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Cultural Immersion in the Digital Age: Developing "Chinese Cultural Wonders" Virtual Tour for Cross-Cultural Understanding

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Abstract
This study aims to develop Virtual Tour-based learning media entitled Chinese Cultural Wonders to improve cross-cultural understanding of China in a contextual and interactive manner for students of the Chinese Language Education S1 Study Program at Universitas Negeri Malang. This research uses the research and development (R&D) method with the ID-TABLET Culture-Based Model (CBM) which consists of pre-production, production, and post-production stages. The media was developed through 360-degree panoramic recording at Tjoe Hwie Kiong Temple, integration of interactive multimedia, and preparation of Chinese culture-based teaching materials that were visually packaged through the Canva platform. The prototype was validated by material experts and media experts and tested on students of the Chinese Language Education study program class of 2023. Chinese Cultural Wonders is a Virtual Tour-based application that can be accessed online. This application consists of the main menu in the form of material content, quizzes, usage guides, mini-maps, temple locations, and contact information. In addition, this application is also equipped with pop-up images, pop-up videos, and navigation hotspots that can increase user interactivity in using it.

Keywords: *Virtual, Cross-cultural, Media, Interactive*

Introduction

Culture is one of the fundamental aspects of human life that includes values, traditions, and mindsets that shape the identity of a nation (Ergashev et al., 2020; Hapsah et al., 2024). In the era of globalization, cross-cultural interactions are becoming increasingly intensive along with the rapid development of technology, transportation and communication (Bangu et al., 2024). This requires each individual to have good cross-cultural understanding in order to be able to adapt and interact harmoniously in a multicultural environment. However, cross-cultural understanding is not always easy to achieve (Asbi et al., 2024). Many individuals still have a limited understanding of foreign cultures, especially Chinese culture (Yu, 2024).

Chinese culture is one of the oldest civilizations in the world because it is supported by a wealth of philosophies, traditions, arts, and values that continue to be passed down throughout history (C. Li, 2020; Saputra et al., 2024). The three main teachings of Confucianism, Taoism, and Buddhism form the basis of the Chinese way of thinking and

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living. Confucianism emphasizes morality and social order, Taoism highlights harmony with nature, while Buddhism teaches liberation from suffering. In addition, Chinese culture's traditions such as architecture, calligraphy, and cultural festivals shape the unique identity of the Chinese people (Zhou, 2024). However, understanding Chinese culture is not simple (Putri et al., 2023). This is because many aspects are abstract, such as symbolism in art, ritual meaning, or philosophy of life that require in-depth understanding through real contexts. Mastery of foreign languages is essential, as they serve as a gateway to global communities and a key means of acquiring knowledge (Kharis, et al, 2020).

In the era of globalization, the ability to understand foreign cultures is one of the important skills, including Chinese culture. This is due to the fact that cultural understanding can build harmonious cross-cultural relationships (Kusumawati et al., 2024). In the context of Chinese language learning, cultural understanding becomes an essential component (Handayani et al., 2024). Therefore, language cannot be separated from the culture in which it develops (Tusadiah et al., 2024). By understanding culture, students not only master the linguistic aspects, but are also able to use the language contextually and understand the meaning contained in communication. Husna, A. S., et al. (2025) state the translator must know what they have to say and can't just translate.

One approach that is considered effective to support cultural understanding is through contextual learning. Contextual learning is a way of learning that presents learning experiences that are relevant to real situations (Dewi et al., 2024). One form of direct learning experience is a visit to a cultural location. Thus, this can provide opportunities for students to witness, feel, and understand Chinese culture firsthand (Simatupang et al., 2023). But on the other hand, this hands-on experience is often not possible to be implemented regularly due to cost, time, and accessibility limitations (Urbanik et al., 2021). This limitation creates a gap in the cross-cultural learning process, where students have to understand abstract cultural concepts only through limited learning media, such as texts or videos. This results in a lack of ability to provide an immersive and contextualized experience.

