

RENOVATING METHODS OF TEACHING HISTORY WITH VIRTUAL MUSEUMS IN HIGH SCHOOLS

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Received:	11/4/2023	Nowadays we are in the threshold of the fourth industrial revolution which can help people come into the digital age. This revolution changes people's way to live, to work and it creates a large influence on education. Building a virtual museum is one of noticeable example of applying technology into teaching and training which helps to link museums and classrooms together. Applying theoretical analyzing method, practical approaching method, the article aims to clarify the concept of the virtual museum, the role and signification of using virtual museums in teaching history, the reality of this problem in high school. Therefore, the article identifies and analyzes deeply requirements that need to be ensured when developing and building a virtual museum for historical teaching at high schools. Furthermore, the article focuses on proposing new teaching and training approaches using the virtual museum in order to improve the quality of teaching history at high schools. Along with introducing measures of using the virtual museum, the article also provides specific and convincing evidence by teaching history particularly.
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ĐỔI MỚI PHƯƠNG PHÁP DẠY HỌC LỊCH SỬ VỚI BẢO TÀNG ẢO Ở TRƯỜNG PHỔ THÔNG

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THÔNG TIN BÀI BÁO		TÓM TẮT
Ngày nhận bài:	11/4/2023	Hiện nay, chúng ta bắt đầu bước vào ngưỡng cửa của cuộc cách mạng công nghiệp lần thứ tư – cuộc cách mạng đưa loài người vào kỷ nguyên số. Cuộc cách mạng làm thay đổi cách sống, cách làm việc của con người và có tác động không nhỏ tới giáo dục. Xây dựng bảo tàng ảo là một kết quả của việc ứng dụng công nghệ vào dạy học, giúp kết nối hiệu quả giữa bảo tàng với lớp học. Vận dụng phương pháp nghiên cứu lý thuyết, phương pháp tiếp cận thực tiễn, bài viết muốn trao đổi làm sáng tỏ quan niệm về bảo tàng ảo, vai trò, ý nghĩa của việc sử dụng bảo tàng ảo trong dạy học lịch sử, thực trạng của vấn đề này ở trường phổ thông. Từ đó, bài viết đi sâu vào phân tích, xác định những yêu cầu cần bảo đảm khi xây dựng và quy trình xây dựng bảo tàng ảo phục vụ dạy học lịch sử ở trường THPT. Đồng thời, từ sản phẩm bảo tàng ảo đã xây dựng, bài viết tập trung đề xuất các hình thức tổ chức dạy học có thể sử dụng bảo tàng ảo và những biện pháp sử dụng bảo tàng ảo trong dạy học lịch sử nhằm nâng cao chất lượng giáo dục bộ môn ở trường THPT. Song song với việc giới thiệu các biện pháp sử dụng, bài viết đưa ra những dẫn chứng cụ thể, có sức thuyết phục trong thực tiễn ở địa phương.
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1. Introduction

In the recently basic and comprehensive renovation of general education, new methods and initiatives are always vital requirements in teaching history. One of the innovation directions that contributes to improving the quality of teaching history is effectively using historical data and documents from museums, which are very valuable in historical research and learning. By using historical data and documents, learners will have a true look and fundamental to recognize and evaluate history.

As cultural institutions, museums have great potential for historical education. The fact, however, shows that there have been many limitations in using museums in teaching History because they have not been paid much attention to use this valuable historical data source. From that situation, it is necessary to find effective ways to use the museum, including connecting the museum to the history of teaching in high school.

Through the application of scientific and technological achievements, the museum has a so-called new form of the virtual museum which is used as a technological solution, helping to connect and use museums in teaching history. A few research studies were conducted lately about online learning in the virtual museum [1]-[4]. Maryse and Marion (2007) conducted a study and examined the way that 125 teachers in Canada used the Internet and museum websites, also called virtual museums, to encourage student learning in history and social studies at the primary and secondary level [5]. Neill (2008) conducted a research focused on cultural heritage and aimed to produce a virtual museum of cultural heritage from ten countries in Europe. He found that rural students were significantly more positive about the educational use of the virtual museums in the Internet [6]. Besides, contents of some articles, thesis helped us to clarify the theory and practice of using museums [7]-[10]. According to Schaller & Allison-Bunnell, the learning theory constructivism underlies much educational practice in museums and has come to inform the design of virtual museums as well [11]. The above studies also supply us some ideas about methodologies to use museums in teaching history in schools.

