

การออกแบบและพัฒนาตัวละครแอนิเมชัน 3 มิติ จากตัวละครยักษ์ในวรรณคดีไทยเพื่อส่งเสริมวัฒนธรรมไทย ในรายวิชาโครงการระดับปริญญาตรี

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บทคัดย่อ

การวิจัยนี้มีวัตถุประสงค์เพื่อ 1) ออกแบบและพัฒนาตัวละครแอนิเมชัน 3 มิติจากตัวละครยักษ์ในวรรณคดีไทยที่มีคุณภาพเพื่อส่งเสริมวัฒนธรรมไทย 2) ประเมินคุณภาพของการออกแบบและพัฒนาตัวละครแอนิเมชัน 3 มิติจากตัวละครยักษ์ในวรรณคดีไทยเพื่อส่งเสริมวัฒนธรรมไทย และ 3) ศึกษาความพึงพอใจต่อการออกแบบและพัฒนาตัวละคร 3 มิติจากตัวละครยักษ์ในวรรณคดีไทย กลุ่มประชากรและกลุ่มตัวอย่าง แบ่งเป็น 2 กลุ่ม คือ 1) ผู้เชี่ยวชาญด้านการออกแบบตัวละครและด้านเทคนิคการผลิตผลงานแอนิเมชัน 3 มิติ จำนวน 3 ท่าน และ 2) นักศึกษาระดับปริญญาตรีชั้นปีที่ 3 สาขาวิชาแอนิเมชัน เกม และดิจิทัลมีเดีย คณะวิทยาศาสตร์และเทคโนโลยี มหาวิทยาลัยราชภัฏบ้านสมเด็จเจ้าพระยา จำนวน 70 คน ที่ลงทะเบียนเรียนในรายวิชาออกแบบและพัฒนาแอนิเมชัน 3 มิติ ในปีการศึกษา 2567 โดยใช้ประชากรทั้งหมดเป็นกลุ่มตัวอย่าง เครื่องมือที่ใช้ในการวิจัยประกอบด้วย 1) แบบประเมินจากผู้เชี่ยวชาญเพื่อประเมินคุณภาพของการออกแบบและพัฒนาตัวละคร 3 มิติ แบ่งเป็น 3 ส่วน ได้แก่ การประเมินคุณภาพของข้อมูลพื้นฐานการออกแบบตัวละคร การประเมินการออกแบบตัวละคร และการประเมินคุณภาพเทคนิคการผลิตตัวละคร 3 มิติ และ 2) แบบประเมินความพึงพอใจต่อการออกแบบและพัฒนาตัวละคร 3 มิติ โดยเครื่องมือทั้ง 2 ชุดผ่านการตรวจสอบความสอดคล้องของเนื้อหากับวัตถุประสงค์ของแบบสอบถามด้วยดัชนีความสอดคล้อง (IOC) ซึ่งมีค่าตั้งแต่ 0.67 ถึง 1.00 การวิเคราะห์ข้อมูลใช้ค่าเฉลี่ยและส่วนเบี่ยงเบนมาตรฐาน ผลการวิจัยพบว่า 1) ได้ผลงานตัวละครแอนิเมชัน 3 มิติ "ชนัญชิตา" ที่พัฒนาขึ้นมีพื้นฐานจากตัวละครยักษ์ในวรรณคดีไทยเพื่อส่งเสริมวัฒนธรรมไทยที่มีคุณภาพ 2) ผลประเมินคุณภาพของการออกแบบและพัฒนาตัวละครแอนิเมชัน 3 มิติอยู่ในระดับสูงที่สุด

และ 3) ผลความพึงพอใจต่อการออกแบบและพัฒนาตัวละครแอนิเมชัน 3 มิติอยู่ในระดับสูงที่สุด

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Design and Development of 3D Animation Characters of Giants from Thai Literature to Promote Thai Culture in a Senior Project Course

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Abstract

This research aimed to: 1) design and develop a high-quality 3D animation character based on giant characters from Thai literature to promote Thai culture; 2) evaluate the quality of the design and development of the 3D animation character based on giant characters from Thai literature to promote Thai culture; and 3) study the satisfaction with the design and development of the 3D character based on giant characters from Thai literature. The population and sample were divided into 2 groups: 1) 3 experts in character design and 3D animation production techniques, and 2) 70 third-year undergraduate students majoring in Animation, Game and Digital Media, Faculty of Science and Technology, Bansomdejchaopraya Rajabhat University, who were enrolled in the 3D Animation Design and Development course during the 2024 academic year. The entire student population was used as the sample group. The research instruments included: 1) an expert evaluation form to assess the quality of the 3D character design and development, divided into 3 sections: the character design data evaluation, the character design quality evaluation, and the technical quality evaluation of the 3D character production; and 2) a satisfaction questionnaire regarding the design and development of the 3D character. Both instruments were validated using the Index of Item-Objective Congruence (IOC), with scores ranging from 0.67 to 1.00. Data were analyzed using mean and

standard deviation. The research findings revealed that: 1) the 3D animation character "Chananchida," based on a giant character from Thai literature and designed to promote Thai culture, was successfully developed with high quality; 2) the quality of the design and development of the 3D animation character was rated at the highest level; and 3) the satisfaction with the design and development of the 3D animation character was also rated at the highest level.

