The Development of Media Formats for Public Relations Books and Applications Using Augmented Reality Technology to Promote Tourism in Chiang Rai Province

Khomkrit Jiraboot and Panuphan Jitkham

The Development of Media Formats for Public Relations Books and Applications Using Augmented Reality Technology to Promote Tourism in Chiang Rai Province

Abstract— The use of AR technology in designing books and applications, as well as designing representative symbols to promote tourism in Chiang Rai Province, is expected to be highly effective in the coming years. Augmented reality (AR) media selected by the researchers highlight tourist destinations known and distinctive to each area. Symbols representing the 10 districts of Chiang Rai Province were created, such as (1) Mueang Chiang Rai District using the symbol of King Mengrai, (2) Mae Chan District with the Mexican Sunflower, (3) Mae Fa Luang District with the Cherry Blossom, (4) Chiang Saen District with the Naga, (5) Chiang Khong District with the Giant Catfish, (6) Wiang Pa Pao District with the Hot Spring, (7) Thoeng District with Phu Chi Fa, (8) Phaya Mengrai District with the Fighting Cock, (9) Wiang Chai District with Lord Gu Na, and (10) Paan District with the Beautiful Woman. The satisfaction level with the use of books and applications combined with AR technology for promoting tourism in Chiang Rai Province was very high ($\bar{X}$ = 4.56). The media was highly capable of attracting and satisfying tourists, particularly with the appealing content of tourist locations and the 3D characters for each district. Because it incorporates AR technology, which differentiates it from traditional, conventional media, it becomes more interesting to tourists.

Keywords— *Augmented Reality, Public Relations Books, Applications , AR location-based*

I. INTRODUCTION

Chiang Rai Province It is a province located in the northern region of Thailand. The location is located at the border between three countries: Thailand, Laos, and Burma. known as the land of the Golden Triangle. It is the location of the city. Having had historical importance since the founding of the Lanna Kingdom, it is an ancient city with a long history. Since the Chiang Saen period, according to Phaya Mangrai, the founder of the city of Chiang Rai on the Kok River basin, there have been many nationalities in the population. Both lowland Thais, mountainous Thais, and Chinese people who immigrated to live high in the mountains Each nation has its own unique traditions, culture, and way of life. It is another charm that makes Chiang Rai gain the attention of both Thai and foreign tourists.

Chiang Rai province has many diverse tourist attractions, such as temples, archaeological sites, ancient artifacts, natural attractions, and cultural sites, which are scattered across various districts. However, due to economic conditions and publicity campaigns, traditional information and media formats are still used, including radio broadcasting, television advertising, print media like magazines and journals, website development, and social media promotions on various mobile devices capable of displaying both images and sounds. Yet, these are not systematic or widespread enough, lacking the novelty of presenting tourism information that has been stagnant in two-dimensional image formats for decades. This could be due to the overwhelming amount of information, making it difficult for tourists to absorb it in the limited time available in today's fast-paced information consumption era, where everyone has limited time to choose and consume information. Therefore, another important aspect of promoting tourism is to increase efficiency by applying technology and innovation appropriately, especially augmented reality (AR) technology, which is a branch of science that blends reality with the virtual world through various software and connecting devices. The virtual images are displayed on computer screens or other display devices. These virtual images, which appear, can interact with the user immediately. They may be in the form of three-dimensional still images or media with accompanying sound, using techniques to overlay three-dimensional images or other digital media onto real-world views. This results in real-time image rendering.[1]

In this study, we researched the distinctive identities of each district in Chiang Rai Province that are interesting and have potential for development. We focused on taking these unique identities and representing them as 2D character images, then developing them into 3D character models. These images serve as representative icons or 'mascots' for each district in Chiang Rai Province. The aim is to use these mascots in the design of promotional materials and books, integrating them through the design process with augmented reality technology (AR), to create an enhanced and engaging experience.