The article is about the using museums in teaching History at high schools by applying virtual museum. In addition, we study forms and methods of using virtual museums in the direction of developing students' ability, in an effort to contribute to innovating methods and improving the effectiveness of teaching history. The study aims to answer these questions: What is a virtual museum? Why should it be used in teaching history at high schools? How is virtual museum design solutions conducted in teaching history? Which forms and measures of use virtual museum help to develop high school students' capacity? Studying the topic, we apply theoretical research methods and pedagogical experimental methods. The article analyzes and processes pedagogical experiment results, then assessing and giving conclusions.

2. Research methods

This study used research methods which are typical of an educational research work, including theoretical research methods and practical research methods. For theoretical research, we conducted educational scientific research methods to build the concept, characteristics of virtual museum, significance of the virtual museum used for teaching history. For practical research, we implemented pedagogical experiments by preparing lesson plans and pedagogical testing of proposed research measures, and testing some proposed measures in practice.

3. Exchange and discussion

3.1. Notion and characteristics of virtual museum in history teaching

Museum is a cultural institution that dates back to ancient times and exists till now. Not only to preserving and promoting the values of human cultural heritage, museum has always renovated the display work and served the public in accordance with the development of the society. Based on

the development of technology, the virtual museum has many different terms and names such as electronic museum, web museum, digital museum, online museum, etc. Despite its different names, virtual museum is defined in the same way. The content of the museum is digitally recorded and accessed via electronic information. The virtual museum is an effective solution to tackle the paradox between displaying and preservation, between quantity and type of displayed artifacts with exhibition spaces, interaction between artifacts collection and of learners' needs.

Thus, the virtual museum is the place to display collections of nature and society's history in digital form to serve the needs of research, education, tourism and cultural enjoyment of people. The virtual museum is a digital product, based on the characteristics of a real museum to complement and enhance the museum experiences through personalization and interaction.

Under the approach ways of historical teaching research, the virtual museum has the following characteristics:

- Digitization: Virtual museum has different characteristics compared to actual museums, of which focuses on reflection methods. A virtual museum does not store actual museums' articles but their electronic ones. Virtual museum digitization is performed by the display mode based on digital devices.

- Intuitiveness and multimedia: Through links' forms between artifacts and galleries, viewers can indirectly observe the artifacts and easily move the observation positions at the same time.

- Flexibility: Through the display in a virtual museum, artifacts connect with multimedia material information such as documents, images, audio tapes, documentary films. Thus, the display in a virtual museum is flexible according to topics.

- Orientation and connectivity: With its existence in digital form, virtual museum can be transmitted and easy to be visited at any time and anywhere.

3.2. The meaning of using virtual museums in teaching history to develop students' quality and capacity

With its characteristics, a virtual museum has many advantages to be used in teaching history at high schools. The virtual museum models designed based on digitized original materials will be a valuable "visual inventory store" for History learning and research. Virtual museum plays vital roles in teaching history as follows:

By using a virtual museum, students seem to visit virtual museum in their classroom or at home. They will be able to observe and learn historical evidence intuitively in the form of original material. When observing virtual museum during school hours, students may access attractive knowledge that lies outside textbooks, thereby deepening the basic knowledge of the lesson, meanwhile history learning will become more vivid, attractive and effective.

Both teachers and students can use virtual museum at any time and in anywhere with the support of IT technology, to enhance the effectiveness of observation, and create symbols in the most honest way.

In particular, teachers can actively and regularly use virtual museum in classrooms with the support of IT technology. Using a virtual museum in the classroom does not depend on geographical distance.

The model of using virtual museum may be cheaper than the model of teaching at museums. Therefore, a virtual museum is a new way for teachers and students to easily access and use museum artifacts in order to create effectiveness in teaching history at high schools.

