

Exhibition of Dong Ho paintings in a virtual reality environment at a Fine Art Museum, Vietnam

Ngoc Quynh Giao, Pham, Ph.D.

Doctoral Thesis Summary

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Exhibition of Dong Ho paintings in a virtual reality environment at a Fine Art Museum, Vietnam

Výstava obrazů Dong Ho v prostředí virtuální reality v Muzeu výtvarného umění ve Vietnamu

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Key words: Fine Art museum, museum exhibition, preservation, Dong Ho folk painting, virtual reality (VR), VR environment, immersed.

Klíčová slova: muzeum výtvarného umění, muzejní výstava, konzervace, lidová malba Dong Ho, virtuální realita (VR), prostředí VR, ponořeno

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ABSTRACT

In the history of human culture development, the museum was born as a kind of cultural institution understood as a symbol of community culture. A museum is a place where anyone who wants to learn about the culture and history of a country needs to have at least one visit. In many works related to architecture, the museum is the only place to store documents and display artifacts related to the historical process, reflecting the culture of a city, a nation, or a country.

For cities with hundreds of years of history, a historic center is often a place where old and new cultural values are symbiotic. These prices continue and change during a continuous process. The city has also faced the abandonment of past achievements in the modernization context. Therefore, the relationship between conservation and development is often a controversial issue in the process of renovating art museums. At present, most developed countries admit the harmony between these two elements is an essential need in the strategy to preserve cultural and artistic traditions.

On the contrary, it is still a painful problem that has not yet ended in Asia. An undeniable fact is that the city-county has not appropriately preserved museums in Vietnam and especially Ho Chi Minh City. This fact has led to the young generation in the city are not interested in visiting the museum. One of the main reasons is that the face with the contemporary exhibition ways has many mistakes and wrong knowledge of installation.

In many works related to architecture, the museum is the only place to store documents and display artifacts related to the historical process, reflecting the culture of a city, a nation, or a country. However, the strength of the technological age and the consequences of the war occurred as the storm destroyed the cultural identity layers. The city has also faced the abandonment of past achievements in the modernization context. Therefore, the relationship between conservation and development is a controversial issue in the process of reservation art-folk painting and art museums. It is still a painful problem that has not yet ended in Vietnam. An undeniable fact is that the city-county has not appropriately preserved museums and art folk paintings in Vietnam. This fact has led to the young generation in the city are not interested in visiting the museum.

Among the folk paintings in Vietnam, Dong Ho paintings belong to the line of paintings printed on wood carving planks, created, produced by the villagers of Dong ho village, and developed into craft villages. This line of painting attaches and vividly shows the traditional Vietnamese agricultural society, the working life of a traditional farmer, and the daily life of the Vietnamese people. Currently, Dong Ho folk paintings are in danger of dying out due to the impact of the market economy, changes in people's aesthetic needs, and difficulties in producing paintings. Besides, according to several painters, Dong Ho paintings are no longer as innocent, simple, "pure Vietnamese" as before but are gradually being commercialized, with no rich colors like ancient paintings. Today, Dong Ho's painting profession exists weakly; only a few families maintain it. According to recent statistics, the number of artisans is only three people, and the number of practitioners is about twenty. The number of artists who are still capable of teaching is only two people (Mr. Nguyen Huu Sam and Mr. Nguyen Dang Che) who are all elderly (Dung, 2013).

Virtual reality technology has become a new trend in human visual communication and visual arts in today's modern context. Virtual reality technology allows people to break down geographic barriers and planes, open up another dimension of 3D models, and even help people immerse themselves in various virtual reality environments. In fact, in terms of physical and geographical conditions, it is difficult for humans to experience.

In the face of the disappearance of a line of Vietnamese folk paintings with long-standing cultural value, as a Vietnamese, I feel a part of my responsibility to research and find solutions to preserve keeping the

Dong Ho folk paintings. Through this research on virtual reality technology, I have formed the idea of bringing Dong Ho paintings in the form of 2D hand-drawn paintings into the virtual reality environment. This project will be a process of concept formation, 3D modeling, and virtual reality environment construction of the museum and Dong Ho folk painting village. Finally, a short virtual reality video will help users experience inside the space of a Dong Ho painting village that has entered a restored legend. The next step is to conduct experiments and compare the correlation between people exposed to Dong Ho painting in 2D in traditional 2D format and experience the VR video.

This thesis aims to find a solution that is suitable for the modern trend of preserving the world's art and applying it to the preservation of Vietnamese folk paintings. In addition, the thesis also wants to perform the experiences in two traditional folk painting environments and folk painting in the form of VR environments and collect data comparing the effectiveness of these two experiences. Finally, this thesis aims to create new inspiration for the popularization and enjoyment of Vietnamese folk painting by the country's young generation.

Key words: Fine Art museum (FAM), museum exhibition, preservation, Dong Ho folk painting, virtual reality (VR), VR environment, immersed

ABSTRAKTNÍ

V dějinách vývoje lidské kultury se muzeum zrodilo jako druh kulturní instituce chápané jako symbol kultury komunity. Muzeum je místo, kde každý, kdo se chce dozvědět o kultuře a historii země, musí mít alespoň jednu návštěvu. V mnoha dílech souvisejících s architekturou je muzeum jediným místem pro ukládání dokumentů a vystavení artefaktů souvisejících s historickým procesem, odrážejícím kulturu města, národa, země.

Pro města se stovkami let historie je historické centrum často místem, kde jsou staré a nové kulturní hodnoty symbiotické. Tyto ceny pokračují a mění se během nepřetržitého procesu. Město také čelilo opuštění minulých úspěchů v kontextu modernizace. Vztah mezi konzervací a rozvojem je proto často kontroverzním problémem v procesu renovace muzeí umění. V současnosti většina vyspělých zemí připouští, že soulad mezi těmito dvěma prvky je nezbytnou nutností ve strategii zachování kulturních a uměleckých tradic. Naopak je to stále bolestivý problém, který v Asii ještě neskončil. Nepopiratelným faktem je, že městský okres nemá náležitě zachovalá muzea ve Vietnamu a zejména v Ho Či Minově Městě. Tato skutečnost vedla k tomu, že mladá generace ve městě o návštěvu muzea nemá zájem. Jedním z hlavních důvodů je, že dnešní výstavní způsoby mají mnoho chyb a špatné znalosti instalace.

V mnoha dílech souvisejících s architekturou je muzeum jediným místem pro ukládání dokumentů a vystavení artefaktů souvisejících s historickým procesem, odrážejícím kulturu města, národa, země. Síla technologického věku a důsledky války se však projeví, když bouře zničila vrstvy kulturní identity. Město také čelilo opuštění minulých úspěchů v kontextu modernizace. Vztah mezi konzervací a vývojem je proto kontroverzní otázkou v procesu rezervace umění lidové malby a muzeí umění. Je to stále bolestivý problém, který ve Vietnamu ještě neskončil. Nepopiratelným faktem je, že městský okres ve Vietnamu náležitě nezachoval muzea a umělecké lidové malby. Tato skutečnost vedla k tomu, že mladá generace ve městě o návštěvu muzea nemá zájem.

Mezi lidovými malbami ve Vietnamu patří obrazy Dong Ho do řady obrazů tištěných na dřevořezbářských prknech, které vytvořili, vyrobili vesničané z vesnice Dong Ho a vyvinuli se v řemeslné vesnice. Jedná se o linii malby, která připojuje a živě ukazuje tradiční vietnamskou zemědělskou společnost, pracovní život tradičního farmáře a každodenní život Vietnameců. V současné době lidové malbě Dong Ho hrozí vymření v důsledku dopadu tržní ekonomiky, změn v estetických potřebách lidí a potíží při produkci obrazů. Kromě toho, podle řady malířů, obrazy Dong Ho už nejsou tak nevinné, jednoduché, „čisté vietnamské“ jako dříve, ale postupně jsou komercializovány, bez sytých barev jako starověké obrazy. Dong Ho malířská profese dnes existuje slabě, udržuje ji jen několik rodin. Podle posledních statistik jsou počet řemeslníků pouze tři osoby, počet praktikujících asi dvacet, počet umělců, kteří jsou ještě schopni vyučovat, jsou pouze dva lidé (pan Nguyen Huu Sam a pan Nguyen Dang Che). všichni starší (Dung, 2013).

Technologie virtuální reality se v dnešním moderním kontextu stává novým trendem v lidské, vizuální komunikaci a ve výtvarném umění. Technologie virtuální reality lidem umožňuje prolomit geografické bariéry a roviny, otevřít další dimenzi 3D modelů a dokonce pomoci lidem ponořit se do různých prostředí virtuální reality. Ve skutečnosti, pokud jde o fyzické a geografické podmínky, je pro člověka obtížné zažít.

Tváří v tvář mizení řady vietnamských lidových maleb s dlouhodobou kulturní hodnotou cítím jako Vietnamec část své odpovědnosti za výzkum a hledání řešení, jak zachovat zachování lidových maleb Dong Ho. Prostřednictvím mého výzkumu technologie virtuální reality jsem si vytvořil myšlenku přinést obrazy Dong Ho ve formě 2D ručně kreslených obrazů do prostředí virtuální reality. Tento projekt bude procesem tvorby konceptu, 3D modelování, budování prostředí virtuální reality muzea a vesnice lidové malby Dong Ho. A nakonec krátké video virtuální reality pomůže uživatelům zažít

vnitřek prostoru malířské vesnice Dong Ho, která vstoupila do obnovené legendy. Dalším krokem je provést experimenty a porovnat korelaci mezi lidmi vystavenými malbě Dong Ho ve 2D v tradičním 2D formátu a zažít video ve VR.

Cílem této diplomové práce je najít řešení, které je vhodné pro moderní trend konzervace světového umění a jeho aplikace na záchranu Vietnamu mé lidové malby. Kromě toho chce práce také provést zkušenosti ve dvou prostředích tradiční lidové malby a lidové malby ve formě prostředí VR a shromáždit data porovnáující efektivitu těchto dvou zkušeností. V neposlední řadě si tato práce klade za cíl přispět k vytvoření nové inspirace pro popularizaci a oblibu vietnamské lidové malby mladou generací země.

Klíčová slova: muzeum výtvarného umění, muzejní výstava, konzervace, lidová malba Dong Ho, virtuální realita (VR), prostředí VR, ponořeno

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1. INTRODUCTION

1.1 Introduction

Museums are known to tend to display static exhibits. It is also understandable because the outside target is to provide knowledgeable information, and this is a place to store and secure historical arrays. Nonetheless, with the Virtual Reality museum in use, it is possible to change this feature dynamically. Malreaux (Malraux, 1978) was one of the first people to introduce the concept of a museum, a different kind of environment without walls for viewing and performing art. Lately, the concept of a virtual museum and technology was coined by Tschritziz and Gibbs (D. Tschritzis, S. Gibbs, 1991). They named it "Virtual Museum," and it has emerged until now.

The purpose of museum exhibitions is to disseminate precise messages from the objects to their visitors, which are noticeable through the form and display of exhibited objects within the museum background. By using multimedia with virtual reality and providing multisensory experiences, scientific and cultural information communicated by museum exhibitions can be augmented (Grigore Burdea, Paul Richard, Philippe Coiffet, 1996) (Christopher D. Wickens, Diane L. Sandry, Michael Vidulich, 1983).

With augmented reality features, museums in Ho Chi Minh City (HCMC) can bring art to life. Scientific concepts, architectural details, and other elements that visitors are granted by revealing from a different and extensive perspective. It does not only make it easy for visitors to answer questions but also partially reflects the story behind an era style, an influence and allows the user to have a sense of authenticity during the discovery process (HoaLT, 2019).

