Multicultural Education

Volume 11, Issue 12, 2025

Testing Matrix Language Framework Model On Urdu-English Online News Entity: A Creative Approach

Jaruek Atthasongkhro, Nuttaphong Kanchanachaya, KanitaNitjarunkul, Virintorn Auksornnit, Juta Tammachart

Article Info

Article History

Received:
September 04 ,2025

Accepted:
December 04,2025

Keywords :
Keywords
Virtual Reality,
Virtual Reality Museum,
Improving learning,
Satisfaction,
Southern Thai Culture

DOI:
10.5281/zenodo.17817728

Abstract

This research was conducted to (1) study a virtual reality museum model for improving the users' learning, (2) develop a virtual reality museum for improving learning of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University, and (3) assess the learning efficiency via virtual reality museum. The target participants in this study were 404 people interested in southern Thai arts and culture. The instruments covered (1) The virtual reality museum model for improving learning efficiency of the users, (2) Quality assessment form of the virtual reality museum model, (3) Virtual reality museum for improving the learning efficiency of the users of the Southern Thai Culture Hall, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University, (4) Quality assessment form of the virtual reality museum, (5) Assessment form of self-learning efficiency and (6) Assessment form of satisfaction with using the virtual reality museum. Mean, standard deviation and t-test were employed in data analysis. The research findings were as follows. (1) The virtual reality museum model has been given a quality level of 'very good' with a mean score of 4.82 and SD of 0.28. (2) The virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University has a quality level of 'very good' with the mean of 4.60 and SD of 0.69. (3) the learning efficiency of users after the use of the virtual reality museum was significantly higher than the performance before the use of the museum (t= 23.084, p <.001). The score after the museum use was M=3.93, SD=0.78 while the score before the museum use was M=2.65, SD=0.97, and the users' satisfaction with the virtual reality museum indicate that the satisfaction level was 'good' (M= 4.04, SD=0.84).

Introduction

The arts and culture can be considered as an essential composition of national security because it is an important factor for determining ethnicity, society and tribes of humans. It represents the identities and ways of life which humans have created such as recreational activities, performances, singings, demeanours, paintings and architectural works. It also influences thoughts, beliefs, and knowledge expressed as behaviours which contribute to nationalism inherited from the ancestors up to the present generation. Culture is dignity of the nation. Therefore, cultural heritage is important and valuable which has to be preserved and passed on to future generations (Katwong, 2018). Up to the present time, attempts in various aspects to promote the awareness of Thai arts and culture have considerably been neglected for a long time. This has partially made the studies and learning of arts and culture become surreal and novel to Thai people. In fact, the arts and culture is omnipresent in daily lives. Hence, arts galleries and cultural museums function as a fundamental mechanism for supporting the development of arts and cultural works. They provide venues for sharing and exchanging artistic and cultural insights, integrating learning with works of arts and culture, and connecting people from different generations (Saentawee and Sukbanjong, 2017).

As observed from the field study, Princess GalyaniVadhana Institute of Cultural Studies is committed to cultivating and preserving arts and culture. One of its main missions is learning resources management. For this purpose, the Hall of Southern Thai Culture was founded in 2004 and has been in service until now. The Hall is divided into two main sections, namely, the Southern Thai Arts Hall for exhibitions of contemporary arts and the Southern Thai Culture Hall for the exhibitions of ways of life, traditions and cultures of the people in the southern border provinces of Thailand. As the institute is located in the southernmost area where there are reports of insecurity situations, some of interested people feel reluctant to visit the Hall at the site. However, the

advancement in the ubiquitous information and communication technology has offered more options for the appreciation and self-learning of arts by integrating technology to the real world. The learning via the Internet networks which can converge different places and sources of knowledge into one place has ignited the development of virtual reality museums. Learning through the Internet networks is convenient because it allows freedom for learning by personal interest with no boundaries of time and place as long as the Internet network is accessible.