II. RELATED WORK

A number of research works have been proposed to promote tourism using virtual reality on tourism. The research works proposed by [2] has been conducted on the development of public relations media in augmented reality for promote tourism in Khu Bua Community, Ratchaburi Province. The objective of their study is to development of

public relations media in augmented reality for promote tourism in Khu Bua community, Ratchaburi province and and study the satisfaction of merchants and tourists in the Khu Bua community on the media of augmented reality promoting tourism. [3] The objective is to develop a public relations media in Augmented Reality for tourism in Phra Nakhon Si Ayutthaya Province. The results showed that it was found that the overall efficiency was at a high. [4] to develop the public relations media for tourism in Phetchaburi province with augmented technology and to evaluate the user's satisfaction and acceptance level on the public relations media. the result revealed that public relations media for tourism in Phetchaburi province application was at the high level, the average of 4.38 and the standard deviation of 0.57. and Phetchaburi provincial slogan postcard was at the high level, the average of 4.33 and the standard deviation of 0.59 [5] to development of the augmented reality application for promoting Sa Kamphaeng Yai Temple Tourism in Sisaket. The results showed that there were 8 models in 3D: Prasat Wat Sa Kamphaeng Yai, Component of Prasat, Lintel of Prasat Wat Sa Kamphaeng Yai, Silver Cave, Golden Cave, Big Gong, Folk song and Buddha image in the posture of Naga Prok. It was also found that the learning evaluation using normalized gain was in medium gain level ($<g>$=0.44). As for the satisfaction evaluation, the average experts' satisfaction was in the 'strongly agree' level ($\bar{x}$ =4.64) with standard deviations (S.D.) at 0.52. The average users' satisfaction was in the 'agree' level ($\bar{x}$=4.33) with standard deviations (S.D.) at 0.67. Based on the results of this research, a prototype of an augmented reality application for temple tourism support can be applied to promoting tourism in archaeological sites.

III. METHODS

The research on "The Development of Media Formats for Public Relations Books and Applications Using Augmented Reality Technology to Promote Tourism in Chiang Rai Province" included the following procedures.

1) Data collection

The researchers collected and analyzed data from fieldwork, focusing on various important aspects such as history, beliefs, lifestyle, and unique tourist attractions in each district of Chiang Rai Province. This was done in the form of data and images to create visual symbols representing each of the 10 districts in Chiang Rai Province, as follows:

1. Mueang District

2. Wiang Chai District

3. Phaya Mengrai District

4. Chiang Saen District

5. Chiang Khong District

6. Thoeng District

7. Mae Chan District

8. Mae Fa Luang District

9. Paan District

10. Wiang Pa Pao District

2) The process of creating 3D cultural ambassadors in conjunction with augmented reality technology (AR Location Based)

2.1) Pre-Production

The researchers conducted fieldwork to collect data on the visual symbols and popular tourist sites in each district of Chiang Rai Province, in consultation with local residents. From the unique characteristics of each district, visual symbols were created to serve as cultural ambassadors. These symbols are part of the effort to promote tourism in Chiang Rai Province, employing 3D representations in conjunction with augmented reality technology (AR Location Based).

2.2) Production

1. The researchers conducted studies on the history and background of the 10 districts in Chiang Rai Province that are interesting tourist destinations. They collected data and still images and conducted informal inquiries with tourists and local residents. This information was used to develop and design character designs for the mascots of each district. These mascots were created as 3D characters, designed to be cartoon representations symbolizing each district, including:

Fig 1. Designing Character Model Sheets for mascots representing the 10 districts

2. Using the Character Design to create the Character Model Sheet for the mascots, which will be used for developing 3D model representations of these mascots

Fig 2. Designing Character Model Sheets for Representative Mascots

3. Using the Character Design to create the Character Model Sheet for the mascots, which will be used for developing 3D model representations of these mascots

    3.1 Create 3D models and apply surface textures according to the model sheet.

    3.2 Perform the rigging of the skeleton and meshing with the 3D model.

    3.3 Create motions, emotions, poses, and facial expressions for the 3D model.

    3.4 Animate the 3D model according to the voice-over.

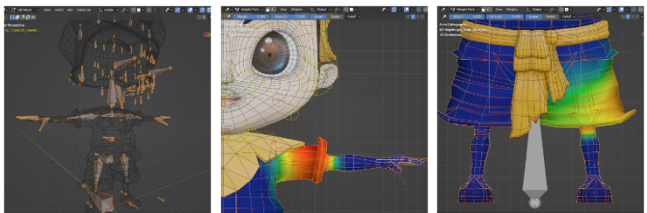Fig 3. Create 3D models and surface textures according to the character model sheet.