The thesis is formed by finding new methods to help preserve Dong Ho Vietnamese folk paintings and doing experiments to compare the effectiveness of the interaction between traditional folk art exhibitions and exhibitions with contemporary virtual reality methods. The project has focused on the purpose of a Virtual Environment (VE) that would enable museum visitors to view and manipulate 3D exhibits. The author will renovate the classic Dong Ho paintings, the most popular and famous in Vietnam culture, from 2D painting to 3D modeling. In the next step, the project also redesigns the interior space of the Fine Arts Museum (FAM) focus to serve the new 3D environment experiment. Furthermore, the necessity of numerous experimental evaluations defines the best structure of VR devices. The configuration quality would enable users to navigate within the VE parallel control exhibits in an effective and perceptive manner (Santiago González IZARD et al., 2019). The number of people participating in museums required the diversity of their age, sex, occupation, and social level. They will attend through the VE by using the Oculus glass and fill in multiple-choice questions to explain their communication feelings in the end. For a larger purpose, the thesis has a plus meaning to contribute to arousing the exploration of Vietnamese folk painting, popularizing knowledge about the country's traditional history through works of art.

1.2 Statement of Research Problem

Show status of museum exhibitions in Vietnam also falls into a particular situation between the hospitality market and the media display method. The buildings that have a history of more than 100 years are used as museums in the city, typically shaped as Fine Art Museum, increasingly degraded in architecture, and at the same time lacking creativity in the way art is exhibited. These issues persisted for many years, leading to extended periods of public interest in the country's art. Museums generally have exhibitions and themes that change seasonally or quarterly of the year to enhance interaction and attract the art-loving public. It is the problems that still exist that the Fine Arts Museum is gradually falling into a certain distance, poor in the method of the exhibition, the art of protection, and gradually losing its position in famous museums in the city (Le, 2007).

According to the history of Dong Ho villagers recorded, Dong Ho painting was born in the 11th century in the Ly Dynasty at Mai village (Dong Ho, village nowadays). The village is located on the southern bank of Duong River, now in Thuan Thanh district, Bac Ninh province, about 35 km from Hanoi. (M. Nguyet, B. Van, 2019). During this period, Dong Ho was one of the places that made famous wood carving traditional paintings alongside other lines of traditional paintings, Hang Trong, Kim Hoang.

The peak period of the painting village was from the late nineteenth century to the 40s of the twentieth century. At that time, there were 17 families in the village. They all made paintings. Before 1945, Dong Ho village had more than 150 families making paintings. However, with the dominance of the wave of modern painting and the changing lives of Vietnamese people, Dong Ho paintings gradually disappeared from Vietnamese families on holidays and New Year. Most people who buy Dong Ho paintings today are tourists or as gifts for foreigners who are still interested in traditional art (M. Nguyet, B. Van, 2019). For that reason, the villagers of Dong Ho village also quit the profession of painting to move to another job to earn additional income, such as making joss paper and gold paper. At the same time, the tradition of printing old paintings by hand was also gradually replaced by a series printer, losing the folk character of Dong Ho's paintings (Anh, 2019).

The disappearance and loss of Dong Ho Painting village are becoming an urgent issue. In addition to maintaining and preserving this folk painting line, popularizing the line of paint to the masses and young generations is also a problem. However, in Dong Ho village, very few artisans still know how to make traditional paintings. Most of these artisans are old; if there is no continuation, this painting line will disappear over time. Therefore, Vietnam is completing a dossier on Dong Ho folk paintings to propose to UNESCO as an intangible cultural heritage in need of urgent protection (M. Nguyet, B. Van, 2019).

1.3 Research goals (RG) and research questions (RQ)

Within the framework of the exhibition of Dong Ho paintings and a virtual reality environment, the research had three main goals:

RG1 Study the historical value and artistic value of Dong Ho folk paintings

RG2 Research and determine measures to preserve Dong Ho folk paintings in the form of 2D paintings in a virtual reality environment

RG3 Conduct experiments and compare the differences between traditional folk painting exhibition environments and virtual reality environments.

RG4 Evaluate the experimental results and draw new methods to preserve traditional folk paintings

RG5 Study on the difference between the visual effects and the attitudes of the viewers between the traditional painting exhibition and the folk painting exhibition in the virtual reality format

To reach the research goals, several research questions had to be addressed:

RQ1 What factors are causing difficulties in preserving Dong Ho folk painting in Vietnam?

RQ2 What is the new method of exhibiting traditional folk art in Vietnam from now and shortly?

RQ3 How to apply virtual reality exhibitions to traditional ways of collecting art in museums in Vietnam?

RQ4 Does the exhibition by the traditional method attract viewers, especially young people? How do they feel that the presentation of folk paintings in virtual reality is different from the conventional exhibition-style?

1.4 Research stages and methodology

The author's method used in this study is more about practical research combined with a quantitative method to conclude. The practical research method is shown in the author's process of participating in designing a short film that reconstructs two Dong Ho folk paintings from a 2D version to a 3D version. The footage is presented as a virtual reality video clip that can be experienced on a VR set or viewed as a standard video on YouTube. The quantitative research method will be applied through a survey of questions related to viewers' perceptions of the film. The survey results will be possible to conclude

how the research affects the research subjects. The author also used the survey to offer a form of exhibition and preservation of Vietnamese folk paintings.

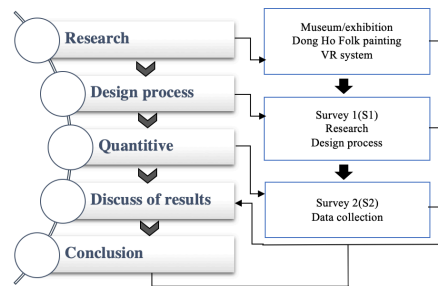


Fig 1 Summary of design method of this study. Author's own.

This thesis includes the following design stages:

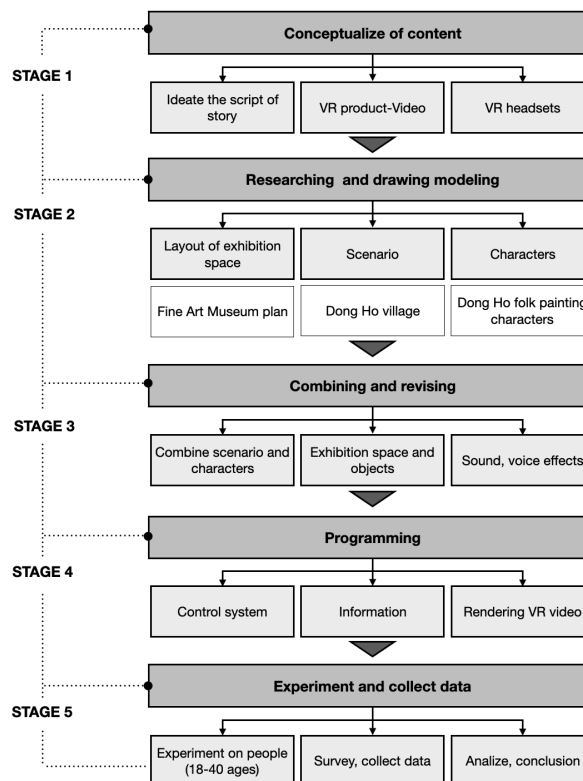


Fig 2 The diagram of the five design stages in this study. Author's own.

1.5 Research Objectives

The coldness of the public coming to museums has existed in Vietnam in general and Ho Chi Minh City in particular. Parallel to that, folk paintings are also increasingly fading and need to find conservation measures to suit the change of time. This study conducts extensive research into the situation of the Fine Art Museum, the problems of current art exhibitions, and to find solutions to overcome these problems. The study also conducted extensive research on the history and characteristics of the Dong Ho folk painting line. The thesis will classify and give the reasons for the disappearance of the famous folk painting line for a while. After that, the main objective of the thesis is to study the method of restoring and transforming the famous Dong Ho paintings from a 2D version on drawing paper into a 3D version operating in a virtual reality environment. Post-production will be conducted to create a virtual reality exhibition space for the first time in Vietnam, with the main content being the characters in the Dong Ho series. Compare the public's specialties and the results of shared experience between how traditional folk paintings are exhibited and how information is exhibited in a virtual reality environment.

1.7 Research contributions

The results of this study are:

- Information about the origin, history of formation and development, special features, and techniques of Dong Ho folk painting in Vietnam
- Discover the new exhibition method used for Dong Ho folk paintings.
- The video describes an exhibition of Dong Ho folk paintings in the form of a virtual reality technology application.
- Data information compares the traditional painting exhibition method and the new exhibition method applying virtual technology.

The thesis completes the contribution to the management of cultural heritage as well as the art museum in Vietnam with the following items:

- Research on visual communication in the exhibition of Dong Ho folk paintings at the museum.
- Research environment reality exhibition of the Fine Art Museum in Vietnam
- Study method of converting Dong Ho folk artworks from the standard drawing version to a virtual environment.

This thesis is also a significant contributor to cultural and artistic heritage preservation and management as it collaborates with studies related to past heritage conservation issues. At the same time, this study gives specialist bodies the ability to make decisions related to practical topics and has a practical basis for comparison.

1.8 Limitation of Study

When put on the scale to compare with other art museums, the art museums in Ho Chi Minh City will have a lot of difficulties in promoting themselves to their public market. The familiar term "going to a museum" is a daily activity in Europe and America, alien to young people and unattractive to adults. In general, the fake city in particular and the Vietnamese people in general are captivated by the American culture, Western popular culture (Hoang, 1993) and recently Korea's entertainment culture.

In addition, the levels of governmental cut assistance in the cultural field also establish many new formulas for the cultural domains in Vietnam. According to Lidstone and Doling (2000), only out that from the year 1988 onwards, the government waived the decision that generous state funding for cultural and arts organizations should be reduced and eliminated entirely. all for the common good in some cases (G. Lidstone and T. Doling, 2000).

In the process of researching documents, I also encountered many difficulties in collecting documents, books, newspapers, scientific journals related to museums, and folk paintings of Vietnam. Profit of the NCascience of the careters canfom with research results and advanced calculation application. This status in the area of culture and art art in Vietnam is still very manageable and lacks proper attention. Literature on folk paintings and valuable manuscripts is still very limited or has been removed over time. Therefore, another limitation in this topic is the fact that the information is accurately determined in the historical and scientifically proven sense of Dong Ho folk art.

The topic also did not receive any support from universities, government, or cultural and art organizations. The costs for the process of researching, testing, and applying virtualization technology to the design and protection of Dong Ho folk are very high. Due to the above-mentioned human resources, the results of the topic may not be able to achieve the goal of reconstructing most of the paintings of Dong Ho and archived to this day, but only some sample information can be used.

1.9 Organization of Thesis

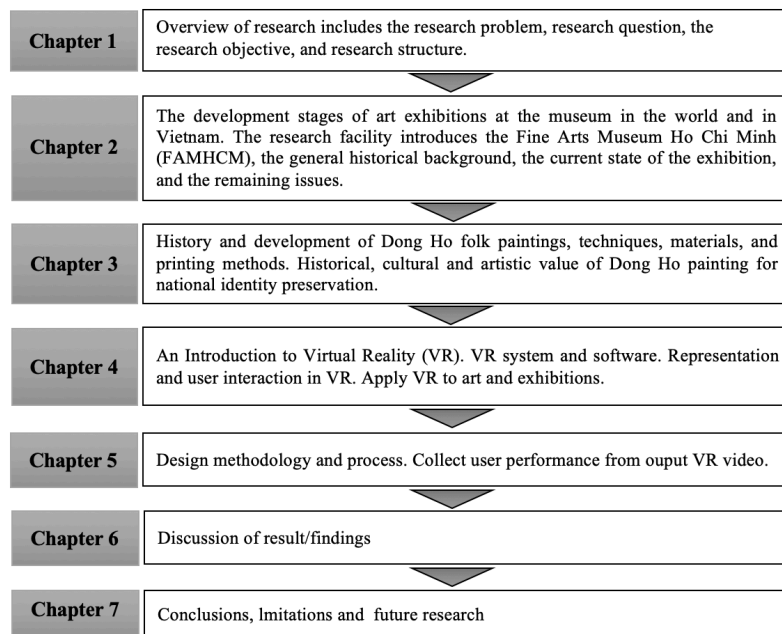


Fig 3 Organization of thesis. Author's own.