Technology can enhance learning efficiency and bridge the interaction gap between the real world and the virtual world. For instance, the integration of virtual reality technology with the image technology creates three-dimensional (3D) images on the screen with components of real environments combined with virtual image. It is a combination of components in virtual environments (VE) and has instant interactive features which allow users to take control of viewing the real world around them. The learners have freedom of choices to view what they want to learn and navigate around, resulting in a reciprocal influence between emotions and learning (Meesuwan, 2011). The virtual reality museum is essentially an application of virtual reality technology in organising exhibitions to attract more attention and enhance learning experiences of the users by capitalising on the advancement of computer, communication and internet technology to create 3D multimedia or mixed media. They can be still or motion images which can be viewed from any angle and can be accompanied with sounds, explanations or short videos to provide the users with a resemblance to the real environments. It saves time, energy and expenses from traveling to the actual sites. It is suitable for those who want to learn about arts and culture but cannot come to the real place. It enables independent learning with minimised limitations on time, place, expenses, etc. (Sakhachan, 2015).

From the aforementioned significance and problems, it could be reiterated that Thai arts and culture is of great emotional value in the Thai society. The presentation of such values via virtual reality museums can be a highly practical way for conserving and an interesting way for exhibiting Thai arts and culture. This is an attempt to conserve, cultivate and disseminate Thai arts and cultures and to facilitate the interested people who want to learn about arts and culture but are unable to visit the sites. Therefore, the researchers are keen to study the effect of using virtual reality museum at the Hall of Southern Thai Culture which presents valuable Thai arts, cultures and traditions via the state-of-the-art technology of virtual reality.

1. RESEARCH OBJECTIVES

1.1 To study a virtual reality museum model for improving the users' learning.

1.2 To develop a virtual reality museum for improving learning of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University.

1.3 To assess the learning efficiency via virtual reality museum among the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University.

2. SCOPE OF THE STUDY

2.1 Target participants

The target participants in this study were 404 be people interested in southern Thai arts and culture.

2.2 Key variables

2.2.1 Dependent variables are 1) the learning efficiency indicated by the users' self-assessment of their knowledge about southern Thai arts and culture before and after using the virtual reality museum and 2) the users' satisfaction with the use of virtual reality museum

2.2.2 Independent variables are 1) a virtual reality museum model for improving the users' learning efficiency and 2) the virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University

3. RESEARCH METHODOLOGY

3.1 Phase 1: Development and quality assessment of the virtual reality museum model for improving learning efficiency of the users

In developing a virtual reality museum model for improving the learning efficiency of the users, the researchers studied documents and relevant research and drafted the virtual reality museum model with three main components, namely, 1) input, 2) process and 3) outcomes. The input includes six factors, i.e., 1.1) learning environment organisation in the 21st century, 1.2) contents, 1.3) users, 1.4) digital media technology, 1.5) connectivism theory and 1.6) constructivism theory. The process involves three processes which are 2.1) learning by stimulating attention, 2.2) self-regulation of knowledge creation and 2.3) learning of contents and

information via digital media. The outcomes include 3.1) the obtained knowledge and 3.2) satisfaction with the use of the virtual reality museum. After that, the model developed by the researchers was presented to the experts for their feedback. The experts' advice was used to revise the model before actual use with the target participants.

3.1.1 The research instruments in phase 1 included:
- Quality assessment form of the virtual reality museum model for improving learning efficiency of the users
- The virtual reality museum model for improving learning efficiency of the users.

3.1.2 The results in phase 1
From the quality assessment by five experts, it was found that the virtual reality museum model has been given a quality level of 'very good' with a mean score of 4.82 and SD of 0.28. The developed virtual reality museum model has three main components, i.e., input, process and outcomes. The details of each component in Figure 1.