Fig 4. Perform the rigging of the skeleton and attach the skin to the 3D model.

Fig 5. Create motion, emotions, poses, and facial expressions for the 3D model.

Fig 6. Animate the 3D model according to the voice-over, narrating various tourist locations.

4. The design of books and packaging to promote tourism in Chiang Rai Province using virtual reality media, employing Adobe Illustrator for designing various illustrations used in the media, Photoshop for editing photographs of various tourist locations, and In Design for arranging the format of publicizing books This is to promote tourism in the 10 districts of Chiang Rai Province in conjunction with the use of augmented reality information technology.
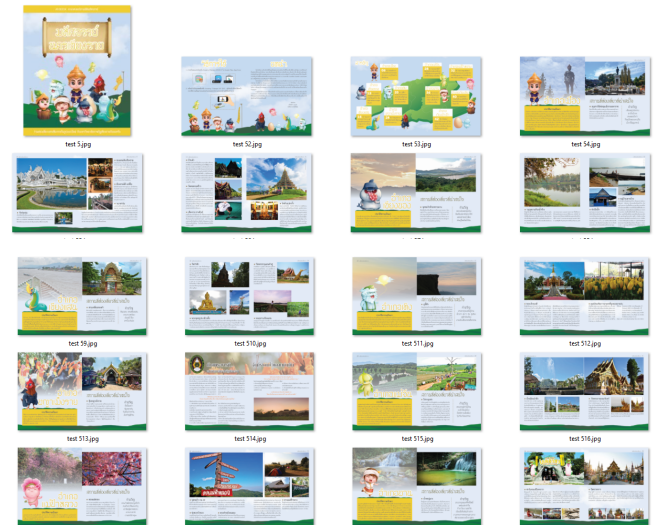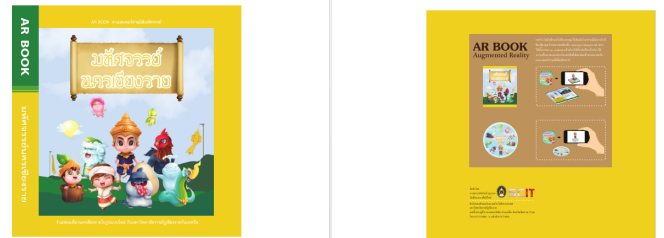

Fig 7. Designing books and packaging using Adobe Illustrator, Photoshop, and InDesign.

5. Developing an augmented reality application using Unity software, in conjunction with 3D models and books, to promote tourism in Chiang Rai Province.

    5.1 Import 3D models and audio files to work with the AR location-based system.

    5.2 Conduct trials of the AR location-based application at various points to test the display results and accuracy of the position of the AR location-based system.