Virtual Reality (VR) technology offers a solution to overcome these limitations. VR is a technology that allows users to interact with the existing environment in a virtual world that can be simulated by a computer (Kharismajati et al., 2020). The use of VR can be adapted to various purposes, one of which is the Virtual Tour (Robbani et al., 2021). Virtual Tour is a simulation of a location that actually exists, and is usually a series of images or videos (Dawis, 2022). With Virtual Tour, students can virtually visit cultural locations, explore the cultural environment, and understand the context visually and interactively. Virtual Tour-based learning media not only bridges the physical limitations of accessing cultural locations (Vinnakota et al., 2023), but is also able to increase student engagement and understanding through simulations that resemble real experiences (Siyamsih, 2024).

The results of the search for relevant previous research show that VR technology-based learning media have been studied by Shadiev et al (2021), Gao et al (2021), and (Naiborhu et al (2024). The research results of the three researchers show that the use of VR technology-based learning media provides a real and contextual learning experience. Shadiev et al (2021) found that 360-degree video-based VR improves cross-cultural understanding, although its application to specific cultures such as Chinese culture is still rarely researched. Gao et al (2021) also showed the potential of VR in increasing students' emotional engagement, while Naiborhu et al (2024) developed a Virtual Tour-based SIVIRCADO application for history learning, which provides an interactive learning experience through 360-degree panoramic simulations.

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Although the potential of Virtual Tour in learning has been widely researched, Virtual Tour-based learning media specifically designed to support Chinese cross-cultural learning is still very limited. Therefore, this research aims to develop a Virtual Tour-based learning media with the name "Chinese Cultural Wonders", which is designed to present a contextual and interesting learning experience for students of the Chinese Language Education Study Program at Universitas Negeri Malang.

Method

This study used a research and development method with the ID-TABLET Culture-Based Model (CBM) development model (Young, 2009). This model integrates various aspects of development that are relevant to the cultural and technological context. This method was chosen because it is flexible in adapting learning technology to student needs and is able to identify cultural elements that affect learning effectiveness. The ID-TABLET model consists of three main stages, namely pre-production, production, and post-production. Each stage has interconnected aspects in the development of Virtual Tour-based learning media.

In the pre-production stage, the process begins with Inquiry, namely identifying the needs of students in the Chinese Language Education S1 Study Program at Universitas Negeri Malang for Virtual Tour-based learning media. This identification was carried out through interviews with lecturers teaching Chinese Culture courses and distributing questionnaires to students to explore obstacles in understanding Chinese cultural material. The results of this stage are the basis for determining the focus of the material and contextual media design. Furthermore, the Team aspect plays a role in forming a development team consisting of media experts and material experts. This process was followed by Brainstorming, where intensive discussions were held regarding the main features of the Virtual Tour as well as strategies to make the learning experience more interactive and immersive.

The production phase includes two main aspects, namely Development and Elements. Development involved designing and creating the initial prototype, selecting appropriate technology, and customizing the content to make it relevant to cross-cultural learning. In line with this, the Elements aspect ensures that the elements presented in the media, such as visual representations, symbols, and colors are in line with Chinese cultural values. One of the main contents in this media is the Tjoe Hwie Kiong temple, which is used as an example in the discussion of Chinese cultural architecture in Indonesia. In addition, the Learners aspect is an important part of this media development. The Virtual Tour is designed to suit various learning styles of students, such as visual, auditory, and kinesthetic. With a culture-based approach, students can understand the concept of Chinese culture in a more real and applicable manner compared to conventional learning methods.

The post-production stage includes evaluation through the Assessments aspect. Formative evaluation was conducted by involving media experts and material experts to assess the quality of design and content suitability. Meanwhile, summative evaluation was conducted through trials with students to measure the effectiveness of the media in improving cross-cultural understanding. In this development research, the data collection technique used was a questionnaire to measure user experience and media effectiveness on Chinese cross-cultural understanding. The data analysis used in this research is differentiated according to the type of data obtained. Qualitative data in the form of criticism and suggestions were analyzed descriptively. Quantitative data in the form of questionnaire results are analyzed quantitatively which will be presented in the form of percentages.

Results

The product produced in this research and development is a Virtual Tour with the title "Chinese Cultural Wonders". This research went through three main stages: pre-production, production, and post-production.