2. MUSEUM LEARNING

2.1 Introduction

Museums are known to tend to display static exhibits. This is also understandable because the outside target is to provide knowledge information, and this is a place to store and secure historical arrays. In 2004, Adler (Adler, 2007), a well-known museum researcher, agreed with the International Museum Association as well as many scholars and museum experts, along with the decision of the International Museum Council (ICOM) considering museums to be a non-profit and permanently social service organization (Ahmad, S. et. al, 3013). This shows that the museum definition is updated and developed in accordance with the needs of society, associated with the reality of the global museum community. In 2007, at the 21st Congress in Vienna, Austria, ICOM took the role of the museum to a new level. The museum also functions as an institution for acquisition, conservation, research, communication, and exhibition for research, education, and enjoyment purposes. Museums hold meaningful exhibitions as a means of presenting a project, as a reference to the international community (Ahmad, S. et al., 2013) (Ahmad, S., Abbas, M. Y., Yusof, W. Z., & Taib, M. Z. , 2013).

2.2 Art Museum in the world

2.2.1 A brief of the history of Art Museum

According to Geoffrey D. Lewis, the Museum is an organization dedicated to preserving and interpreting tangible evidence about humanity and its surroundings. Through the retention of a lot of evidence in kind, the basic documents have made a clear difference with the library. Because these raw materials and materials are used for learning and research through installations and exhibitions. In many situations, some artifacts lose information about when, where, and where they were born and will be communicated to viewers through other means. The museum was born with many different purposes (Rodini, 2018). However, the museums have a common history to tell. The museum is not just an organization of many things, but precisely the museum is a place to reflect the complexity of the cultures that have produced them, including politics, social structures, and ideological systems. of the museum itself.

2.2.1.1 Etymology-From mouseion to museum

The word "museum" begins with the classic Greek goddess of inspiration, the nine Muses, a designated, a philosophical institution, or a place of contemplation. Although in ancient Alexandria, founded by

Ptolemy I Soter early in the 3rd century BCE, "Museion" was more like a university with a library rather than an artifact display (Rodini, 2018).

The Latin origin confined the museum to the Roman era as the main place for philosophical discussion. The word museum is then used again in 15th century Europe, depicting the collection of Lorenzo de' Medici in Florence, Italy. However, the word museum now carries the concept of holiness rather than a representation of a building (Lewis, 2021).

By the 17th century, the Ole Worm collection in Copenhagen was called a museum. Later in England, the museum was also used to describe the collection of John Tradescant in Lambeth, the catalog of which was published titled *Musaeum Tradescantianum* in 1656. The collection was transferred to the University of Oxford in 1656 after becoming the property of Elias Ashmole. Later, a building was built to exhibit the collection and then opened to the public in 1683. It was now called the Ashmolean Museum.

During the 19th and most 20th centuries, the use of the word museum was to denote a building containing cultural material accessible to the general public. In the long run, increasingly museums keep changing on the basis of social change. There were more outdoor museums, electronic museums, and as electronic technology appeared, we saw the advent of digital museums. Although virtual museums offer an attractive new approach for visitors, and bring some benefits to the museums. However, virtual museums are still dependent on the collection, preservation, and interpretation of material that exists from the actual museum's prototype.

2. 2. 1. 2 Art museum

According to the media, the art museum will be a place to display collections of paintings, sculptures, and decorative art. The target audience of the art museum (also known as the art gallery) mainly communicates freely with the works. Since the 19th century, a number of art museums have included industrial art, aimed at encouraging good industrial design. Exhibiting works of art also comes with certain problems for the curator (Lewis, 2021). The artworks exhibited convey a visual message and directly influence visitors. While in other museums, the display is stereotyped and classic. For art museums, the curator of the work is particularly interested in its performance. The ambience in which the work is to be placed is unobstructed, which must be enhanced by highlighting the appearance and color of the work, combined with the right lighting and background. Artificial light used to be a priority in painting exhibitions both to create effects and to avoid harmful effects from natural light. Today, museums focus on the use of natural light that is used indirectly. (Lewis, 2021).

Another important factor is the preservation of art artifacts. Some art materials are very sensitive to the environment, so care should be taken in controlling the temperature, humidity, and light they are exposed (Lewis, 2021).

In many cases of exhibiting great arts, the role of the museum becomes as a separate institution to the art public in its development. This can be found as for example at the Pompidou Center in Paris, the Stedelijk Museum in Amsterdam, and the modern art museums in Stockholm, unique and special art forms are on display. (Lewis, 2021).

2. 1. 2 A changing the role of information professionals in museums

In Vietnam, the open-door policy of the state has led to economic changes, the expansion of archives, the application of the science and technology ministry, and the improvement of people's lives. The popularity of television and the internet with increasingly appealing programs to individual families addressing the parts people demanded, but not stopping them from leaving their homes and looking to recently distant cultural, tourist, sports, entertainment facilities or places.

Previously, during the time when the whole country was liberated and the social regime was under a subsidy period, museums did not have to think about many jobs "to feed themselves". Granted a guarantee on the state of museum delays, which deactivates the museum's functionality. Currently, museums are not outside the law on the market economy anymore. (Huy, 2015). As mentioned above, the public plays a vital role for the museum, it is indispensable to understand their company's needs. With their advanced level of awareness and awareness, people do not easily accept any "dishes" that the museum offers, but they have their own choices.

To attract the public to the museum, first of all, the museum must understand clearly to respond to the requirements of the public, that is, the museum does not merely offer exhibitions or activities. subjectivity without regard to interests, needs, or opinions of the public. Therefore, only when there are

diverse, periodical, attractive, informative, and educational displays and activities, at the same time, the information about such activities will be disseminated to the public, then the museum really "reaches out" to its public (Huy, 2015).

2. 2 Museum exhibition

2. 2. 1 Museum exhibitions as a function of museums

Many scholars have agreed that the exhibition is the core function of the museum. The museum's exhibitions that are open to the public are the main attraction and benefit of the museum itself. Museum scholars also fully agree that museum exhibits are meant to bring about transformative, expansive, and transformative experiences. Visitors will show their attention, interest, and judgment on many aspects of their perceptions through the exhibition.

According to Dawson (Macdonald, 2006), the museum is a cultural institution that exhibits, collects, records, and preserves objects, artifacts, or specimens such as property. The museum performs activities such as display, research, and interpretation by imparting meaning through exhibitions for educational purposes. In each collection usually includes many objects grouped together to create visual statements. This combination will form a visual story. For that reason, the ideas on display are often cohesive to convey in the texts of the exhibition, which may give a preferred interpretation of the different displayed images (Hooper-Greenhill, Museums and Their Visitors, 1994).

2. 2. 2 Museum exhibition as the communication of meaning

The museum's tool for communicating with righteousness is the exhibition itself. Currently, along with the rapid development of science and technology, the preservation of natural and cultural heritage, as well as the popularization of multimedia communication, has also developed. Different from styles of display for retail or commercial purposes, museum displays feature a unique creative experience.. Exhibitions are successful when they adopt a method of educating visitors about the theme of the show. These exhibits are always helpful and educational and contribute to the museum's success (Ahmad, S., Abbas, M. Y., Yusof, W. Z., & Taib, M. Z. , 2013).

Today, as museums are becoming progressively more popular, the application of new techniques, modern audio-visual media, and the creation of many new experiences has been discussed in the exhibition. Interactive experiences can spontaneously boost visitor interest and awareness of exhibits. In each different theme of the museum exhibition, depending on the flexible variation in the exhibition's exhibitionism, learning and education through the exhibition will delight visitors. Lord (2001) (Barry Lord, Gail Dexter Lord, 2001), stated that due to a number of ways of conveying the meaning of the objects on display, creating a sense of curiosity, stimulating visitors to explore that object. Therefore, the purpose of the exhibition is to effectively convert some aspects of the visitors' attitudes, preferences, and values, and increase confidence in the perceived authenticity of visitors to the object display.

2. 2. 3 Modes of exhibition apprehension

Although there is much to explore in museum exhibits, the exhibiting methods of visitors (Lord, 2001) (Barry Lord, Gail Dexter Lord, 2001) are generally classified according to the following four criteria:

- *Contemplation*: This is the museum-preferred method of cosmetic experience. In addition, it is also used in museum history and science.
- *Comprehension*: History and natural sciences museums often organize reverse exhibits according to the context and theme. In it, the exhibits on display are linked together for no viewing or research purposes.
- *Discovery*: Traditionally, this model was used extensively in natural history museums with specimen collection systems, now it has been modified and applied in all other museum types. This is a model with intellect and visual interaction that is more active in the museum exhibition.
- *Interaction*: This is the method favored by many science centers and children's museums. Using the staff and exhibit apparatus, the specimens are identified as a practical educational collection that helps visitors discover the meaning of the specimen.

2.3 Fine art museum in Vietnam - Case study Fine Art Museum in Ho Chi Minh city (FAMHCM)

2.3.1 Fine art museum in Vietnam

Moreover, one must recognize the Museum of Fine Arts as a unique environment for the masses' enjoyment and experience of beauty in the whole society, and primarily it must be organized and arranged as a destination/"artistic rendezvous" of the art world. We also know that the museum's characteristics are reflected in the collections of original artifacts kept in the preservation warehouse and organized by display themes to serve the needs of scientific research, education, and helpful dissemination of knowledge for people.

From that, we see that the fine art museum has an extraordinary strength that other types of museums cannot master: collections of original artifacts kept in storage and combinations in the museum's galleries. An art museum is always the ultimate artwork of master artists (folk and professional) in painting, sculpture, and graphics. Furthermore, therefore, we cannot and should not define a "frozen framework" that binds the fields of operation of the Vietnam Fine Arts Museum. Some national and international museum definitions can be cited here for a deeper understanding of the concept of the fine art museum.

First of all, we see two types of objects cited in museum definitions: artifacts and the public (users, exploiters, and consumers of museum products). Those two objects will always be artifacts, works of art, and visitors (domestic and international), especially artists who compose, research, and critique fine arts for the Museum of Fine Arts.

Second, the Museum's activities are geared toward the research, collection, preservation, display, and presentation of physical shreds of evidence and information about such physical pieces of evidence to the public. Furthermore, accordingly, the Museum of Fine Arts must focus on the material evidence related to the aspect of the visual arts (the original, accurately dated, with the high aesthetic value of each period of aesthetic history).

Third, museums are specific and non-profit cultural institutions. The main goal is to serve the community's interests, even though museums still provide services appropriate to their nature and function. The Museum's features that visitors in need will buy with money (and the amount collected from these services is not tiny). We have the impression that the Vietnam Fine Arts Museum people are still hesitant and lack creativity in researching compatible services to attract the public to the Museum (Bàì, 2017).

Twenty years ago, the Vietnam Fine Arts Museum had the following display topics: Fine Arts of Ethnic Minorities; Prehistoric and prehistoric art; Feudal art from the 11th to the 19th centuries; Ancient Vietnamese sculpture from the 13th to the 18th centuries; Folk Arts and Crafts; Statues before 1945; Statues in the period 1946 - 1954; Modern painting (Bàì, 2017).

At present (2016 - 50 years), the content displayed at the Vietnam Fine Arts Museum has been structured more logically and logically according to the historical process and thematic suitable for the type of historical Museum. fine arts as follows: Prehistoric and prehistoric art; Fine Arts from the 11th to the 19th centuries; Fine arts from the 20th century to the present; Traditional applied arts; Folk art; Vietnamese ceramics from the 11th to the 20th century (Bàì, 2017).