    5.3 Experiment with exporting the project file to mobile device systems.

5.4 Export the project file for use at various key tourist locations in Chiang Rai Province.
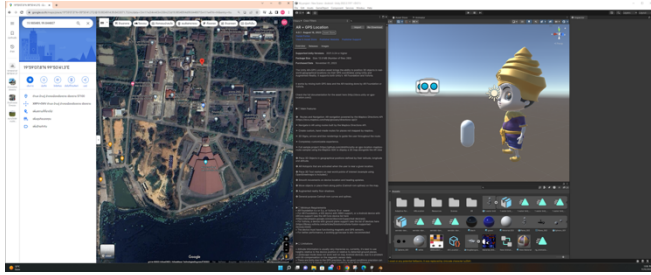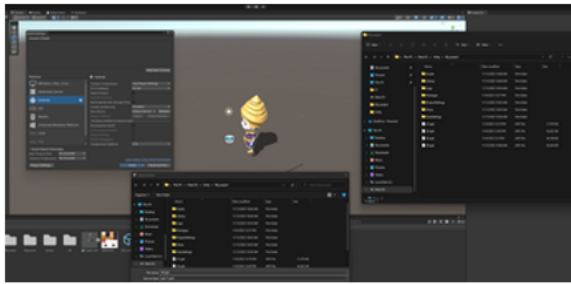

Fig 8. Import 3D models and audio files to work with the AR location-based system.

Fig 9. Conduct trials of the AR location-based application at various points.

Icon Application

Fig 10. Experiment with exporting the project file to mobile device systems.

3) Research evaluation and data analysis procedures

The researchers used promotional media with augmented reality technology, including books and applications, to promote tourism in Chiang Rai Province. The study focused on satisfaction with the use of books and applications in terms of designing 2D–3D mascot characters, images, and content within the book format, and satisfaction with the use of augmented reality technology in terms of its value and benefits for promoting tourism at various tourist locations in Chiang Rai Province. The study involved a group of 100 tourists from the 10 districts of Chiang Rai Province, selected randomly. The data were analyzed to find the mean and standard deviation.
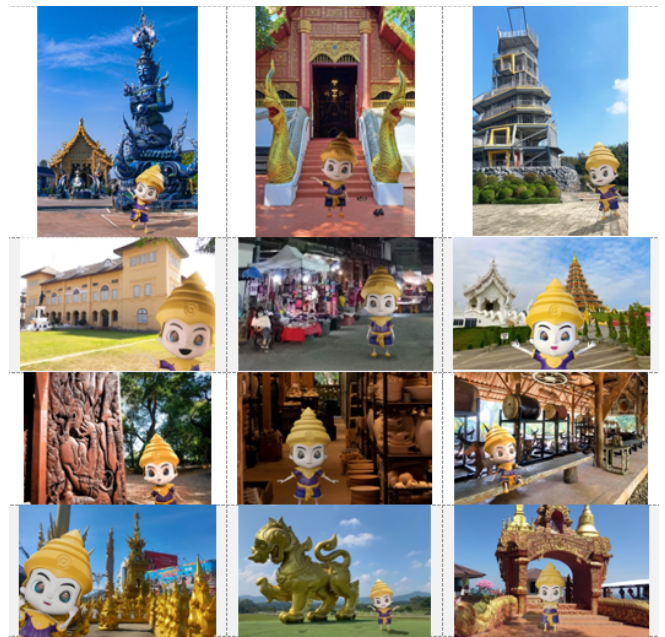

Fig 11. Experimenting for use in various important tourist destinations in the province of Chiang Rai.

IV. RESULTS AND DISCUSSION

The researchers developed promotional media using augmented reality technology, including books and applications, to enhance tourism in Chiang Rai Province. They studied user satisfaction with these books and applications in terms of book design, the design of 2D-3D mascot characters, image and content design within the books, and satisfaction with the use of augmented reality technology in terms of its value and benefits for promoting tourism at various tourist locations in Chiang Rai Province. The study involved a group of 100 tourists from the 10 districts of Chiang Rai Province, with the following analysis results:

TABLE I. THE MEAN AND STANDARD DEVIATION OF SATISFACTION WITH THE USE OF BOOKS AND APPLICATIONS TO PROMOTE TOURISM IN CHIANG RAI PROVINCE, BOTH OVERALL AND IN SPECIFIC ASPECTS.