Pre-production

In the pre-production stage, a needs analysis of the Chinese Culture course was carried out by involving lecturers to identify aspects of material that require Virtual Tour learning media. The results of discussions with material experts show that the main focus in media development is the religious aspect of Chinese culture, which includes:

a) Religious History in Chinese Culture: Background to the development of Confucianism, Taoism, and Buddhism in Indonesia.

b) Religious Beliefs and Practices: Implementation of religious teachings in the daily lives of Chinese communities in Indonesia.

c) Religious Rituals and Celebrations: Traditions such as 春节 (Chinese New Year), 元宵节 (Lantern Festival), 布袋戏 (Glove Puppetry), and worship practices in temples.

d) Religious Acculturation in Indonesia: Interaction and adaptation of Chinese beliefs in the lives of Chinese communities in Indonesia.

The learning strategy in this Virtual Tour is designed based on case-based learning and cooperative learning. In case-based learning, students are given a case study on the religious practices of Chinese communities in Indonesia. They are asked to analyze and discuss their findings based on the material they have learned. Meanwhile, cooperative learning is applied through group discussions, where students work together in understanding and completing Virtual Tour-based tasks.

To support media development, discussions were held with media experts to determine the technical and design aspects of making Virtual Tour. Based on the discussion, the Virtual Tour was developed using 360-degree panoramic images taken with Insta360 camera and processed through 3D Vista application. In terms of appearance, the use of sans-serif fonts was chosen to improve readability. Some of the main features implemented in the Virtual Tour include: mini-map-based navigation to facilitate exploration, interactive hotspots containing pop-up cultural information, multimedia integration in the form of photos, videos, and audio to enrich the learning experience, interactive quizzes to measure student understanding of the material presented, and media usage guides to ensure ease of access and utilization by students.

Tjoe Hwie Kiong temple in Kediri was chosen as the main location in the Virtual Tour because it has strong historical and architectural value in representing Chinese culture in Indonesia. This temple reflects the acculturation of Chinese culture with local culture, so it can be a real example for students in understanding the adaptation of Chinese culture in Indonesia. In addition, this temple is also a center of religious activities that are still actively used today.

Production

The production stage in this research is the process of realizing the product design in the form of learning media for cross-cultural understanding of China based on Virtual Tour. The product developed in the form of Chinese Cultural Wonders application that allows users to explore the Tjoe Hwie Kiong Temple interactively with a 360-degree panoramic view. This

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learning media is designed to provide a more interesting learning experience with the help of digital visualization. The following are the steps in the production stage:

1. Panoramic Image Capture

The production began by preparing an Insta360 panoramic camera to capture images of the Tjoe Hwie Kiong temple in Kediri. Each part of the temple was photographed from various angles, including the front, side, and back views using panoramic technology so that the results could be uploaded to the 3DVista application. The results of these photos became the basis for creating the Virtual Tour display (see Figure 1).

Figure 1. View of the temple building

2. Editing Process With Photoshop

After capturing the images, an editing process was carried out using Adobe Photoshop to remove unwanted elements (object eraser), improve image quality, and adjust lighting for a more optimized appearance. This process aims to produce clean and clear visuals before being integrated into the 3DVista application (see Figure 2).
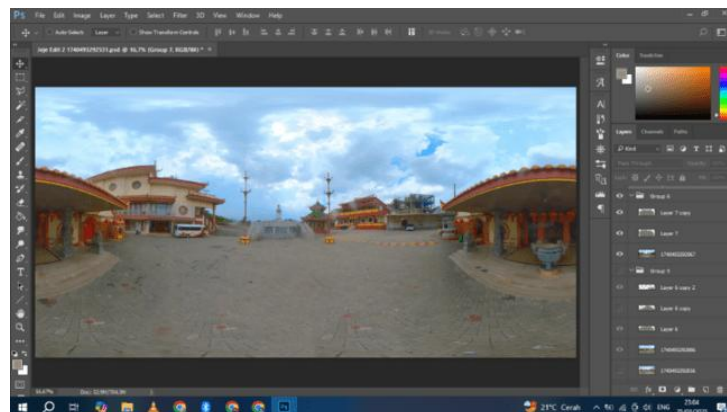

Figure 2. View of Photoshop Editing

3. Integration of Elements into 3DVista Application

At this stage, the edited images were uploaded into the 3DVista application. The images are combined so that users can explore the temple virtually equipped with hotspot icons that allow users to navigate between areas. In addition, a mini-map (floorplan) is created in