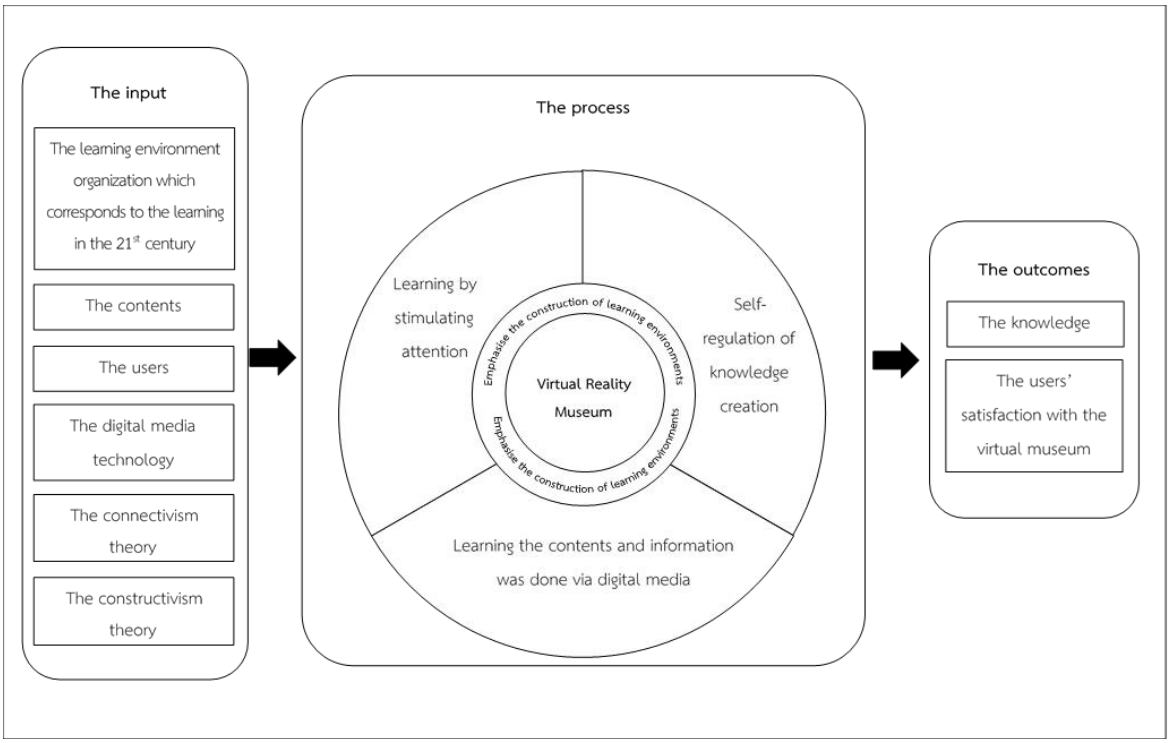

Figure 1.The virtual reality museum model for improving learning efficiency of the users

The details of each component are as follows.

The input has the following six elements.
- The learning environment organization which corresponds to the learning in the 21st century has to capitalize on the technological advancement to enable learning environments in various modes and create virtual learning environments similar to the ones in the real classroom. This supports learning without having to be on site. The support system was designed to provide optimal learning experience for the users. The system is supportive of unique learning needs of different learners or users and promote interactions between the users and the media in practical ways.
- The contents used in the model are related to cultural heritage in the three southern border provinces. The contents can be selected for learning on demand. Each section provides background knowledge periodically for the learners to read, analyze and try to understand the southern Thai culture.
- The users are those who are able to read and understand Thai and are enthusiastic about seeking knowledge. They are capable of self-learning and are not limited by gender, age or educational level. They are supposed to have fundamental skills for using technology to seek knowledge and study further. They need to have computer equipment and network system in place.

- The digital media technology used for improving the learning efficiency of the users included virtual reality and digital media technology. The technology was used as a tool for transmitting knowledge and facilitating the users to study wherever and whenever they want via a computer and the internet network.
- The connectivism theory posits that learning occurs by creating and connecting knowledge to develop networks. Learning is formed by the decision of the users to choose relevant learning resources around them and selectively filter such resources to obtain the ones which are meaningful to themselves.
- The constructivism theory emphasises the processes and methods of knowledge creation from experiences as well as the intellectual and belief structures which are used to interpret phenomenon and things. This notion underlines the learners' role in creating new knowledge by themselves by relating the existing experiences with the new knowledge. The process requires the users to organize information they received.