2.3.2 Case study-The Fine Arts Museum Ho Chi Minh (FAMHCM)

The audiences' absences at museums or art galleries in Ho Chi Minh City are progressively common in real life. The challenge lies perhaps not in the massive change from colonial archeological collections to 20th-century museums and galleries, but also in the possibility that the community is not the primary target audience. Although the museum's definition, which has never been implemented and incorporated into the citizenry's public activities, local involvement declined significantly. Museums of art present a substantial obstacle to rationalizing and attracting visitors as arts and museums are unfamiliar and unique to South-East Asian communities in general and especially in Vietnam. The definition of art as an aesthetics and amusement artifact had little part in Vietnamese local experience. Recent art projects may have opened their doors to the establishment's culture, but most citizens also

had no code to appreciate art pieces. One challenge was the art space—the museum as a touch zone—which did not occur in connection with Western modernists' emergence in the region.

The majority of Vietnamese museums are historical museums which reflect the country. The two largest Art Museums in Vietnam: the Vietnam Fine Arts Museum (VFAM) in Hanoi and the Fine Arts Museum Ho Chi Minh (FAMHCM) reflect the nation-wide historical establishments that uphold Vietnamese nationalist agendas. The VFAM honors the ethnic origins of the Vietnamese people throughout Asia, defiance to external invasion, and endurance to war hazards. The art specimens of the Museum are categorized into three cycles: from the earliest, ancient to the 11th centuries, from 11th to the 19th, and up to the 20th century. The dual scope of the anthropological and fine arts is the critical role for the museum to display its acquisitions, informing the audience about the status of artifacts in Vietnamese culture while showcasing their artistic elegance. Vietnamese artists integrate the advantages of global art, while maintaining native personality (VNFAM, 2011).

Concerning the VFAM, the FAMHCM maintains a national archive of Vietnamese paintings, but it exposes the absence of works from the post-colonial Southern artists of the former capital area of the South of Vietnam. After the *Đổi Mới* (Reform Era), Ho Chi Minh City became Vietnam's socioeconomic capital, and the museum became a central site for the society to associate with the local and national art heritage. Therefore, South Vietnamese arts' distinctive heritage has either been ignored or otherwise blurred by the government-supported cultural factual record from post-colonialism to reconciliation duration; many art experiences and artists in the southern Republic of Vietnam have been substituted by their Northern communist equivalents (Corey, 2014). Whereas the philosophy of acquisition of the FAMHCM retains conservative, the museum has expanded its spaces to showcase more creative Vietnamese contemporary art. The museum has been leased to numerous arts organizations since the 1990s to organize installations and activities.

The museum is planned to satisfy the requirements of the communities in the metropolitan area to embrace visual art and be a destination for tourists to discover and explore Vietnamese art historians. Over a preparation process for facilities and objects, the museum was launched to the community in late May 1989. At present, the museum has over 21,000 objects grouped into valuable collections. The museum artworks are subdivided into two critical areas: Classical art - native crafts and contemporary art with notable acquisitions such as rebellion paintings, artworks from Indochinese and Gia Dinh college artists. Other authors are Nguyen Gia Tri, Nguyen Sang, Diep Minh Chau, Kim Bach, Dinh Ru, Quach Phong, etc. They represent the core characteristics of the Vietnamese art community and fine art in the southern regions (VNFAM, 2011).

2. 4 The current stage of exhibition in Fine Art Museum Ho Chi Minh (FAMHCM)

2. 4. 1 Reflected on painting exhibits in the FAMHCM

Booth (2014) presented the latest museology study that alternative ideas on communication, content production, promotion, and visitor engagement have helped attract and influence visitors to art galleries in a more comprehensive and cooperative. Enrolling guests in the tourist gaze, encouraging this perception to be optimized and personalized, and concentrating on impact rather than philosophy, is facilitated by using emerging immersive technology tools, innovative ways of curation, and fantastic architecture declarations. The art museum's obstacles concentrate on two sectors, all critical to its identification. Both make a significant contribution to the postmodern authority's actual situation: the first addresses, what should be expressed and who need to speak; narration and expression matter. The second involves who responds, which is a subjective topic, comprehension, and interpretation development.

The individual usage of museums and art galleries by young folks is a dynamic and competitive phenomenon. It can anticipate the substance and consequences of indications of current policies on art

museums and adolescent people's thoughts according to their requirements, expectations, and desires, as well as the probable factors behind their choices, in line with the increased practical improvement of research and planning. Museums and galleries are considered a place for many youngsters' memories about compulsory field trips to contemplative displays in gloomy buildings (Whittington, 1997; Anderson, 1997). They seem to be unable to utilize these facilities and comprise a limited fraction of the total amount of tourists. Furthermore, most young people tend to be neglected or disconnected from popular arts. During education, art is perceived as a minor theme in the program, and there are minimal strategies for improving creatives or exhibits (Harland et al., 1995; Hargreaves, 1983; Lazotti, 1988). Beyond college, traditional masterpieces also often seem to be overlooked in younger's viewing experiences, whereas youngsters seem to be either at the fringe or uninterested in constructive engagement in art experiences displaying, yet again a fascination towards the youth's subculture (Willis, 1990; Visalberghi, 1988; Harland et al., 1995; Anderson, 1997).

2. 4. 2 Exhibitions and the dilemma in the FAMHCM

The FAMHCM seems to be disconnected from its audience, primarily younger audiences. There are very few youngsters at the museum attending exhibitions or premiers; there are multiple causes, two key factors to be discussed: a shortage of contemporary exhibits aimed at younger audiences and the strong emergence of Vietnamese independent arts organizations. Galleries and museums are perfect venues for cultivating an engaging association between youngsters and the arts, focused both on comprehensive engagement and youth desires and expectations (Bourdieu and Darbel, 1991; Gardner, 1981; 1982).

The initiatives coordinated by two Vietnamese independent organizations, including The Factory Contemporary Arts Centre (FCAC) and Salon Saigon, address national and global aspects related to Vietnamese society, which are scarcely seen throughout nation agendas and the printmaking industry. They identify domestic and international aspects. Many courses offered a sophisticated view of Vietnam's background and social science challenges from locally and internationally lenses, whereas some programs supported spaces for visibility of certain minority groups. Vietnamese artists, curators, and social analysts addressed their political orientation and traditions in other showcase programs produced by the agencies. Independent Vietnamese arts associations serve specific demographics with the opportunity to grow communication about Vietnam. The impact is a complex, intricate, and social critique of Vietnamese representations that have not been seen in national museums or the fine art industry. Community alliances enable multicultural groups with the potential to cultivate empathy and represent their viewer's personality norms and expectations, thus providing audiences a position in societal entities' programmatic and operational orientations; therefore, audiences experience great satisfaction, integration, and appreciation of cultural organizations.

3. BIOGRAPHY OF DONG HO FOLK PAINTING THE DANGER OF LOSING A LINE OF DONG HO FOLK PAINTING IN VIETNAM

3. 1 Biography of Dong Ho Folk painting

3. 1. 1 History of Dong Ho painting village

Dong Ho folk painting line is one of the three most famous folk painting lines of our country. Dong Ho is the place name of Dong Khe village, Song Ho commune, Thuan Thanh district, Bac Ninh province.. Dong Ho village is located in the middle of Kinh Bac land with thousands of years of civilization. Since a few thousand years ago, Kinh Bac has had many Vietnamese villages residing and establishing villages since the reign of Hung Vuong. According to the Nguyen Dang family (Dung N. D., 2018) (Nguyen T. Thu et al., 2019) (Nguyen T. Thu et al., 2019) Dong Ho painting village dated back to the Le Dynasty in 1527. Such traffic advantages have contributed to making Dong Ho paintings easy to

distribute to many North and Central Vietnam regions. When Tet comes, every countryside has pictures to hang on the right occasion. Dong Ho has folk as a roofed village. There is a folk song about the painting profession in the roof village, it must have been a long time, because these days few people know the Vietnamese name like the village. Dong Ho is a small village, currently with only a few roofs. There was originally a handicraft village with three ancient occupations: making horses, folk paintings, and artillery.

Besides the famous folk painting, Dong Ho has the profession of making votive papers to supply many places. Perhaps these two professions are closely related, both based on the resources of the hands and with similar production techniques. The custom of destroying all cryptographic elements spawns votive-making and specialty item-making careers. Dong Ho is such a village. The lines of Dong Ho's code are full of spirituality. The Dong Ho craftsman made many artistic diplomas that did not slow down the process of folk painting. The village has both a Painting festival and a Ma festival.

3. 1. 2 Lines of folk paintings in Dong Ho Village

In the past, when people thought of Dong Ho folk paintings, they only thought of wooden and hand-painted folk paintings. However, the Dong Ho art staff also produced some world paintings and made extra paper. Therefore, when studying Dong Ho folk paintings, it is impossible to talk about world paintings and paper paintings besides the line of wooden and hand-painted paintings that we still call Dong Ho folk paintings.

3. 1. 2. 1 Do The paintings

Paintings made by artisans Dong Ho produce to serve religious and spiritual needs. The mentality of the people in the past was that there was an afterlife; people still had to have an average daily life and production. They also could return to the world of the living to harm people, animals, and the world object. So they require a kind of web world graphics for a particular person or animal, with the human desire peaceful life, not destroyed by evil spirits. Expressive paintings are often made simpler than other folk paintings in Dong Ho (Chuong, 2010).

3. 1. 2. 2 Engraved paper paintings

According to painter Duc Hoa, a well-known researcher, as there are not many articles on printed paper, this is a study on this type of painting in Vietnam, a kind of painting that few people know, rather than say anything. big head up. While there are several articles and a few dense books on the famous Dong Ho painting series, it is confidential as there are no research articles on this type of painting in Vietnam. The same product produced in Dong Ho village, the folk paper Troop painting, is a junior born after the Dong Ho painting line (Chuong, 2010).

The topic of drawing paper: If it is a paper, the topic is always simple: flowers, plants, animals, insects. Sometimes it is not a picture but just a condensed and simplified image to formalize through the stroke (Dung K. , 2013). A few years ago, staff member Nguyen Dang Che in Dong Ho village was still selling Dong Ho paintings and papers, mainly a set of 12 animals. In Hanoi, it is also a document. However, the father and son of artisans Dang Khiem - Dang Giap made the whole picture of 4 lonely women (removed details), looking more luxurious and going to the page of modern papers, with topical topics:

- Uncle Ho's portrait
- Collective production
- Development of poultry flocks
- Both production and combat
- Encouragement of young people to join the army

3. 1. 2. 3 Wooden folk paintings

The last of the Dong Ho paintings is the most well-known, folk paintings produced by woodcarving for printing or hand painting. Temporarily dividing those types of images by logic, execution, wood paintings, and hand-drawn paintings account for many long-standing researchers, artists, and the public enjoying too many.