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3DVista as the main navigation and helps users understand the layout of the building systematically (see Figure 3).
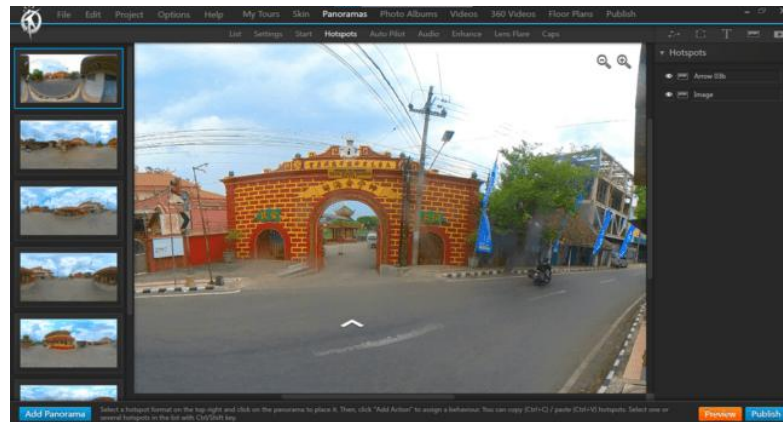

Figure 3. View of 3DVista Product Design

In the editing process in the 3DVista application, there are several steps taken:

a. Structuring the Virtual Tour

The navigation structure of the Virtual Tour was designed using the Floor Plan feature in 3DVista. This Floor Plan serves as an interactive map that makes it easier for users to explore the temple area. With this feature, users can select the location they want to visit by simply clicking a point on the map (see Figure 4).

Figure 4. View of Floor Plan

b. User Interface (UI) Design and Development

The user interface was designed to be easy to understand and easy to use. Some of the UI elements developed include (see Figure 5):

1) Tour Information: Provides a user guide on how to use the Virtual Tour according to the elements that are already available.
2) Quiz: Provides an interactive test to measure user understanding.
3) Location: Displays the location of The Tjoe Hwie Kiong Temple Kediri on Google Maps.
4) Floor Plan: Main navigation or commonly referred to as mini-map in Virtual Tour.
5) Content: Provides materials on traditional Chinese religion and beliefs.
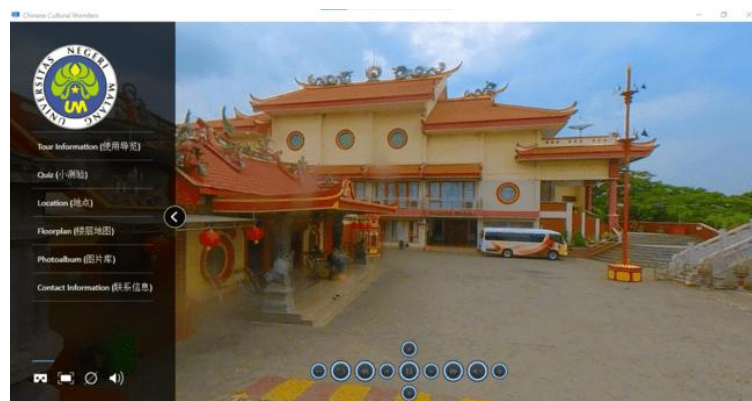6) Contact Information: Provides contact information for users who want to know more.

Figure 5. View of User Interface (UI)

c. Interactive Multimedia

To enrich the learning experience, the Virtual Tour is equipped with interactive multimedia that includes photos to display images of the temple's building elements in detail with pop up images that also include audio containing the mention of element names in Mandarin. There is also a video that provides visual documentation of cultural activities at the Tjoe Hwie Kiong temple.

d. Interactive Quiz

As part of the learning evaluation, the Virtual Tour is equipped with a Quizizz-based interactive quiz. This quiz is designed to measure the user's understanding of the material that has been presented in the Virtual Tour.

4. Preparation of Learning Materials

Learning materials are designed using the Canva application. In the material there are Learning Outcomes, table of contents, introduction, pictures of elements in the temple building and an explanation of each element in the temple building.

5. Preparation of Usage Guide

To help users understand how to use the application, a usage guide was created that contains navigation steps, feature explanations, and tips on exploring the Virtual Tour. This guide is packaged in text form to make it easier for users to understand.

Pasca-Production

The post-production stage in this research focuses on the evaluation process of Chinese Cultural Wonders learning media based on Virtual Tour which is carried out through a validation process by two validators, namely media experts and material experts. In addition, this media has also been tested by the respondents. Research data were obtained through instruments in the form of validation questionnaires and trial questionnaires.