The process involves the following three processes.
- Learning by stimulating attention is an innovative way of transmitting knowledge by organizing the learning environment in congruence with the demands of the 21st century. Digital media technology is integrated into the museum so that the learners can access the learning resources from outside the classroom. In addition, the interested users can learn it on demand. This integration can boost the museum users' interest in learning.
- Self-regulation of knowledge creation is facilitated by the integration of virtual reality technology to the museum. By doing so, the museum is transformed into an online social media platform which functions as an extra knowledge resource or lessons that benefit the learners. The users of the virtual reality museum can choose to learn the contents on their need. Such innovation can respond to the users' differences in terms of learning preferences and needs which customise the right learning options for themselves.
- Learning the contents and information was done via digital media. Relevant contents were constructed and provided around the virtual museum which is the venue for transmitting knowledge to the users. The provided contents and information were from reliable resources and were presented through digital media such as still images, letters, etc. The provision of contents and information was aimed to help the learners to understand the topic, overall message, key concept, background, significance and meaning as well as to analyze and appreciate the values of what they read reasonably.

The three processes emphasise the construction of learning environments by arranging an experience conner and structure in a similar way to the real on-site exhibition of cultural heritage in the three southern border provinces. The learning environment was organized to allow users to learn from the surroundings and choose to study according to their wishes. This supports the learners with a learning context where they can have hands-on practices by themselves. The users can learn, make decisions, and select the learning resources around them on their own demand. The atmosphere in the virtual museum which supports learning, is well-organized, offers supplementary knowledge contents, and provides exhibitions of cultural work or cultural heritage illustrating events and stories will allow the users to connect knowledge sources and create new knowledge for themselves. In addition, the users can share the obtained knowledge with other people.

The outcomes involve the following two main aspects.
- The knowledge gained by the users is the primary outcome. The learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies is expected to develop through the learning and receiving of information in a clear and comprehensive manner. This includes 1) knowledge of the border landscape, 2) knowledge of pre-archeological history and ethnicity, 3) knowledge about the early history of Patani Darussalam and Rattanakosin kingdoms, 4) knowledge about people with outstanding cultural contributions 5) knowledge of language and literature, 6) knowledge of cultural attractions, 7) knowledge of Buddhist ways of life, 8) knowledge of Chinese lifestyles, 9) knowledge of Muslim ways of life 10) knowledge about handcraft, 11) knowledge of folk performances and games, 12) knowledge of local wisdom and 13) knowledge about the southern border today.
- The users' satisfaction with the virtual museum is another aspect of the outcome. It was expected to bring about the users' positive perceptions, contentment, delight, impression or satisfaction towards to the learning environment via the virtual reality museum.

3.2 Phase 2: Development and quality assessment of the virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University

The development of the virtual reality museum for improving the learning efficiency of the users was based on the actual museum and a deliberate selection of contents and information. The development was in compliance with the virtual museum model to enhance the learning efficiency of the users. The virtual museum is divided into two levels, in line with the real Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University. Each level is divided into zones with 13 zones in total. The

virtual reality museum developed by the researchers was presented to the experts for quality assessment. Subsequently, it was revised in line with the experts' feedback before use with the target participants.

3.2.1 The instruments used in phase 2 included:
- Quality assessment form of the virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University
- Virtual reality museum for improving the learning efficiency of the users of the Southern Thai Culture Hall, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University.

3.2.2 Results in phase 2
From the assessment by three experts, it was found that the virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University has a quality level of 'very good' with the mean of 4.60 and SD of 0.69.