3. 2 History of Dong Ho Folk painting

Dong Ho's painting profession is said to have originated when people began to grasp the wood carving technique of Lieu Trang from the mid-15th century (Nguyen T. Thu et al., 2019). The painting profession of Dong Ho village officially started around the 17th century. Besides making Dong Ho paintings, people also made votive paper (only paper objects and used to burn when worshipping the dead) before 1909. History books of the Nguyen Dynasty period recorded the profession. Votive paper and Dong Ho painting craft coexist and support each other. During this period, Dong Ho village was a significant center of painting production. Dong Ho folk paintings have the feature of not having an artist's registration. The person who created the model and printed and painted the picture did not leave any traces on the picture. However, the people of Dong Ho village still remember all of the artisans in the village. They are the true creative artists; their works are the original model for Dong Ho artists to follow and create more diverse paintings (Tran Lam, Trinh Sinh, 2011). Before 1945, the French imported ram paper and pigments, adding modern materials to the craft of making folk paintings. Before 1986, Dong Ho paintings were exported to socialist countries. Typically, the set of paintings of Quan Am Thi Kinh, including four paintings by artist Nguyen Dang Khiem, attended the Vietnam Culture Week exhibition in former Czechoslovakia (Czech Republic). In 1990-1991, artists Nguyen Huu Sam and Nguyen Dang Che respectively established their painting production facilities, restoring the current color paintings. In 2013, the Dong Ho folk painting profession was recognized as a National Intangible Cultural Heritage. In March 2017, the President of Bac Ninh province approved a detailed outline to develop a national candidacy file to request UNESCO to include the profession of making Dong Ho folk paintings on the list of intangible cultural heritage in need of protection emergency. The dossier development period lasted three years, divided into two phases: survey research, inventory, consent form, construction, and submission of dossiers on time.

3. 3 Dong Ho Folk painting process

3. 3. 1 Prototyping techniques

Prototyping is an important step. In the past, artisans often chose stable antique models. Then, besides the antique models, the artisans began to create new ones. New models are improved with more details, villagers comment and edit more for artisans to complete the work. Choosing a new model will come to the engraving of the plank. Initially, the woodcarvers were mainly from Lieu Trang village. After that, artist Dong Ho can compose and then take samples. When creating a pattern, the artist must determine from the very beginning: distinguish which patterns to print and which ones to print and color, and colorize accordingly.

3. 3. 2 Wood carving technique

After making a new pattern, carving a plank requires the artisan to separate the pattern into each plank. Each pattern is a printed board. When finished printing, the overall picture will be published. Usually, a picture has to be engraved with many boards, maybe up to 5 boards for five different colors. There are two types of boards, printed boards and color printed boards. The worker, when printing, must align to the correct position to avoid the same color. According to the image on the plate paper, the engraving must be smooth, with a high degree of flatness to make a negative on the engraving board. After printing is completed, the result obtained is a positive of the picture (Nguyen T. Thu et al., 2019).

3. 3. 3 Do paper production techniques

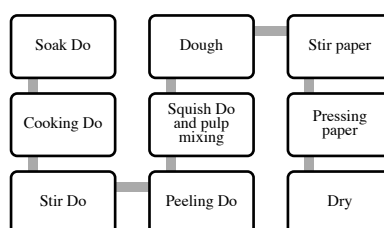


Fig 4 Do papermaking process

3. 3. 4 Diep scanning technique

Only Dong Ho paintings have a way to stir up the wind to sweep shellfish powder on the surface of the painting. To make the iridescent beauty of scallops is a unique, labor-intensive, and centuries-old technical process: the craft of making oyster paste.

Workers need to go to the sea to collect dead scallop shells specialized for making paper (Mop disk shell). Then, they put the cockles in the mortar and pounded them like rice into a powder for two hours. Today, this process uses a motor blender to replace human power. The result is a fine, milky white powder. After that, the powder is mixed with water and then holds a round ball, dried for use gradually. When making folk paintings, people mix that powder with the paste made from glutinous rice flour to create a smooth, viscous paste and then use a pine brush to sweep the surface of the Do paper to create a specialized Diep paper.

3. 3. 5 Dong Ho painting production techniques

Technique of printing face-to-face, color overlapping

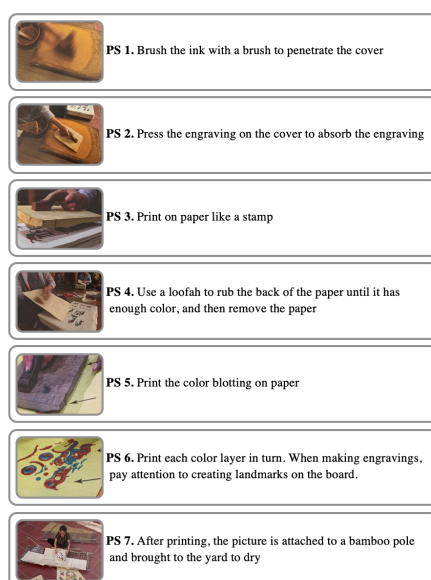


Fig 5 Dong Ho Folk Paintings Stage (PS)

Coloring materials

Black	White	Red	Orange	Yellow	Green	Blue	Pink
Use bamboo leaves and straw to burn to ashes, put in a barrel to soak for a year, decanted the condensed water, and then mix it with glutinous rice	Crush the white scallop shell, then mix it with glutinous rice	The vermilion stone on the Thai mountain is broken into a small dam, finely ground dried, filtered and mixed with glutinous rice flour	Grind the Hien flower to form a powder, then mix it with glutinous rice	Cook Hoe flower buds to thicken, then mix with glutinous rice	Taken from the leaves of the tree tree , pounded sage leaves, mixed with glutinous rice	Buy from ethnic minorities, soak indigo leaves to get color	Mix scallop shell with red lipstick

Fig 6 The method of creating paint colors from natural materials

3. 4 Classification of Dong Ho painting themes

In the integration and interweaving of Vietnamese folk paintings, Dong Ho's woodcut paintings also have some specific characteristics on the subject, usually including nine types as follows: *i. Worship paintings*, *ii. Painting of couplets*, *five fruits*, *iii. Tran Trach paintings*: , *iv. Historical paintings*: , *v.*

Congratulation painting, vi. Paintings satirical, vii. Comic paintings, viii. Decorative picture, ix. Paintings of daily life

3. 5 Dong Ho painting. Vietnamese folklore value

3. 5. 1 Value socialiation of Dong Ho paintings

The themes of the paintings reflect all aspects of the life of Vietnamese society, in which agriculture was the main focus of are the daily activities of farmers and their livestock, poultry, and their aspirations simplicity of the people at that time. Through the images of folk paintings, viewers can understand the social context and understand many unknown artists' talents. Folk paintings are a treasure of the cultural heritage of invaluable Vietnamese peoples, from the largest ethnic group to the ethnic minorities living throughout the country. The simplicity and proximity to rural life make folk paintings have a substantial spread from the South to the North. Moreover, the distribution of pictures is also from the village fairs held periodically according to the village's custom.

3. 5. 2 The artistic language of Dong Ho paintings

a. Material: The drawing is placed on a glittering Do paper background. The raw material of dó paper has edges that do not need to be trimmed flat. The surface is rough as if it has just been made from the factory, along with the natural carding lines, making the picture rustic beauty, increasing the painting effect many times.

b. Surrealism: The beauty of Dong Ho's paintings also shows the surrealism of the paintings. Please take a picture of the Pigs as an example; although the pigs are drawn from a horizontal perspective, they are still depicted with two ears and two nostrils like a straight view.

c. Artist: It is worth noting that the anonymous artists who paint Dong Ho paintings are all from their romantic imagination and their memory. In contrast to the painters who paint realistically depicting nature and people. The use of recognizable lines compared to other paintings exudes a liberal, rough, unpolished quality.

d. Color: The layout is opposite and flexible. The painting uses primary colors and pairs of opposite colors such as red-yellow, green-orange, and white-black to create a unique feature for Vietnamese folk paintings. The features of using colors are strong and colorful, such as accents in the general context such as communal houses, nail columns, and stone feet in favor of cold colors

e. Block array combined with message material on paper: The block array in the picture is shaped according to the principle of convention, rustic, uniform texture. Artisan Dong Ho has created many unique creations, unlike any other in the world, using scans as the background of drawing paper.

f. How to hang Dong Ho painting: Many Vietnamese families in the past not only hung one picture but hung many pictures in groups of pictures. The central painting is located between the houses to worship ancestors.

3. 6 The danger of losing a line of Dong Ho paintings in Vietnam

Through many ups and downs of its history, Dong Ho folk paintings are still a valuable cultural heritage in the treasure trove of Vietnamese folk paintings. From 1990 until now, the profession of making Dong Ho paintings has existed in solitude, with only 2-3 households remaining in the village. From more than 50 artisans, the whole village now has only a few artisans and about 20 workers. The next generation of artisans has continued to create, inherit the legacy of their ancestors, preserve traditional folk paintings and create many new paintings following market demand. Artist Nguyen Huu Qua - the second son of the late artist Nguyen Huu Sam, has become the owner of a famous painting factory in the village, attracting many domestic and international tourists to enjoy and buy paintings.

Today's profession of making Dong Ho paintings exists "weakly," only a few families maintain. According to recent statistics, the number of artisans is only three people. The number of practitioners is about 20 people. The number of artisans who can still teach is only two people (Mr. Nguyen Huu Sam and Mr. Nguyen Dang Che) were elderly. Faced with this risk, the Provincial Party Committee and the People's Committee of Bac Ninh province have had several guidelines and measures to preserve and promote the value of the intangible cultural heritage of Dong Ho folk painting craft.

4. VIRTUAL REALITY

APPLICATION OF VIRTUAL REALITY IN FINE ART EXHIBITION

4.1 Introduction

The article Applying Virtual Reality (VR) to Enhance the Interpretation of The Museum of Fine Art (TMOFA) in Vietnam is part of the project Dong Ho painting restoration project used in magic exhibitions at TMOA in Ho Chi Minh City, has been taken in two years from 2020 to 2022. The project has focused on the propose of a Virtual Environment (VE) that would enable museum visitors to view and manipulate 3D exhibits. We will renovate the classic Dong Ho paintings, which most popular and famous in Vietnam culture from 2D painting to 3D modelling. In the next step, the project also redesigns the interior space of TMOFA focus to serve the new 3D environment experiment. Furthermore, the necessity of numerous experimental evaluations defines for determining the best structure of VR devices. The quality of the configuration would enable users to navigate within the VE parallel control exhibits in an effective and perceptive manner. The number of people participating in museums required the diversity of their age, sex, occupation, and level social. They will attend through the VE by using the Oculus glass and fill multiple-choice questions to explain their communication feelings in the end.

4.2 What is virtual reality

Virtual reality (VR) is a computer simulation that creates images of a world different from the physical. More specifically, virtual reality is a medium that allows actual participants to immerse themselves in some environment other than physical reality. People can use virtual reality as a medium to share ideas and experiences. The experience part is a "virtual world" created on a computer, called a virtual world. As Sherman and Craig define, people feel immersed and present in the simulation: A medium composed of interactive computer simulations that sense the participant's position and actions, providing synthetic feedback to one or more senses, giving the feeling of being immersed or present in the simulation (Alan B. Craig et al., June 2, 2009).

Two other terms that are equally important are "telepresence" and "augmented reality" (AR). Telepresence, although similar to VR in terms of means to place participants in a different location from reality. The differs in that this location is due to geographical reasons or the terrain is too rugged or dangerous and inconvenient for people directly going there. Augmented reality (AR) also brings users an altered view of the natural world. The difference is that the actual space is still present, and AR adds virtual images to the user's normal senses. For example, users' sense of sight can place more objects in space, and doctors can see through the patient's body or the mechanical parts inside military equipment (Alan B. Craig et al., June 2, 2009).

4.3 Virtual reality system

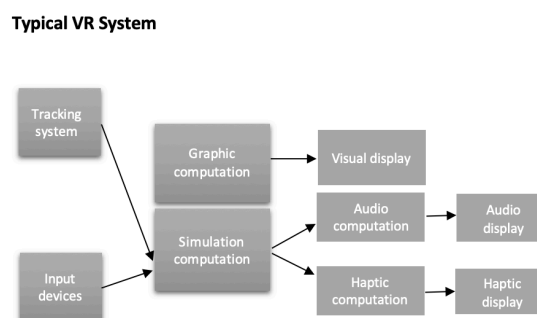


Fig 7 This diagram illustrates how the various components are integrated in a typical VR system. Author's own.