Validation by material experts includes aspects of content suitability, contextuality, language use, and evaluation spread over four sub-materials, namely Religious History in Chinese culture, Religious Beliefs and Practices, Religious Rituals and Celebrations, and Religious Acculturation in Indonesia. Then the qualitative assessment explores input and suggestions and validators.

Table 1. Results of The Expert Validation Assessment of The Material

No	Sub Material	Aspect			
		Suitability of Content	Contextual	Language	Evaluation
1.	Religious History in Chinese culture	4	4	4	4
2.	Religious Beliefs and Practices	4	4	4	4
3.	Religious Rituals and Celebrations	4	4	3	3
4.	Religious Acculturation in Indonesia	4	4	3	3

Based on Table 1, the results of material validation show that the sub-materials of religious history and practical beliefs are categorized as very good in the aspects of content suitability, contextual, language, and evaluation. In the aspects of content suitability and contextual, the celebratory rituals and acculturation sub-materials were also categorized as very good. However, in the aspects of language and evaluation, the sub-material of celebratory rituals and religious acculturation was categorized as good. In addition, the validator provided several inputs, including the addition of Hanzi characters to a number of special terms related to Chinese culture and adjustments to the paragraph structure. The following presents the results of improvements based on the input from the validators (see Figure 6).
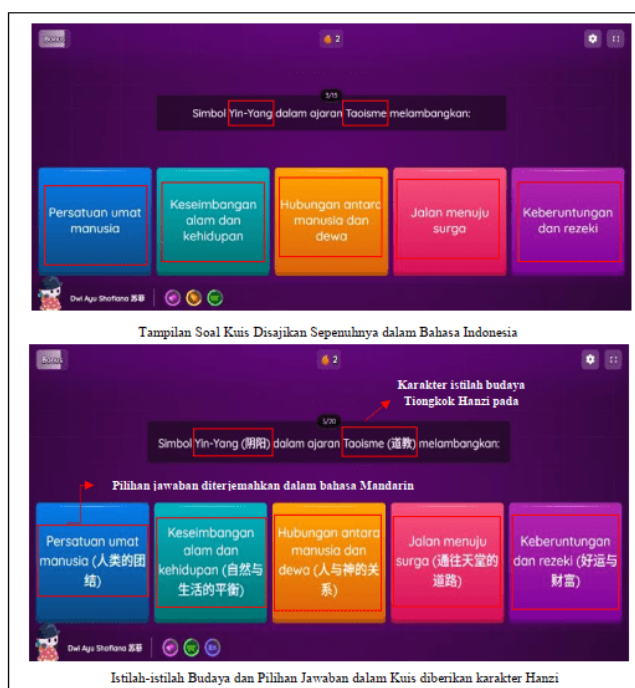

Figure 6. View of Additional Hanzi Characters

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In addition, the validator also provided input on the addition of richer cultural information, including explanations of Ulambana celebrations, Cap Go prayers, Chiu It, and culinary specialties in the context of Chinese and Indonesian cultural acculturation. The following are the results of the revision in accordance with the validator's input (see Figure 7).

Figure 7. View of Addition of Cultural Information

The next stage is the assessment of media aspects involving media experts on this application. Quantitatively, the assessment was carried out on aspects of visual appearance, text readability, navigation, relevance, and media usability, qualitatively exploring input and suggestions from validators.

Table 2. The Result of the Validation of Media Experts

Aspect	Statement	score			
		1	2	3	4
Visual Design	Attractive visual design and in accordance with theme of Chinese Culture				√
	Colors and visual elements in the media support material content			√	
	Media display in accordance with student characters			√	
Text Readability	The size and the type of the font are appropriate			√	
	The writing is easy to read			√	
	The language used is appropriate to the grammar and spelling				√
	The text color used is appropriate				√
Navigation	Navigation in media is easy to understand and use				√
	Media has interactive elements (click, direction, information, pop-up, etc.)				√
Relevance	Media helps students understand Chinese culture contextually				√

	Media presents the cultural atmosphere in real terms through images or panoramas	√
Media Usage	The media is easy to operate and use in the learning process	√
	Instructions for use can facilitate the learning process	√
	The media is easily accessible anywhere and anytime	√