These above issues affirmed that virtual museum is a technological solution that plays an important part for teaching history, and is required to be applied at high schools.

3.3. Designing virtual museum on 3DVista Virtual Tour software to apply in teaching history at high schools

The most important step of the virtual museum design is using software. 3DVista Virtual Tour is a software that enables to create a virtual sightseeing models, including virtual museum design

support. The software performs the transformation of a set of 360° panoramic images and detailed artifacts into virtual display models in the form of the closest to reality. The main result of using this software is to create an engaging virtual sightseeing model through interactions and a variety of impressive personalities such as Live Pano, Photo Album, Map, Audio, Video (the design interface in Figure 1).

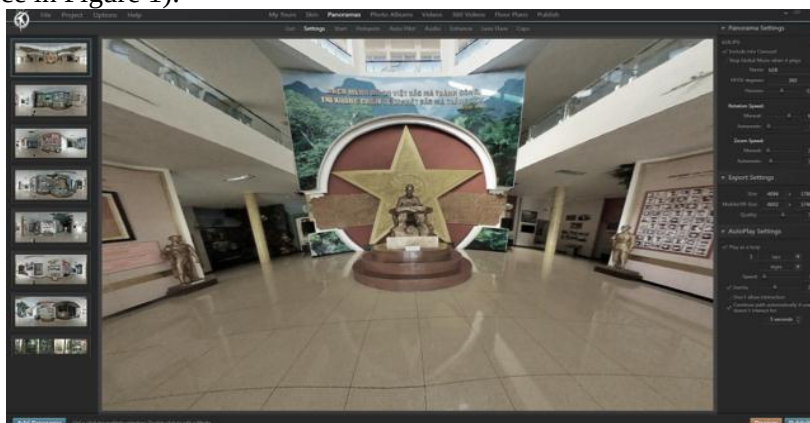


Figure 1. Interface for designing virtual museums on 3DVista Virtual Tour

On the basis of digitalized sources, teachers use software to design VMs according to the following process:

Step 1: Opening the software, create a visual model of virtual museum. Teachers open the software, click Select kin to create a virtual museum display model.

Step 2: Entering panorama data. In the Panoramas dialogue box, the teacher clicks Import Panorama, then click Standard Panorama, adding the panorama photos source and save on the computer to the project.

Step 3: Setting a virtual museum view. In the Settings, teachers select the mode of observation at the start, the speed of movement.

Step 4: Creating detailed observations of artifacts, images and travel directions. This is the most important step in virtual museum designing. At the Hotspot, teachers select the buttons Polygon, Text, Picture, Video to add moving arrows, insert text, images, audio, and video into the project.

Step 5: Edit and publish virtual museum models. The newly-designed virtual museum models are edited by teachers to ensure consistency, easy to be used, observed, and can meet the usage purpose of teaching history. Teachers click Preview, detect errors for editing, click Publish to publish virtual museum models (in the form for Web and offline).

3.4. Forms and measures to use virtual museums in teaching history at high schools

3.4.1. Using the virtual museum in the curricular lessons

- Using the virtual museum to organize warm-up activity

Both theoretical and practical research shows that the most effective way to brainstorm students at the beginning of the lesson is to create a learning situation. Virtual museum documents include an interesting historical document, so it can be used to create learning situations, and warm-up students' awareness activities. In teaching History in Vietnam, teachers use museums' documents to create learning situations and warm-up students' awareness activities through the following steps:

- Teachers provide information on virtual museum artifacts for students with a projector
- Teach students how to identify historical events through images and documents. Students receive tasks, read information, observe, identify and answer questions. However, students may not have enough knowledge, so they need to continue to study the problem.

- Teachers present created learning situations and give cognitive exercises.

For example, when teaching lesson 18 namely "The first years of the national resistance against French colonialism (1946 - 1954)", the period 1, (grade 12), teachers choose materials to be exploited at the displaying room in Vietnam Armed Forces Museum to create learning situations for students: Why did President Ho Chi Minh have to leave Hanoi city for Viet Bac war base?