4. 3. 1 Hardware

Hardware is classified as display devices, consciously activated user input devices, and user monitoring input devices along with the computer that supports the modeling and rendering of the virtual world.

4. 3. 1. 1 Computer/graphic engines

The computer system needs to meet the need to be powerful enough to perform calculations that simulate the physical world of the virtual world and to have enough performance to render graphics from the computational components of the graphics engine, the media that generates the sound, and the output display other senses, for example, as tactile information when touching an image. Graphics engines must quickly render charts sync display updates between multiple monitors for binaural, multi-monitor, or possibly multi-projector transmission. No synchronization between monitors will result in the image appearing discontinuously between two neighboring screens. In addition, active sound positioning aggressiveness can be sent to the external handlebar is also a requirement for modern computer systems. A system VR needs to be able to perform multiple impacts simultaneously, multi-threading through the use of multiple computers at the same time also meets this need.

4. 3. 1. 2 Visual displays

On the virtual reality system, the part that displays the virtual reality image is the part that has the most influence on the viewer and the experience. There are different visualization models, i.e., fixed, hand-based, head-based. With the development of technology, computer hardware has reached the level of developing VR systems on laptops, although not many laptops have stereoscopic screens. The most significant disadvantages are that the size of the desktop screen limits the user's field of contact, the cost of software upgrades, stereoscopic displays, and tracking devices are also higher than those of conventional devices be different.

4. 3. 1. 3 Haptic display

Tactile display refers to the touch of the human body. *Touch* is a complex term that manifests not only through the "tactile" (input through the skin) but also through the "proprioceptive" musculoskeletal system. For the "self-grounded" display, the user will be wearing a glove-like device equipped with a small vibrator for tactile visualization. The "self-grounded" display is as effective as a grounded display, allowing the user to feel the touch of the skin and the object's shape thanks to the mount-mounted device.

4. 3. 1. 4 Input devices and user tracking

The virtual reality system has two types of input "cognitive input" (specific user-triggered events) and "user monitoring" (tracking the user's body movements). In other words, the duo acts as an active input that uses a passively inspired receiver for attributes like the user's location. The shape of the system host computer to create a will not be matchable if there is no input. The sensor location is the device used to track the user's usage, and it holds the most critical position in any VR system.

4. 3. 2 Software

4. 3. 2. 1 Laws odd nature simulation code

Many types of VR experiences have some programming that governs behavior and interactions with objects according to the laws of nature. The user cannot act on the object in this context but only works around the simulated environment. The user may have global behaviors on specific objects subject to more advanced simulations.

4. 3. 2. 2 Rendering libraries

The rendering library is a collection of rendering algorithms suitable for depicting any meaning. The libraries of rendering visualizations are developed for the visual element and auditory and tactile

applications. Users will experience what transforms the world's internal computer database from rendering libraries.

4. 3. 2. 3 VR libraries

The task of the VR library is to collect the necessary information about the user display the outputs appropriate to the user's current location and actions. The library also has to perform simulation and rendering capabilities, analyzing input data at high speed to make the simulated VR world look lifelike and respond to participants' actions quickly.

4. 3. 2. 4 Ancillary software

During the presentation of the experience, in addition to the required software, it is necessary to use much different software to create a convincing and realistic virtual reality experience. In such cases, the audio editing software needed to build the audio tracks will be heard in the experience. The image processing software helps create a sensible texture map. The operator will control experience parameters through the user interface libraries associated with the VR experience.

4. 3. 3 User interaction

Unlike the traditional computer systems known before, virtual reality (VR) presents an unprecedented mode of interaction between humans and the virtual world. One drawback of this new mode of interaction is that there will be no established set of traditional communication languages and must be borrowed from a two-way user interface. However, when using borrowed models, taking advantage of these languages designed for traditional 2D environments for use in 3D virtual environments is also a challenge.

- Interaction methods:
- Targeting object
- Operating the virtual reality
- Navigations

4. 4. Explanation of the effort developing of VR environment

VR systems bring a compelling sensory and affective experience that is certainly afforded by fully immersive might be the most effective system in an exhibition at the museum. The number of installations worldwide is limited because these systems use cutting-edge technology at an extremely high cost (G. Lepouras, A. Katifori, C. Vassilakis & D. Charitos , 2004). These previous examples of VR exhibitions in museums show several other reasons that may explain the exertion of improving such a system:

- Deficiency of space
 - Simulation of the exhibition environment
 - No extended exist today
 - be damaged and in the requirement of reconstruction renovation
 - not be able to experience because they exist in a served weather condition or their conditions do not allow for their interior to travel through.
- Performance in an unsafe or isolated environment
- Ambulatory exhibition

4.5 Suggestion for Visual Reality (VR), application of an art exhibition in the art museum in Vietnam

As described above, the number of young audiences attending at the art museum is decreasing since they can not pursue their specific motivation, tackling the issues of the Vietnamese Art Museum in general and the HCMCMFA in specific. Virtual museum-focused groups are museum curators and end-users. In the second group, three subcategories may be divided: experts, academics, and visitors (Bowen et al., 2004). Digital museum exhibits will provide a significant volume and level of experience,

intended to expand insights, operate efficiently, and cultivate a broader understanding of each of the previously mentioned demographics of cyber guests.

Digital museums are often capable of presenting in-depth appropriated knowledge for different groups of visitors, thus bringing attention to not just one but several museums and art galleries, to various investigations, including the descriptive analysis criteria of experts and students. In comparison, artistic galleries can attract audiences who are rarely accessing museums or exhibitions and have no relevant familiarity or interest in the exhibition's subjects (Economou, 1998).

The restoration process we summarized in Project work flow will be followed over the two-year project period. This process consists of three main steps: Planning, Modeling and Programming. We also conduct a selection of the most iconic and iconic paintings of Dong Ho folk painting. Then we will conceptualize the scenario and story setting.. We use popular modeling and animation programs such as 3DMaya, 3DsMax, to reconstruct the character modelling story background. Texture mapping will use larger software such as 3DMaya, Blender, Unity to render 3D spatial scenes and can be used in VR. We also check, test, and fix errors in rendering and rendering. The Programming section links modelling environments and contexts to the same video. In this section, stages such as adding subtitles, annotations, sound, and animations are also edited and edited to be included in the final movie.

5. DESIGN PROCESS

QUANTITATIVE SURVEY RESULTS

5.1 VR videoclip design process

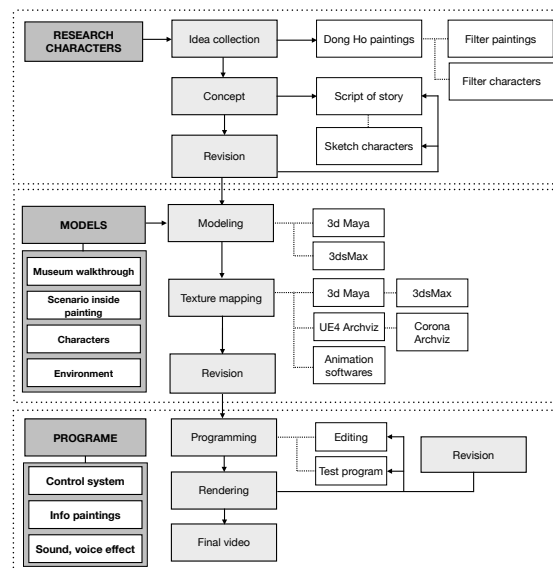


Fig 8 Workflow for the development of the VR video – A: PLAN (top), B: MODELLING (center) and C: PROGRAMMING (bottom). Author's own.

5.1.1 Research characters, history, context

5.1.1.1. Recap the survey before design and select characters

The survey includes 21 questions (4 questions about personal history, 17 questions about Dong Ho folk paintings and museums in Vietnam). The survey was opened for seven days from September 10-17, 2021, with 163 participants, aged 15-65 years old, across all provinces in Vietnam.

5.1.1.2. Research paintings

- **The Mouse Wedding painting**

With a history of about 500 years, the painting Mouse Wedding has both humorous and profoundly satirical content. The folk artist breathes the soul into the picture, anthropomorphizes the mouse so that they have a human appearance and know how to get

married. The irony is that the other rat groom who wants to receive the bride has to bring birds and fish to feed the cat (Minh, Tranh Đám cưới chuột - tác phẩm nghệ thuật nóng hổi tính thời sự, 2020).

The cat in the picture represents the ruling and exploiting class in ancient society. The mouse is a metaphor for the industrious, honest, and simple farmer. The picture has no captions. Nevertheless, anyone who sees it also recognizes the subtle metaphor of the folk craftsman. Rats are inherently sly, mischievous, suspicious, constantly wary of cats - sworn enemies, and witty satirize cats greedy for bribes. Therefore, the painting Mouse Wedding was born to satirize and deeply lash out at the unjust, antiquated, corrupt feudal system that always oppresses gentle farmers.



Fig 9 The Mouse Wedding, Paintings satirical Line, Dong Ho Folk painting, Sample of artisan Dang Khien Nguyen. Size 26x37cm



Fig 10 Beautiful Woman, Decoration Line, Dong Ho Folk Painting, Sample of artisan Dang Che Nguyen. Size 37x52cm.

- **Beautiful Woman painting**

Meaning of the picture: The meaning of Dong Ho folk painting four quarters of the female element not only shows the four seasons of the year. It also shows the beauty and talent of Vietnamese women who are gentle and have a talent for singing.

The four female elements are in harmony. The girls are not all the same height: She plays the highest fiddle, then plays the flute lower, and holds the flute a little lower. Moreover, she holds the fan. Of these four props, the sound of the lute gives the highest timbre, then the flute, the second click of the "senh," which is an ancient percussion, and the lightest is the sound of the fan. The critical point of the art is that borrowing forms show the meaning inside. Artists have taken the numerical height to express the high and low levels of the sound to praise the sonic beauty of the props. Beautiful Woman painting is a surreal picture; the beauty is not in the person's description. The idea of the artist who made the quartet of female feminist paintings lies in that profound point (Tam, 2021).

5.1.1.3. Research history costume, sketch characters



Fig 11 Concept of costumes Le Dynasty for commoner and courting year 1500 in in The Mouse Wedding painting

5.1.1.4. Context of virtual reality environment

The communal house of Ho Dia village is located in Song Ho commune, Thuan Thanh district, In the communal house of Ho village, the architectural shape of the wooden frame and the decoration of the lines (edges), floating and sinking on architectural elements such as hitchhiking, first sentence, passer, trapezoid, beam, have been made. For the interior of the building to become soft and flexible.