The results presented in Table 2 indicate that several aspects received an "Excellent" rating. These include statements related to the attractiveness of the media's visual design, the accuracy of grammar and spelling, appropriate text color, ease of navigation, presence of interactive elements, contextual understanding of culture, realistic depiction through images/panoramas, and accessibility. Meanwhile, aspects such as visual elements, text readability, and usability specifically the use of color, suitability for student characteristics, font size and type, text legibility, ease of operation, and clarity of instructions were rated as "Good." In addition, the validator suggested adjustments to the font size. The original font size of 24-point for body text and 45-point for subheadings was revised to 16-point and 18-point. Respectively, ensuring consistency throughout the document (see Figure 8).

Figure 8. View of Adjusted Font Size

As shown in Figure 10 the font sizes have been modified in accordance with the validator's recommendations. The validator also advised changing the page orientation from portrait to landscape to enhance visual comfort.

Further suggestions included the addition of a comprehensive usage guide to improve the final media prototype. This guide is intended to facilitate user understanding of the application's features, especially those presented in Mandarin. Below is an image of the usage guide that has been refined according to the validator's instructions (see Figure 9).

Figure 9. View of Usage Guide

Following the validation and revision stages, the Chinese Cultural Wonders media was tested with students in a classroom setting. The researcher distributed the media access via a QR code, followed by a direct explanation, independent exploration by students, and a quiz conducted through the Quizizz platform. Students were then asked to complete a questionnaire via Google Form. The summarized results are presented below.

Table 3. Recapitulation of Students Trial Results

Aspect	Statement	Score			
		1	2	3	4
Ease of Use	Navigation is easy to understand and operate		3	4	22
	Instructions are clear and helpful		2	5	22
	Easily accessible anytime and anywhere		2	4	23
Visual Quality	Visually appealing and engaging		2	3	24
	Layout and transitions are consistent and neat		3	5	21
Language	Text is easy to read		5	4	20
	Language is easy to understand		2	7	20
Content	Content is easy understand		2	5	22
	Content is relevant to intercultural understanding		2	1	26
Cultural Context	Cultural information is clear and accurate		2	2	25
	Provides an immersive cultural experience		2	3	24
	Enhances understanding of Chinese culture		2	3	24
	Support independent cultural learning		2	5	22

The recapitulation results show that the ease of use aspect obtained a very good category with a percentage of 92%, although there were 8% of respondents who gave unfavorable ratings on the same aspect. In the display quality aspect, the excellent category was obtained with a percentage of 91.4%, while the unfavorable category reached 8.6%. Furthermore, the language aspect obtained an excellent category of 88%, while 12% of respondents rated this aspect as unfavorable. Finally, the material content and cultural contextual aspects each reached a percentage of 93% in the excellent category, with 7% of respondents giving unfavorable ratings on both aspects.

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In addition, at the trial stage students also provided a number of inputs, including the need to increase the volume of audio as well as media access constraints caused by the internet network. Nevertheless, the majority of students found the media interesting, easy to understand, and able to provide a visual experience that resembles a direct visit to a cultural location.

Based on the trial results, a comprehensive evaluation of the Chinese Cultural Wonders media was conducted. The evaluation shows that the media has met the criteria as an effective and interactive technology-based learning media. The high percentage score on each aspect shows that this media can be used as an alternative contextual learning to introduce Chinese culture to students. The use of 360-degree panoramic visuals, interactive pop-ups and audio narration provides an immersive learning experience. However, the evaluation also noted several things that need to be developed, such as improving audio quality, adding more varied cultural materials, and providing offline access to overcome internet network barriers. This evaluation is the basis for further development of the media to optimize it in supporting cross-cultural learning.

Discussion

The final product developed in this research is a Virtual Tour-based learning media entitled Chinese Cultural Wonders. This media is designed to increase students' understanding of Chinese culture in a contextual and interactive manner, especially in learning Cross-cultural Understanding of Chinese culture. The learning material is developed using Canva platform with an attractive visual approach. The materials include learning outcomes, table of contents, illustrations of building elements, and the addition of Hanzi characters to important terms in Chinese culture. The main material in this media covers religious topics in Chinese culture, including the history of the development of Confucianism, Taoism and Buddhism, religious practices of Chinese people, traditional rituals and celebrations such as Chinese New Year and Cap Go Meh, and acculturation of Chinese culture in Indonesia. Images of temple elements accompanied by contextual narratives enhance the culture-based learning experience. This material is not only presented in the form of reading and visuals, but also equipped with interactive Quizizz-based quizzes to measure student understanding directly. The quiz is designed using a multiple-choice format, and contains questions that test mastery of cultural vocabulary, understanding of context, and important terms featured in the media.