By using virtual museum materials on the above events, students will work their minds to handle problems, thereby forming their learning motivation.

- *Using the virtual museum to form new knowledge*

- *Describe the virtual museum artifact to create a historical symbol*

Museum artifacts are cited with very brief and simple information. If they are not described, symbols are not formed, museum artifacts will be just a silent artifact, with little educational effect. Therefore, when using the virtual museum, teachers not only allow students to observe information about artifacts but also need to combine with presentation to make those objects become vivid. To describe documents and articles of the museums, teachers follow the following steps:

- Teachers introduce information about materials, articles that need to be described and state learning tasks;
- Teachers provide virtual museum materials and supporting documents for learning through information sheets;
- Teachers instruct students to exploit the content of objects, and describe objects (shapes, materials, meanings of objects)
- Students present and make a report on learning results, describe images and historical objects.

In teaching Vietnamese history, teachers can instruct students to describe some typical articles such as the revolutionary flag used in the 8th Party Central Conference (May 1941), the Hermes typing machine, Uncle Ho's shirt, or the Bazooka gun,... The description of the above artifacts will help students to have a vivid historical symbol and bring them emotions of History.

- *Guide students to use the virtual museum to explain and evaluate history*

Virtual museum documents are not only visual means to specify events, and create historical icons for students but also have important effects in explaining and evaluating events and historical issues. Teachers should take these steps as follows:

- Teachers raise questions, and tasks that need to be explained and evaluated;
- Teachers provide virtual museum information sources and guide students to discuss;
- Students discuss together and find solutions to problems that to be explained and evaluated;
- Teachers give feedback, comments and close the content.

For instance, when teaching about our guideline in the Viet Bac campaign – in the Fall-Autumn of 1947, the teacher asked, "What were the advantages of our army and people when we started the Vietnam North counterattack campaign?", Students read sources of information, conduct discussions, and answer, then teachers comment and suggest, introduce information sources to explain the event: One of our important advantages was that we had the whole plan. When the enemy attacked Viet Bac, we organized enemy attacks on all fronts.

The use of virtual museum to explain and evaluate events, and historical issue is a measure to bring efficiency, that helps students to get comprehensive knowledge, present their thoughts and understanding to comprehend basic knowledge.

- *Using the virtual museum to organize practice activities and application*

The requirement of nowadays teaching is to enhance the use of knowledge to develop learners' capacity. One of the ways to solve that problem is that teachers will act as guides. After forming new knowledge, teachers organize role-playing activities to strengthen the practice of knowledge for students as follows:

- Teachers assign tasks and give requirements for acting as a guide for each group of students.
- Students prepare explanation speeches, select artifacts and practice presenting their explanations.

- Students play a role as tour guides.
- Teachers evaluate students' performance results.

For example, when teaching about Vietnam North-Autumn Campaign in 1947, teachers can divide groups to organize activities for students to act as guides. Based on the information they learned, as well as using articles, students can practice and revise lessons through role-playing activities.

3.4.2. Applying the virtual museum in extracurricular activities

- *Organizing virtual museum visiting activities*

Using virtual museum enables teachers to organize experience activities in the classroom or at the computer room. The process of virtual museum tour activities comprises these following steps: Firstly, teachers instruct virtual museum tour skills for students such as the use of the system, steps to visit virtual museum (Observe the display space, listen to explanations, observe the artifacts, fill in the answer sheet with their answer and then report results of the visit). Secondly, teachers make a snapshot of the museum and tell students to visit the virtual museum, use it on their computers and complete visiting sheet in turns of the museum's exhibition. For example, teachers organize a visit to the Viet Bac Armed Forces - Military Region I in class on the occasion of celebrating the anniversary of the establishment of Vietnam People's Army (December 22). Through virtual museum tour activities, students will understand typical historical events taking place in Viet Bac and evaluate great contribution of the Viet Bac peoples to the development of the nation.