Name of the VR video clip: WALK INTO DONG HO PAINTING

Poster of the exhibition



Figure 12 Moodboard of the exhibition poster and the final poster

5.2. Models system

5.2.1. Museum sample modeling

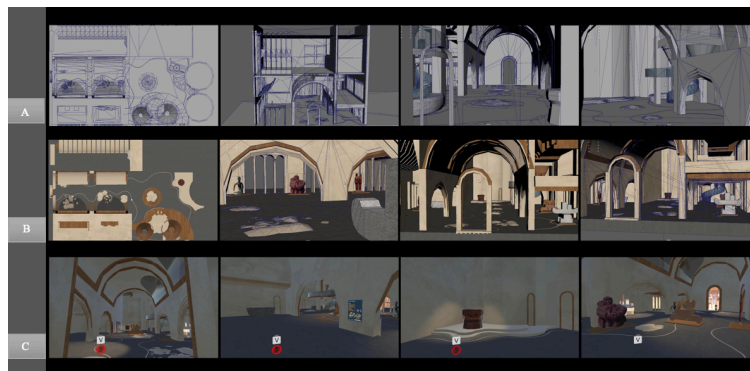


Fig 13 Process of drawing the exhibition space (TES)

5.2.2 Dong Ho painting modelings

- Dong Ho temple context: Dong Ho village communal house

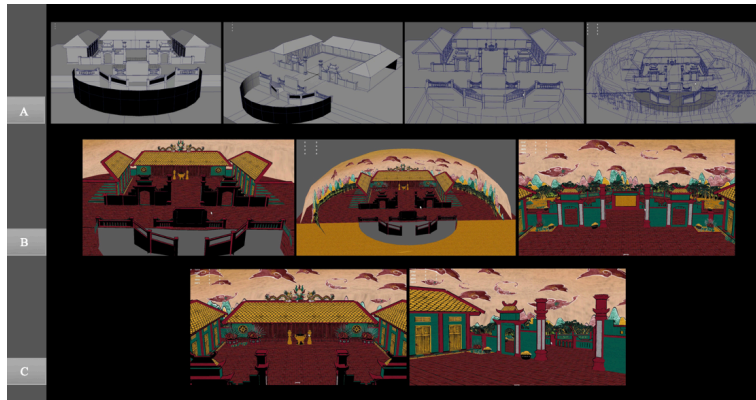


Fig 14 Process of drawing Dong Ho village communal house (DHVCH) modellings

- **Mouse wedding characters**



Fig 15 Process of drawing The Wedding Mouse painting modellings

- **Beautiful woman characters**



Fig 16 Process of drawing Beautiful woman painting modellings



Fig 17 Some views of Dong ho village communal house modellings with two paintings set up

PROCESS	DETAILS	TIMELINE
A. SOFTWARE	<ul style="list-style-type: none"> • Museum rendering, painting: 3ds max, Maya, Blender • Bring it all into VR: Unity • Filming: OBS • Movie editing: Adobe After Effects 	
B. TEXTURE, MATERIAL	<ul style="list-style-type: none"> • Draw 2D materials of female paintings, mouse wedding paintings, Dong Ho village hall with Clip Studio Paint software. • Process images of materials in exhibitions using Photoshop software. • Apply 2D materials to 3D using the reverse map technique in Maya. • Grid processing optimizes all maps to fit into VR. 	October, 2021 to February 2022
C. VR PROCESS	<ul style="list-style-type: none"> • Lay the floor flat so the character does not fall out of the scene. • Include all 3D-drawn products. • Create one wall and floor to place two pictures on. • Set the overall lighting for the museum, and the light emphasizes the paintings. • Place pre-processed materials to all 3D products. • Set the scene outside the museum. • Set the character drop point so that the character has a place in the museum, not free-falling (all characters, when falling into the museum, will be at the same drop point to not fall from the scene). • Assign poster available. • Assign pictures and describe pictures. • Technical processing click on the picture so that the picture frame appears with the picture and the information. • Technical processing to change the scene from museum to Dong Ho painting. • Technical processing to press back, the museum returns to its original state. 	January to March 2022

D. CAMERA SET UP	<ul style="list-style-type: none"> • All video recording data is in VR chat software. • Characters will be dropped when participating in the scene. • The character will move and use his perspective as a camera to record the entire image in the VR scene. • Edit video with After Effect software (insert audio, cut and edit necessary parts in the clip). • Convert clip format to conform to Youtube's 1080 standard. 	March 2022
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Table 1 Recap programe, VR process, camera set up. Author's own.

5.3 Quantitative survey results

In this study, the author conducted two surveys to get the results.

The first survey (1stS) with 163 participants (including Vietnamese and foreigners) was conducted from March 15 to March 30. This survey aims to measure the understanding of Vietnamese folk paintings, Dong Ho folk paintings, and the younger brother's taste in folk painting exhibitions. This survey was also mentioned in the character research and survey section (5.1.1).

The 2nd survey (2ndS) with 120 participants (Vietnamese only) was conducted from April 1 to April 10. After submitting the link to the VR chat exhibit Folk painting Walk into Dong Ho painting, this survey was conducted for online viewers. The exhibition aims to measure the audience's interest in the folk painting exhibition in the VR environment and their expectations for future VR exhibitions.

The above surveys were conducted on the Google Form platform and sent survey links via email and social media.

Table 3

Table 2 Demographic profile of research participants 1stS

No	Factor		Vietnameses		Foreigners	
			Frequency	%	Frequency	%
1	Age	Range 15-20	103	63.2	2	6.9
		Range 21-30	39	23.9	5	17.2
		Range 31-40	14	8.6	15	51.7
		Range 41-50	3	1.8	5	17.2
		Range 51-60	4	2.5	2	6.9
		Range 61-65	0	0	0	0
	Sub-Total		163	100	29	100
2	Sex	Male	49	30.1	9	31
		Female	114	69.9	20	68.9
		Another gender	0	0	0	0
	Sub-Total		163	100	29	100
Grand-Total			163	100	29	100

Source: Author processing from Google form from 15 September to 30 September 2021

Table 4

Table 3 Demographic profile of research participants 1stS

No	Factor		Vietnameses		Foreigners	
			Frequency	%	Frequency	%
1	Job	Highschool, college	125	77.2	2	6.9
		Master, Doctoral degree	5	3	5	17.2
		Officer	27	16.5	15	51.7
		Part time, freelancer	11	6.7	5	17.2
		Intreprenuer, bussiness	2	1.2	2	6.9
		Retirement	0	0	0	0
	Sub-Total		163	100	29	100
2	City	Ho Chi Minh(Vietnam)	47	22.8	0	0
		Another city (Vietnam)	116	77.2	0	0

	Helsinki (Finland)	0	0	2	6.9
	Stockholm (Sweden)	0	0	15	51.7
	Zlin (Czech Republic)	0	0	7	24.1
	Hamburg (Germany)	0	0	5	17.2
	Sub-Total	163	100	29	100
	Grand-Total	163	100	29	100

Source: Author processing from Google form from 15 September to 30 September 2021

Table 5

Table 4 The participants knowledge about Vietnamese folk paintings 1stS

No	Factor	Vietnamese		Foreigners	
		Frequency	%	Frequency	%
1	Number of people who know about folk paintings and have a bit of knowledge	94	57.7	0	0
2	Numbers who have heard of folk paintings but have no knowledge	67	41.1	10	34.5
3	Numbers who no have heard of folk paintings before	2	1.2	19	65.5
	Grand-Total	163	100	29	100

Source: Author processing from Google form from 15 September to 30 September 2021

Table 6

Table 5 Recognize the familiarity of Vietnamese folk paintings 1stS

No	Factor	Vietnamese		Foreigners	
		Frequency	%	Frequency	%
1	Dong Ho folk painting	160	98.2	3	10.3
2	Kim Hoang folk painting	21	12.9	0	0
3	Hang Trong folk painting	60	36.8	2	6.9
4	Glass Southeast folk painting	12	7.4	0	0
5	Sinh village folk painting	16	9.8	0	0
6	Numbers who no have heard of any folk painting lines before	1	0.6	14	48.3
	Grand-Total	163	165.7	29	100

Source: Author processing from Google form from 15 September to 30 September 2021

Table 7

Table 6 Demographic profile of research participants 2ndS

No	Factor		Vietnamese	
			Frequency	%
1	Age	Range 15-20	75	62.5
		Range 21-30	21	17.5
		Range 31-40	12	10
		Range 41-50	6	5
		Range 51-60	5	4.2
		Range 61-65	1	0.8
	Sub-Total		120	100
2	Sex	Male	32	26.7
		Female	88	73.3
		Another gender	0	0
		Sub-Total		120
	Grand-Total		120	100

Source: Author processing from Google form from 25 March to 5 April 2022

Table 8Table 7 The level of interest in the virtual reality exhibition space
Walk into Dong Ho painting (WIDHP) 2ndS

No	Question	Degree evaluation					Vietnameses	
		1	2	3	4	5	Frequency	%
1	The level of interest in the virtual reality exhibition space WIDHP (Rate from 1 to 5)	0	1	13	55	51	120	100
	Grand-Total	0	0.8	10.8	45.8	42.5	120	100

Source: Author processing from Google form from 25 March to 5 April 2022

Table 9Table 8 Impressive level with the exhibition of Dong Ho folk paintings in VR 2ndS

No	Question	Degree evaluation					Vietnameses	
		1	2	3	4	5	Frequency	%
1	Do you find Dong Ho paintings presented more impressively and vividly than traditional 2D painting exhibitions? (Rate from 1 to 5)	0	2	11	71	36	120	100
	Grand-Total	0	1.7	9.2	59.2	30	120	100

Source: Author processing from Google form from 25 March to 5 April 2022

Table 10Table 9 Desire level to see more Dong Ho folk paintings in VR 2ndS

No	Question	Degree evaluation					Vietnameses	
		1	2	3	4	5	Frequency	%
1	Please rate your desire to see more Dong Ho folk paintings in the virtual reality (VR) exhibition environment. (Rate from 1 to 5)	0	0	12	74	34	120	100
	Grand-Total	0	0	10	61.7	28.3	120	100

Source: Author processing from Google form from 25 March to 5 April 2022

Table 11Table 10 Level of Interested in learning more about Vietnamese folk paintings after seeing the
WIDHP exhibition 2ndS

No	Question	Degree evaluation					Vietnameses	
		1	2	3	4	5	Frequency	%
1	Please rate your interested in learning more about Vietnamese folk paintings after seeing the Walk into Dong Ho painting exhibition (Rate from 1 to 5)	0	2	19	72	27	120	100
	Grand-Total	0	1.7	15.8	60	22.5	120	100

Source: Author processing from Google form from 25 March to 5 April 2022

Table 12

Table 11 Predict application of this VR exhibition in the future 2ndS

No	Question	Positive (%)	Negative (%)	Vietnamese	
				Frequency	%
1	Do you think in the future this type of exhibition will continue to be invested in and promoted at museums of Vietnamese folk paintings?	117	3	120	100
	Grand-Total	97.5	2.5	120	100

Source: Author processing from Google form from 25 March to 5 April 2022

6. DISCUSSION OF RESULTS/FINDINGS CONTRIBUTIONS OF THE DOCTORALS THESIS

6.1 Discussion of results/findings

RQ1 *What factors are causing difficulties in preserving Dong Ho folk painting in Vietnam?*

First of all, the first difficulty is that there is no necessary attention from the competent authority and the local government of Bac Ninh province. According to selected documentary sources, at least one Dong Ho folk paintings exhibition shows per year. Unfortunately, they lack investment in installation, space design and should not highlight the actual value of Dong Ho folk paintings. The proposal to build a profile of the profession of making Dong Ho folk paintings was planned a few years ago in the hope that, if it becomes a world heritage site with specific regulations on conservation, promoting heritage will "save" a craft that is in danger of disappearing (Lu, 2018).

According to artist Nguyen Dang Che, the next difficulty said over the years of working in the profession, I have realized that one must live by it to keep a job. The people in his village know about skills in painting art, but due to limited market demand and difficult life, it is not difficult for people to switch to other occupations. Because he has a passion for the traditional paintings of his homeland, he also studied fine arts and worked in many different cultural agencies. He would like to retire early to focus on painting because his family can manage, run a business and live off of paintings. That fact helped to convince his children and grandchildren to quit farming and make wares (Lu, 2018).

At an international scientific conference, "Protecting and promoting the artistic value of Dong Ho folk paintings in contemporary life," coordinated to organize from November 1st to 2nd, 2019), domestic and international scientists and delegates discussed and shared experiences on how to promote the traditional values, culture art of the nation.. The preservation of paintings and their release to the world is also another difficulty. Over time, paintings can fade and be challenging to maintain. From here, it becomes clear that the question of a new method to preserve Dong Ho folk paintings is an urgent and essential issue for the Vietnamese state and the artists trying to maintain its existence.