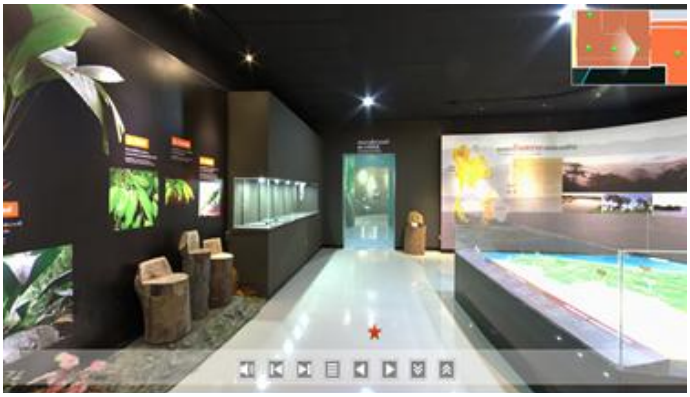

Figure 2.Design ofthe virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University

3.3 Phase 3 Evaluation of the learning efficiency of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University users via virtual reality museum

3.3.1 Data collection
In this study, the researchers had been publicizing the virtual reality museum to the users to use, study and evaluate the virtual museum for improving learning efficiency for three months. Such data was collected and subsequently underwent analysis.
3.3.2 Instruments in phase 3
- Assessment form of self-learning efficiency
- Assessment form of satisfaction with using the virtual reality museum

4. DATA ANALYSIS
The statistics used in this study were means (M), standard deviations (SD) and a statistical t-test.

5. RESULTS
The results from the assessment of the virtual reality museum model for improving the learning efficiency of the users indicate that the quality level of the model is 'very good' with a mean of 4.82 and SD of 0.28. Regarding each component of the model, the input has a mean of 4.77 and SD of 0.35, the process has a mean of 4.93 and SD of 0.15 and the outcome has a mean of 4.80 and SD of 0.27 in Table 1.

Table 1. The results from the assessment of the virtual reality museum model.

Items	*M*	SD	Quality
The input	4.77	0.35	very good
The process	4.93	0.15	very good
The outcome	4.80	0.27	very good
Overall quality	**4.82**	**0.28**	**very good**

The results from the evaluation of the virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University suggest that the quality level of the museum is 'very good' (M= 4.60, SD=0.69). Concerning each aspect of the museum, it was found that the virtual reality technology (M=4.50, SD=0.86), contents (M=4.55, SD=0.57), presentation (M=4.66, SD=0.57) and application (M=4.66, SD=0.57) in Table 2.

Table 2. The results from the evaluation of the virtual reality museum.

Items	***M***	**SD**	**Quality**
The virtual reality technology	4.50	0.86	very good
Contents	4.55	0.76	very good
Presentation	4.66	0.57	very good
Application	4.66	0.57	very good
Overall satisfaction	**4.60**	**0.69**	**very good**

The evaluation of the self-learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University, it was found that on average the learning efficiency of users after the use of the virtual reality museum was significantly higher than the performance before the use of the museum (t= 23.084, p <.001). The score after the museum use was M=3.93, SD=0.78 while the score before the museum use was M=2.65, SD=0.97. The effect size is medium (0.68) in Table 3 and in Diagram 1.

Table 3. The evaluation of the self-learning efficiency of the users.

Variable	**The score before the use of the museum**		**The score after the use of the museum**		***t***	**df**	***p***	**Cohen's *d***
	M	***SD***	***M***	***SD***				
The evaluation of the self-learning efficiency	2.65	0.97	3.93	0.78	23.084	334	<.001	0.68