- *Using the virtual museum to organize vocational experience activities*

The virtual museum is a source of rich electronic data and contains traces of history, evidence of the past on digital media. Based on the past's traces, both researchers and learners of history can recreate events, historical phenomena which used to take place. Teachers can organize vocational activities for students like "I am a young historian" to track traces, re-create history. By visiting the virtual museum, they will track historical traces to restore events and phenomena. A teacher conducts the following steps: Teacher determines content; divide students into groups, and assign students to track traces; The groups study through observation, recording artifacts annotated information; and reporting... For example, teachers organize students to practice as a "young historian" to search for traces to learn about some contents such as activities of Nguyen Ai Quoc leader in Viet Bac (1941 - 1945), armed forces in the August 1945 Revolution through the articles of the Viet Bac Armed Forces virtual museum.

3.5. Pedagogical experiment on renovating methods of teaching history with virtual museums

Based on the methods of using virtual museums in teaching inner history lessons, the research group has conducted the lesson 20 of pedagogical experiment, namely "The national resistance war against the French colonialists ended (1953 - 1954)" History of grade 12 at Viet Bac High School (Thai Nguyen province). In the control class, teachers still go to class as usual but in the experimental class, teachers go to class with lesson plans based on the methods of using virtual museums we recommend.

When conducting experimental lessons, teachers instruct students to use the virtual museum in some of the teaching activities. For instance, in the activity to start the lesson, teachers use the image of Tin Keo shack and a photo of the Politburo meeting (December, 1953) of the virtual museum, instruct students to identify historical relics related to the decision to launch Dien Bien Phu campaign. The teacher organized a historical survey to answer the question "Why did the Vietnamese resistance government and the French colonialists choose Dien Bien Phu as the strategic point?". Teacher divided the class into 3 groups, then assigned tasks to each one, and instructed them to use related virtual museum materials. Group 1: The position of Dien Bien Phu and the conspiracy of the French colonialists?; Group 2: Why did the French-American suppose that Dien Bien Phu was an "impregnable fortress"?; Group 3: What was the guideline of the

Vietnam's resistance party and government? From the partial research results of the 3 groups, with the interaction and criticism among the groups, students made conclusions: Dien Bien Phu became a historical rendezvous, a place where a strategic and decisive battle took place, fighting against the French colonialist... After the experiment, we tested students' awareness. Test results are processed mathematically. Based on the results of the test scores, we calculate the average ($\bar{x}$), standard deviation (Sd). The results are shown in Table 1.

Table 1. Experimental results of curricular lessons

Class	N	Marks									$\bar{x}$	S _d
		2	3	4	5	6	7	8	9	10		
Control	45	00	01	04	05	10	15	08	02	00	6.46	1.39
Experiment	45	00	00	00	04	08	13	15	05	01	7.31	1.16

As shown in Table 1, the average score of the experimental class is higher than the control class (0.85 points). The standard deviation (Sd) of experimental and control classes is negligible. These results show that the precision of the figures around the mean is guaranteed. Experimental results show that the proposed measures ensure the feasibility.

After the experimental class, we had a meeting to evaluate and learn from lessons of teachers, interviewed students about lessons using virtual museums. We realized that when initially applying virtual museums, there have still difficulties for teachers. When instructing and discussing each task and plan in details, teachers have become aware of problems and apply new teaching methods during class time. With students, observing artifacts and visual images from virtual museums help them to better absorb lessons, and increase the ability to explore knowledge of each student for the lesson.

4. Conclusion

In the context of teaching history in the 4.0 industrial revolution era, the application of new teaching technologies, including using virtual museum is an essential issue. With the outstanding advantages and favorable conditions, using virtual museum is a technological solution that effectively connects visual and attractive sources of museums, helping teachers and students to use them in a regular and flexible way in curricular classes and extracurricular activities. Besides favorable advantages, however, the use of virtual museum at high schools also poses challenges, and requires the good preparations of necessary conditions such as equipping facilities and training IT application skills for teachers and students. Above all, teachers need to have enthusiasm, a spirit of vocational training to stimulate students to be interested in learning with virtual museum, so that "history becomes their teacher in their life".

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