Satisfaction toward VR to present cultural tourist attractions, the nine pagodas in Chiang Rai Province	Mean	S.D.	Satisfaction Level
1. In terms of book design	4.56	0.27	Highest
2. In terms of designing 2D-3D mascot character symbols	4.78	0.42	Highest
3. In terms of image design	4.62	0.38	Highest
4. In terms of the content within the book format	4.52	0.44	Highest
5. In terms of using the book in conjunction with the application	4.54	0.73	Highest
Total	**4.60**	**0.58**	**Highest**

Table I The satisfaction with the use of books and applications to promote tourism in Chiang Rai Province, both overall and in specific aspects, was found to be at the highest level among tourists.

TABLE II.   THE MEAN AND STANDARD DEVIATION OF SATISFACTION
WITH THE USE OF BOOKS AND APPLICATIONS COMBINED WITH AUGMENTED
REALITY TECHNOLOGY FOR PROMOTING TOURISM IN CHIANG RAI
PROVINCE

Satisfaction with the use of books and applications in conjunction with augmented reality technology to promote tourism in Chiang Rai Province	Mean	S.D.	Satisfaction Level
1. The system is easy to use and not complicated.	4.64	0.53	Highest
2. The system is convenient to use.	4.44	0.54	Highest
3. The sharpness of the images.	4.66	0.52	Highest
4. Technology that is more unusual and interesting than conventional media.	4.50	0.61	Highest
Total	**4.56**	**0.43**	**Highest**

Table II. The overall satisfaction among tourists with the use of books and applications combined with augmented reality technology to promote tourism in Chiang Rai Province was found to be at the highest level.

TABLE III.   THE MEAN AND STANDARD DEVIATION OF SATISFACTION
WITH PROMOTIONAL MEDIA IN TERMS OF ITS VALUE AND USEFULNESS IN
PROMOTING TOURISM IN CHIANG RAI PROVINCE.

Satisfaction with promotional media in terms of its value and usefulness in promoting tourism in Chiang Rai Province	Mean	S.D.	Satisfaction Level
1. It is beautifully designed, easy to use, and suitable as a souvenir or gift.	4.50	0.54	Highest
2. Provides beneficial information about interesting tourist destinations.	4.52	0.50	Highest
3. Creates motivation to visit those places.	4.38	0.53	Highest
4. It is a technology that is more unusual and interesting than conventional media.	4.46	0.54	Highest
Total	**4.56**	**0.43**	**Highest**

Table III. The overall satisfaction among tourists with the promotional media in terms of its value and utility in promoting tourism in Chiang Rai Province was found to be at the highest level.

V. CONCLUSIONS

The development of media formats for promotional books and applications using augmented reality technology (AR) to enhance tourism in Chiang Rai Province resulted in practical and effective works. The media was highly capable of attracting and satisfying tourists, particularly with the appealing content of tourist locations and the 3D characters for each district. Because it incorporates AR technology, which differentiates it from traditional, conventional media, it becomes more interesting to tourists. The content and images within the books are easy to understand, modern, and thus in high demand among tourists.

REFERENCES

[1] P. Limpinan, Using Augmented Reality (AR) for Encouraging the Retention of Learning English Vocabulary, vol. 4. Journal of Technology Management Rajabhat Maha Sarakham University, 2017, pp.7–16.

[2] S. Wichiranon, R. Porncharoen, S. Julapan, C. Papattha, "Development of Public Relations Media in Augmented Reality for Promote, Tourism in Khu Bua Community, Ratchaburi Province," [Tourism and Humanities: Tourism in a Transformative Era Conference 1st, p.733-746, 2019]

[3] A. Hongsa, K. Thongngao, Public Relations Media in Augmented Reality for Tourism in Phra Nakhon Si Ayutthaya Province, vol. 16. UMT Poly Journal, 2018, pp.126-130.

[4] P. Keowsawat, Development of Public Relations Media for Tourism in Phetchaburi Province with Augmented Reality Technology, vol. 1. DEC Journal, 2022, pp.50–75.

[5] C. Supaartagorn, S. Hom-ngern, The Development of the Augmented Reality Application for Promoting Sa Kamphaeng Yai Temple Tourism in Sisaket, vol. 33. Journal of Information and Learning, 2022, pp.57–69.