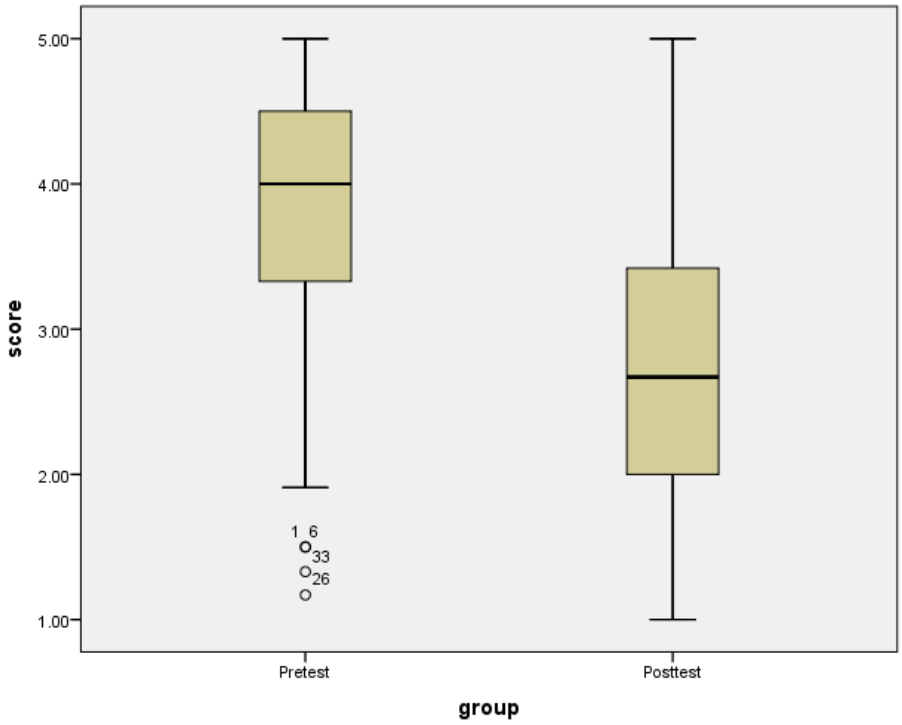

Diagram 1.Comparative evaluation of the self-learning efficiency of the users between before and after the use of the museum

The results from the evaluation of the users' satisfaction with the virtual reality museum indicate that that the satisfaction level was 'good' (M= 4.04, SD=0.84). For each aspect of evaluation, it was found that clear and comprehensible instructions (M=4.06, SD=0.88), ease of use (M=4.09, SD=0.83), display speed (M=3.81, SD=0.93), appeal of the media (M=4.01, SD=0.86), accuracy and coverage of the contents (M=4.10, SD=0.74), clarity in explanation (M=4.06, SD=0.80) and congruence between images and contents (M= 4.14, SD=0.83) in Table 4.

Table 4. The results from the evaluation of the users' satisfaction with the virtual reality museum.

Items	*M*	SD	Quality
That clear and comprehensible instructions	4.06	0.88	good
ease of use	4.09	0.83	good
display speed	3.81	0.93	good
appeal of the media	4.01	0.86	good
accuracy and coverage of the contents	4.10	0.74	good
clarity in explanation	4.06	0.80	good
congruence between images and contents	4.14	0.83	good
Overall satisfaction	**4.04**	**0.84**	**good**

6. DISCUSSIONS

6.1 Results of the quality assessment of the virtual reality museum model for improving learning efficiency of the users

The results from the quality assessment of the virtual reality museum model for improving the learning efficiency of the users was at 'very good' level (M=4.82, SD=0.28). This positive result could be because the virtual reality museum model is a learning approach which puts the users at the center. The integration of the advanced digital media technology of the 21st century which consists of virtual reality technology and digital media technology facilitates the users to be able to learn from anywhere on their demand. The learning of

contents and information through digital media via the internet network and up-to-date technology allows the users to have more freedom in their learning and creating knowledge by themselves and enhance their learning experiences. As Tali (2016) suggested, the organization of museum must put the users at the center. Even if the museum has complete contents and excellent presentation, it is meaningless if the users are missing. Thus, users are the primary target of the museum development and the presentation formats should be adjusted to suit the users and to increase efficiency. This could be achieved by laying out the plot and contents of the museum in a way which allows the users to participate and corresponds to their needs with the support from digital technology which has increasingly gained popularity among the 21st century citizens. As explained by the Office of Knowledge Management and Development (2020), the rapid changes in the digital age have resulted in dramatic changes in people's lifestyles and learning habits. The world of learning has substantially evolved since the development of ubiquitous internet network and digital technology. The online knowledge networking has obviously been prevalent. The Internet will play a more significant role in enabling people in remote areas to access knowledge. Various new learning formats and platforms in the digital age have been developed. The virtual reality technology is one of the digital media used for supporting the learning of history, natural science, biology, etc. The technology is used to make learning easier to understand and eliminate the necessity of commuting to the real site. It helps to generate enthusiasm for learning and support learning beyond the normal texts.

