consequently, the History and Geography lesson truly transformed into an exciting journey of "knowledge decoding".

The article has concretized Constructivism into a specific EdTech model. We demonstrated that digital technology only maximizes its power when placed behind a "guiding question" from the teacher, transforming students from "passive viewers" into "active evidence seekers".

5.3. Humanistic value: Nurturing "Digital citizens with a cultural identity"

Many opinions express concern that the abuse of virtual environments will cause students to lose their connection with reality. However, through supplementary activities such as "Virtual Field Trip - Real Reflection Writing" and interdisciplinary connections (Fine Arts, Music), we guided students to transform inanimate 3D images into deep inner emotional responses.

VR technology and digital maps in our study do not merely stop at the function of spatial illustration, but have become a bridge between the heroic history of our ancestors and children's souls. When students manually paint a picture of Hoi An ancient town, make a clay model of the Japanese Covered Bridge, or write "messages to the future" to protect the ancient capital of Hue, knowledge is deeply ingrained and personalized. The model has shaped a new learning style: Active - Creative - Humanistic. This is the core foundation for educating a generation of "digital citizens with a cultural identity" in the future.

5.4. Lessons learned and feasibility

From the experimental process, we concluded that technology cannot and will never completely replace familiar teaching methods. The success of the experimental lessons heavily depends on the meticulous preparation of pedagogical scripts, as well as the teacher's harmonious combination of lecturing, Q&A, and technology.

With a system requiring only common hardware configurations (computers, projection screens, the Internet) and utilizing free digital learning resources (Google Earth, VR360), this solution completely eliminates the dependence on complex and expensive specialized equipment. Therefore, this model has high feasibility, not only applicable to 4th-grade History and Geography but also fully capable of being replicated in other subjects such as Science and Experiential Activities in primary schools.

6. CONCLUSION

6.1. Conclusion: The application of the "Station Rotation Model “1 lesson - 3 roles” integrating Virtual Reality (VR) and digital maps" has truly created a breakthrough in the teaching method of 4th-grade History and Geography. Pedagogically, we have successfully transformed the classroom space from imposed knowledge transmission into a constructive and experiential learning model. The effectiveness of the model is evidenced by impressive figures: the percentage of students interested in the lesson skyrocketed from 45% to 85%, along with clear progress in presentation skills and confidence in applying technology (increasing from 30% to 76%). This excellently meets the competency development objectives set out by the 2018 General Education Program.

Besides the quantitative results, the greatest success of the initiative is bringing profound humanistic value. Through the "Virtual Field Trip - Real Reflection Writing" activity, digital technology is no longer dry but has become a bridge arousing national pride and an awareness of heritage conservation, contributing to shaping "digital citizens with a cultural identity". Furthermore, this solution has high feasibility because it has eliminated the dependence on expensive specialized equipment, utilizing only common hardware and free learning materials. Therefore, this process can absolutely be effectively replicated in other subjects such as Science or Experiential Activities in primary educational institutions.

6.2. Recommendations: For the station rotation model integrating Virtual Reality (VR) and digital maps to maximize its effectiveness, educational institutions need to have a reasonable technology infrastructure investment strategy and enhance training in digital pedagogy methods for the teaching staff. On the teachers' side, it is necessary to proactively design "pedagogical scaffolds" to control cognitive load, combine them harmoniously with traditional methods, and coordinate closely with families to orient student learning. Finally, to affirm the universality of the solution, future studies should continue to expand the scale of experiments in various regions, conduct more in-depth measurements of cognitive psychology factors, and progress towards replicating this model in other subjects, contributing to building a comprehensive digital education ecosystem at the primary school level.

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Corresponding Author: Nguyen Minh Giam