To present the material in a contextualized manner, a virtual environment was developed at the Tjoe Hwie Kiong temple in Kediri. This temple was chosen because it has historical value, distinctive architecture, and religious practices that reflect the acculturation of Chinese and local Indonesian cultures. The virtual environment was generated by capturing images with an Insta360 camera, which were then edited using Adobe Photoshop to ensure visual quality. The images were then integrated into the 3DVista application to build a complete Virtual Tour simulation. According to Figueroa et al (2025), the use of Virtual Tour in cross-cultural learning can increase engagement and enrich the learning experience of students. In making media through Virtual Tour, panoramic images are needed that can display images from all directions.

The panorama is arranged systematically, starting from the front of the temple, then heading to the side, the main altar, to the backyard, so as to produce a 360-degree panoramic image. Each panorama point is equipped with interactive hotspots, consisting of: (1) Image Pop-up, displaying the architectural elements of the temple accompanied by audio pronunciation of the name of the building elements in Mandarin and explanatory narration

in Indonesian. Thus, users can get information about the meaning and symbolism of temple elements through image and audio narratives; (2) Pop-up Video, containing documentation of cultural activities such as religious rituals and traditional performances. With the documentation, users can witness religious rituals and traditional performances organized by Tjoe Hwie Kiong Temple; and (3) Navigation Hotspots, which include a forward arrow icon, a back arrow icon, and a door to enter icon. These icons can be used by users to virtually move between areas. This kind of interactivity is important to create deep learning engagement, as Liu et al (2022) stated that interactive visualization can significantly strengthen the understanding of cultural concepts.

This media is equipped with Chinese music background sound that reinforces the atmosphere of Chinese culture (Y. K. Li et al., 2024), In addition, at the beginning of the media display, it provides a little planet effect, and the user interface (UI) provides a main menu that facilitates navigation. The user interface of this media is designed to be simple and functional, consisting of several main menus: (1) Tour Information provides a user guide; (2) Content contains learning materials in PDF format that can be downloaded; (3) Quiz in the form of an interactive quiz based on the Quizizz platform; (4) Location in the form of a temple location map integrated with Google Maps; (5) Floorplan in the form of a temple floor plan provided to facilitate users in exploring the temple area, which each predetermined location point can be accessed through one click on the available hotspots; and (6) Contact Information as a communication channel with media developers.

Despite the advantages of Chinese Cultural Wonders, it has some limitations. The reliance on a stable internet connection is a major challenge in accessibility. In addition, visual documentation has not covered the entire temple area due to limited shooting permits. To overcome these obstacles, the development of an offline version is a strategic step forward. Furthermore, expanding the content coverage to other cultural sites that reflect the acculturation of Chinese culture in Indonesia is also a future development opportunity.

Conclusion

Virtual Tour-based learning media entitled Chinese Cultural Wonders was created to improve cross-cultural understanding of China in a contextual and interesting way. This media integrates a 360-degree panorama of the Tjoe Hwie Kiong Temple in Kediri with interactive features such as hotspots, cultural information pop-ups, Quizizz-based quizzes, and visual teaching materials developed through the Canva platform. The contextual aspect in this media is realized through the presentation of a real cultural environment, namely a virtual panorama of the Tjoe Hwie Kiong Temple in Kediri. Students can explore the entire temple area, from the front view to the main altar and backyard, while getting cultural explanations in the form of narration, audio pronunciation in Mandarin, and video documentation. The contents of the material include religious history, belief practices, traditional celebrations, and the acculturation of Chinese culture in Indonesia, thus providing a cultural understanding that is connected to the real-life context. Meanwhile, interesting aspects are presented through aesthetic visual design, little planet effects, traditional music background sound, and a functional and easy-to-use interface. The existence of interactive hotspots, navigation features, and Quizizz-based quizzes also encourage active student involvement. This media also provides downloadable PDF materials for self-study.

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