6.2 Results of the quality assessment of the virtual reality museum for improving learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University

According to the results from the quality assessment of the virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University, it was found that the museum has a quality level of 'very good' (M=4.60, SD=0.69). This high-quality rating can be due to the development of the museum based on the ADDIE model. In the Analysis stage, the target participants, objectives, contents and relevant information about the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies were considered. In the Design stage, the virtual reality museum was designed on the basis of the data from the analysis stage and the virtual reality museum model for improving the learning efficiency of the users. In the Development stage, the virtual museum was developed in line with the researchers' design and the advice from the experts' quality assessment. Moreover, evaluation forms were developed for use in later stages. In the Implementation stage, the virtual reality museum was launched to the interested users via online network. The implementation lasted for three months. In the Evaluation stage, the results from the experiment were analysed and evaluated which informed practical improvement for future use. In line with Dissara (2019), the development of virtual museum based on the ADDIE model is a systematic approach. The ADDIE model includes Analysis which takes various factors into account, Design which draws upon the information from the analysis stage for designing learning materials, Development which builds up the virtual museum in compliance with the designed elements and presents it to the experts for quality assessment, Implementation which is a pilot trial of the virtual museum before the actual use, and Evaluation which assesses the quality and efficacy of the museum for improvement purpose before the real use. The trial results suggest that the virtual reality museum can promote the users' learning and remembering of the contents in the museum. Therefore, the virtual reality museum can be used for educational purposes practically and effectively.

6.3 The results from the evaluation of the self-learning efficiency of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University users via virtual reality museum.

From the evaluation of the self-learning efficiency of the museum users, it was found that the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies after the use of the virtual reality museum was significantly higher than the performance before the use of the museum ($t = 23.084$, $p < .001$). The score after the virtual museum use was M=3.93, SD=0.78 while the score before the virtual museum was M=2.65, SD=0.97. The effect size is medium (0.68). Such positive outcomes were reasonably caused by the virtual reality museum which was designed with systematic and appropriate learning processes and presentation of contents. It was convenient for the users to select what they want to study on their demand. The users can access knowledge and information in a clear and detailed manner by interacting with the contents presented in the museum first-hand. In addition, the presented contents were drawn from the actual sites and were in various forms such as still images, attractive audio effects, and 360° motion pictures which can capture full details of the scenes. Moreover, the virtual reality museum was easy to use and was accessible anytime. The findings were in accordance with Klainak (2008) who reported that virtual museums which are based on appropriate contents, presentation methods, language use and audio effect promoted the learning about area layout, interior utilities and structure of the virtual museums, causing the participants to appreciate and

realise the values of culture and ways of life which are worth a long-lasting preservation. Similarly, Dissara (2019) asserted that the learning via virtual reality museum developed with systematic and effective principles can enhance the users' interest in and enthusiasm for learning because the virtual museum is developed to allow the users to interact with the contents, affecting their learning.

According to the results from the evaluation of the users' satisfaction with the virtual reality museum, it was found that the satisfaction level was 'good' (M= 4.04, SD=0.84). Such positive feedback could be because the users were enabled to study on their demand at their own convenience. Additionally, it allowed the users to interact with the learning resources which can well arouse the users' interest and enthusiasm for learning. The virtual museum also helped the users to learn with comfort, contentment, liking, impression and satisfaction with the learning environment of the virtual reality museum designed to provide a learning resource accessible on demand anytime and anywhere. This is in with Lerttayakul (2018)'s study which proposed that self-directed learning helps the learners to maintain attention, concentration and enjoyment. The virtual museum can be considered as one medium which can satisfy the self-learning needs. The users can choose to learn at their convenience, select what they want to learn on their demand and customise the learning contents and sequence without limits in the numbers of audience and the audience's differences in age, education and socioeconomic backgrounds. The virtual museum reduces the time for travelling to the real places. Indeed, it minimises restrictions on distances and time.