RQ2 *What is the new method of exhibiting traditional folk art in Vietnam from now and shortly?*

From the difficulties in preserving Dong Ho folk paintings answered to RQ1, we continue to find solutions for promoting Dong Ho paintings through the form of exhibitions. The State should fight to promote the preservation of paintings and enjoy paintings in ancient and outdated forms. The above promotion methods only make the majority of the public different and bored with traditional national artistic values. This prejudice will frame everything that belongs to the national tradition, which is not an area of concern for young people.

According to the author, the image represents the Dong Ho folk painting line as a decisive key for orienting the trend of aesthetic development of the young generation in a country. Typically exhibitions at museums, galleries, graphic publications. For large exhibitions with capital investment from the government, careful preparation is required before being officially opened to the public. The preparation

here includes relevant factors to marketing and PR that have long been forgotten. Those critical factors include: understanding market needs, understanding the public's art tastes, understanding art development trends in the community, finding out about accessibility, and attracting the public's attention.

This survey will provide standards and reasonable reasons for designing the basic concepts for the museum following aesthetic tastes, updating trends to keep up with the times while still smoothly intersecting between classic and modern. From these initial impressions, although small, the author believes that with many efforts to improve the way the exhibition is displayed, it will help to change people's old prejudices at the same time. People will feel the beauty and value of their country's traditional folk painting art and be proud that their country owns that treasure. Doing this is not easy in a short time, but the authorities need to show their interest and develop a long-term plan with specific goals.

Accordingly, the graphic details will be processed by computer software to store in a digitized environment, avoiding any risk of damage or loss during operation time. Over time, folk painting patterns will have conditional applications in fashion design, graphics, furniture, and handicrafts to deepen the media. If this application is being tested with a Tranh Dong Ho, people can actively contribute to the story of preserving and promoting the valuable cultural system.

RQ3 *How to apply virtual reality exhibitions to traditional ways of folk painting exhibition in Vietnam?*

This process is studied and described in great detail in sections 4 and 5 of the study. In addition, the author also lists in detail the jobs of producing 3D models, converting 3D environments into VR, and producing videos, which are also presented in detail in Table 2.

Subtracting the research step is the first step of the process. The following steps in costume and character design ideas, virtual museum space design, and environmental design occur in the paintings (precisely, Dong Ho communal house), taking place almost parallel the work of many designers and artists at the same time. These steps take a lot of time and effort of the performer, editing many times to reach perfection according to the original requirements. The step of transforming the museum environment into a painting into a virtual reality (VR) environment does not take too much time. However, it will give the most overview of the entire process. At this time, the editing allows only limited performance, and it is difficult to change the drawn models. The last step is the video editing part because the author's purpose is to show the video for a broad audience to see and participate in the survey. Conditions for viewing in a virtual reality environment require a computer system with a high-configuration processor and graphics card. In addition, the need for a VR headset is an obstacle for all audiences. The author decided to render the exhibition footage in 1080HD video clip format shown on a link from his personal Youtube channel. Although it is the last stage, this stage of editing also requires careful selection of music and subtitles, scenes, and scripts.

RQ4 *Does the exhibition by the traditional method attract viewers, especially young people? How do they feel that the presentation of folk paintings in virtual reality is different from the conventional exhibition-style?*

Based on the survey results in Tables 7 to 12, the age group who is willing to participate in viewing the link of Dong Ho painting exhibition space accounts for the majority of the age group from 15 to 20 (62.5%), and the age from 15 to 20 years old. 21 to 30 years old (17.5%). These ages also showed a positive attitude towards the exhibition environment of Dong Ho folk paintings in virtual reality. According to the survey scale from low to high (level 1-5), more than 55 people chose level 4, and 51 people chose level 5 out of 120 survey participants. The number of less excited people is only 14 people (accounting for 11.6%). Among them, there were still 13 people who reached the average level of excitement (level 3).

When asked about the difference between the traditional painting exhibition method and the method of jumping into the picture (VR environment), the participants almost unanimously agreed that the exhibition method applied VR creates a feeling of more vivid and visually stimulating (62.2% level 4 and level 5).

When submitting the survey link, we had to take the extra step of instructing viewers how to install Steam and VRchat software to be able to access the exhibition space link. This software is also quite popular and easy to install for those who play games or use desktop computers and Windows operating systems—restricted to users of Macbook and iOS operating systems. That is also why the number of people participating in the second survey did not reach the same number as the first time.

However, the second survey again shows the ease of receptiveness to the exhibition trend in the VR environment. Although this exhibition concept model is incomplete with a small number of paintings, the survey results show that participants experience the desire to see more Dong Ho folk paintings in virtual reality. After seeing the exhibition, they also wanted to learn more about Vietnamese folk paintings, with 60% of people choosing level 4 and 22.5% of survey respondents choosing level 5.

6.2 Contributions of the doctoral thesis

6.2.1 Theoretical implications

In researching documents on Vietnamese folk paintings, the author found that there are very few valuable and updated sources of new information. The field of VR exhibitions in Vietnam is also not yet widespread. Arguably, this study is a pioneer of research to find new methods in the exhibition folk paintings in Vietnam. The culture of Vietnam inherently has the interference of Western cultures (France, America) and Chinese culture. The development of art in general and art museums is still young and has not received real government attention. In terms of cultural awareness, the aesthetic and artistic sense of the majority of the population is still limited. For those who do not have much knowledge about Dong Ho folk paintings, the content of chapter 4 of this study also contributes to providing the most general knowledge about the history and production process of folk paintings.

This study, therefore, suggests a direction for the Dong Ho folk painting exhibition to be more accessible to the general public of all ages. The study challenges the application and adaptation of 2D folk painting digitization methods to the VR virtual reality environment. This process takes much time to research, create ideas, build contexts, draw the modeling and edit modeling. The study applies quantitative methods and application design methods in a single study, so the survey numbers from users are close to reality and social needs for future studies to consider using two methods instead of individually.

6.2.2 Practical implications

In terms of research application, this can be said to be the first virtual reality video and link in Vietnam to introduce Dong Ho folk paintings. The study will be a valuable reference source for the competent authorities related to cultural preservation and the museums and Dong Ho painting villages in Bac Ninh to create other aspects of painting presentation of traditional folk. In addition, the work state and steps to make a clip for the exhibition in the VR virtual reality environment are also systematized by the author. These steps will be a practical example for organizations and competent authorities to continue developing other painting themes of Dong Ho folk painting or other lines of folk painting in front of their risk of transmission loss.

Research has shown that young people (15-30 years old) are entirely interested in the country's folk art, not indifferent and indifferent. They are willing to visit the VR exhibition in real life for research purposes and introduce to international friends Vietnamese folk paintings. Of course, these needs can only happen when museums and cultural agencies pay attention to and update the trends in understanding the folk art of Vietnamese youth.

The study is also a reference example of the budget to implement the digitization process and build 3D models for the relevant organizations. In order to create a complete archive of more than 200 paintings (including Dong Ho folk paintings), the competent authorities will have to solve an economic problem and propose the necessary funding sources from the bank national and independent donors.

7. CONCLUSION, LIMITATION, AND FUTURE RESEARCH

7.1 Conclusion

Dong Ho folk paintings with more than five centuries of vitality have left bold imprints and distinct nuances in Vietnamese folklore. Preserving, honoring, and developing the profession of making Dong Ho folk paintings is now an essential issue. The line of Dong Ho folk paintings has long entered the subconscious of many generations of Vietnamese people with images of the wedding of mice, chickens, honor, and wealth, combining the quintessence of plastic arts, paper making, and color mixing. However, the most important thing is how to make the heritage live sustainably in the heart of the community, which is not at all easy.

This research project is one of the author's passions, hoping to contribute to preserving national folk paintings. The project is studying the steps of restoring folk paintings from the traditional 2D version to the 3D model and transforming it into a virtual reality environment. To be able to achieve the main objective, three specific goals were set for implementation: RG1 Study the historical value and artistic value of Dong Ho folk paintings, RG2 Research and determine measures to preserve Dong Ho folk paintings in the form of 2D paintings in virtual reality environment, RG3 Conduct experiments and compare the differences between traditional folk painting exhibition and virtual reality environments, RG4 Evaluate the experimental results and draw new methods to preserve traditional folk, RG5 Study on the difference between the visual effects and the paintings of the viewers between the traditional painting exhibition and the folk painting exhibition in the virtual reality format. The research was conducted according to researching documents about the museum, the types of exhibitions in the museum, the history of Dong Ho folk paintings and the steps of making folk paintings, and researching virtual reality technology applied to the field exhibition model. Then research picture information, a small survey to choose the required painting, and 3D modeling reconstruction from two selected paintings. Finally, the drawn 3D modelings are integrated with the VR virtual reality environment. The author also downloads a link on the free Steam and VR chat platforms for users to experience at home (with or without VR glasses) and a clip of people's experiences in the art exhibition's virtual reality environment (VRE). From here, after sending clips and links for users to experience and filling out a survey on user perception, the author draws statistical tables and synthesizes parameters to answer the research questions from the beginning.

The author supposes that beyond the involvement of the State, functional units, within the local craft villages, with the keenness of the artisans, the mobilization of socialization activities is additionally necessary to form the revival of people's paintings simpler and more sustainable. Today, although time has passed, fading, folk paintings are not any longer at their peak, but the good values of every line of paintings are still there and can forever be the heritage of the Vietnamese people.

Limitation of the study & Future research

First, the limited budget makes it impossible to pay for the restoration of more Dong Ho folk paintings so that the virtual reality exhibition environment can achieve a higher visual effect. The process of designing and restoring Dong Ho folk paintings took place when the epidemic in Vietnam entered the most intense period of lockdown. In this situation, the author, designers, and artists do not meet directly to develop ideas. However, they have to work through the social networking platforms of Facebook messenger, Drive, and Gmail of Google, Discord, and Teamviewer to exchange jobs. It is a big obstacle

for the design process because the interaction via the internet makes the idea review process late. The two sides do not understand each other or misunderstand each other, describing the design by words or messages must go through.

This research needs more attention from the authorities, the culture, and the museum to further perfect the testing methods of painting exhibitions suitable to the times. The research also needs more support from designers and artists to further edit the character models in the picture to be animated and moveable in the future. Funding implementation for similar field research is also a challenge. In the future, other studies should also pay attention to the configuration of the computer system and the use of virtual reality glasses for the final output. The author also expects other folk painting collectors, such as Kim Hoang folk paintings, Hang Trong paintings, and Lang Sinh paintings, to consider this study as a typical example to promote the conservation of Vietnamese folk paintings further.

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- 2) **Pham, N. Q. G.,** Han, Seung Hoon. Reconstructive analyses on architectural design performance for the spatial sustainability by interactive shape grammars, 2017, *ISER International Conference Vienna, Austria*.

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- 5) Pham, P. Phuong, **Pham, N. Q. Giao,** A Comparative Study of a Difference in the Spatial Structure of Vietnam Village, *EUROPEAN ACADEMIC RESEARCH Vol. VIII, Issue 10/ January 2021*
- 6) **Pham, N. Q. G.,** Le, T. H. A., Nguyen, M. H., Adzovie, D. E., & Stanisky, P. Application of Virtual Reality to enhance the interpretation Dong Ho folk paintings in Museums of Fine Arts in Ho Chi Minh City, *AET conference December 2021*

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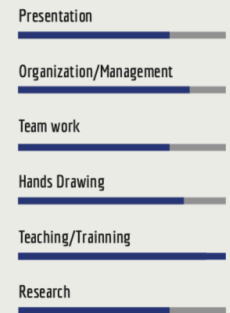
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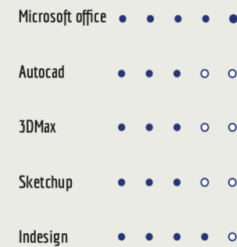
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**Exhibition of Dong Ho paintings in a virtual reality environment at a Fine Art Museum,
Vietnam**

Výstava obrazů Dong Ho v prostředí virtuální reality v Muzeu výtvarného umění ve Vietnamu

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