7. SUGGESTIONS

7.1 Implications for applying the research findings

The virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University requires self-learning capacity. Thus, the users need to have adequate reading and comprehension skills in Thai language, be enthusiastic to learn and be capable of self-learning. There is no limitation on gender, age and educational levels.

7.2 Suggestions for further studies

The virtual reality museum for improving the learning efficiency of the users of the Hall of Southern Thai Culture, Princess GalyaniVadhana Institute of Cultural Studies, Prince of Songkla University can be applied in educational institutions for the learners to study about southern Thai arts and culture. The virtual museum, with its digital media technology, can be disseminated to a wider audience who are interested in the southern Thai arts and culture. It can also be used as a measure for promoting tourism.

References

Dissara, T. (2019). Development of Tung Wa Elephant Virtual Museum, Satun Province (master's thesis). Thaksin University.

Katwong, T. (2018). *Presenting Thai culture photographs in online media with a broadcast and conservation of Thai culture* (master's thesis) .Bangkok : Dhurakij Pundit University.

Klainak, K. (2008). The creation of virtual museum for promoting education in Thai architecture: A case study of Thai Lue house (master's thesis). Chaing Mai: Chaing Mai University.

Lerttayakul, D. (2018). Development of a virtual local Museum: the case study of learning center for traditional local fabrics hand-woven by Lao ethnicities of Chee and Khrang in Suphanburi Province. *NakhonPhanom University Journal, 8*(3), 52-62.

Meesuwan, W. (2011). Augmented Reality Technology for Learning. *Journal of Education, Narasuan University, 13*(2), 119-127.

Office of Knowledge Management and Development. (2020). *Learning inthe Digital Age*. Retrieved May 5, 2021, fromhttp://www.okmd.or.th/okmd-opportunity/life-long-learning/3678/

Saentawee, K. and Sukbanjong, S. (2017). *Trends and factors influencingaesthetic experiences of the Visitor of Museum of Contemporary Arts* and Culture (Research Report). Bangkok :Office of Contemporary Art and Culture,Ministry of Culture.

Sakhachan, C. (2015). *Development of virtual museum design: Phutthamonton center of world Buddhism*. NakhonPathom: Rajamangala University of Technology Rattanakosin.

Tali, K. (2017). A local museum content presentation model basing on present-to-past concepts through digital technology: a case study of Angsila local museum. Chonburi: Burapha University.

Author Information

JaruekAtthasongkhro
Faculty of Education, Prince of Songkla University Faculty of Education, Prince of Songkla University, Pattani

NuttaphongKanchanachaya
Faculty of Education, Prince of Songkla UniversityFaculty of Education, Prince of Songkla

Campus 181 Jalearnpradit Rd, Rusamilae,
Muang, Pattani 94000 THAILAND

KanitaNitjarunkul
Faculty of Education, Prince of Songkla University Faculty of Education, Prince of Songkla University, Pattani Campus 181 Jalearnpradit Rd, Rusamilae, Muang, Pattani 94000 THAILAND

JutaTammachart
Faculty of Education, Prince of Songkla University Faculty of Education, Prince of Songkla University, Pattani Campus 181 Jalearnpradit Rd, Rusamilae, Muang, Pattani 94000 THAILAND

University, Pattani Campus 181 Jalearnpradit Rd, Rusamilae,
Muang, Pattani 94000 THAILAND

VirintornAuksornnit
Faculty of Education, Prince of Songkla University Faculty of Education, Prince of Songkla University, Pattani Campus 181 Jalearnpradit Rd, Rusamilae, Muang, Pattani 94000 THAILAND