Keywords: 3D Character Animation, Giant, Thai Culture, Thai Literature

Introduction

In today's rapidly evolving digital world, the challenge of preserving Thai cultural identity among younger generations has become increasingly urgent. While youth are highly engaged with digital platforms, their connection to traditional Thai heritage is weakening. This inspired the researcher to explore how 3D animation particularly character design can be used as a modern, engaging tool to reconnect young audiences with Thai cultural narratives. Characters from Thai literature, such as Phisuea Samut, Totsakan, Nang Montho, and Nang Suphan Matcha, are powerful cultural symbols. However, presenting these figures in a format that resonates with today's audiences while preserving their original meaning requires a thoughtful balance between artistic creativity and cultural sensitivity, as seen in studies that reinterpret Thai literature through animation to enhance cultural relevance for younger audiences [1]. As noted in previous studies, effective character design should convey cultural identity through deeply rooted symbols and values [2].

This study responds to the problem of cultural disengagement by focusing on the development of giant characters from Thai literature in 3D animation. Giants in Thai epics symbolize strength, power, and virtue, making them ideal for visual storytelling. However, without careful design, the essence of their cultural meaning could be lost. Preserving traditional elements such as costumes, kanok patterns, and mythology is essential for maintaining cultural authenticity [3][4]. To enhance practical impact, this project defined specific post-production objectives, including 3D character modeling, the production of a short animation film, and the creation of a progressive tutorial book. These outputs not only showcase the creative process but also serve as learning tools that promote technical skill development and cultural appreciation.

This study applied a Project-Based Learning (PBL) approach to guide students through each stage of character creation from planning and research to design and development. PBL has been shown to enhance critical thinking, creativity, and collaboration, especially when paired with digital tools like 3D animation [5]. Students also gain a deeper understanding of cultural values through hands-on engagement with traditional content [2]. Ultimately, this

research demonstrates how combining Thai literary heritage with digital art can result in compelling educational media that supports cultural preservation. By developing 3D characters that are both meaningful and visually appealing, the project offers a sustainable model for using technology to foster national identity and pride among new generations.

Research Methodology

1. Type of Research

This research is experimental research, aimed at establishing guidelines or methods for practical application. It also analyzes and identifies deficiencies and issues in the work process to enhance efficiency.

2. Population and Sample Group

2.1 Expert Evaluators

3 experts were selected using purposive sampling based on their relevant expertise to evaluate the quality of the 3D character design and development. The experts were chosen according to the following qualifications

- (1) a university lecturer specializing in 3D animation design,
- (2) a professional character designer with industry experience in 3D production
- (3) a cultural expert with a background in Thai traditional literature and performance art.

2.2 Student Participants

The student participants consisted of 70 third-year undergraduate students majoring in Animation, Game and Digital Media at the Faculty of Science and Technology, Bansomdejchaopraya Rajabhat University. All participants were enrolled in the 3D Animation Design and Development course during the 2024 academic year. The entire population was used as the sample for assessing satisfaction with the 3D animation character.

3. Data Collection Instruments

3.1 The evaluation forms for experts to assess the quality of 3D character design and development, divided into three parts: character design

data quality evaluation, character design quality evaluation, and 3D character production technique quality evaluation.

3.2 The satisfaction evaluation form for the design and development of the 3D characters.

The research instruments were validated using the Index of Item-Objective Congruence (IOC), with scores ranging from 0.67 to 1.00, as assessed by 3 experts.

The statistics used for data analysis were the mean and standard deviation. The criteria for interpreting the mean scores are as follows:

- A mean score of 4.51 – 5.00 indicates the highest level,
- A mean score of 3.51 – 4.50 indicates high,
- A mean score of 2.51 – 3.50 indicates moderate,
- A mean score of 1.51 – 2.50 indicates low,
- A mean score of 1.00 – 1.50 indicates the lowest level.

4. Data Collection

The research on the design and development of 3D animation characters based on giant characters from Thai literature to promote Thai culture in a Senior project course involved the researcher outlining the method for data collection and the sequence of steps. The research was conducted according to the process illustrated in the following diagram.

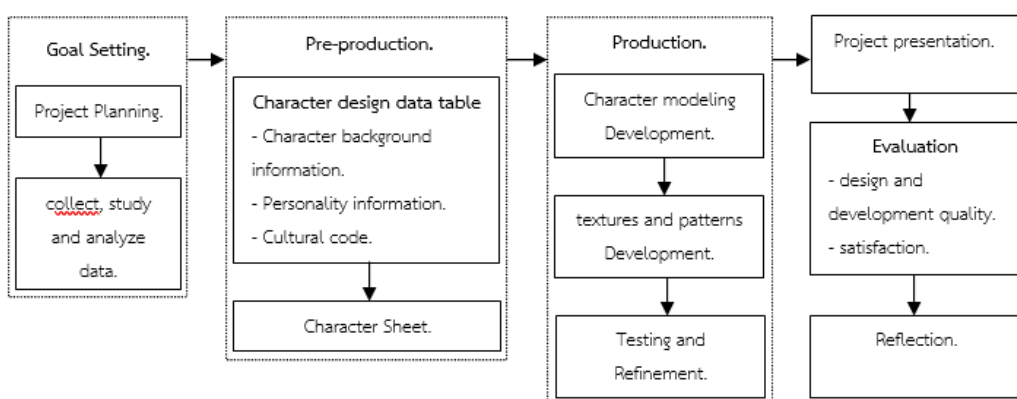


Figure 1 Research Process Diagram

4.1 Goal Setting Stage: Establish clear project objectives and goals by specifying the project's purpose, designing in alignment with the storyline, planning the workflow, creating a timeline, and setting short-term goals. Collect, study, and analyze data, focusing on creating unique characters and selecting specific software tools for character development.

4.2 Pre-production Stage: Start by developing a character design data table, which includes defining character background information, personality traits, and cultural codes, to create a Character Sheet.

4.3 Production Stage: Develop the prototype of the 3D character model, design accessories and clothing, create textures and patterns for the model, combine animation elements, and render images for initial quality testing.

4.4 Quality Assessment Stage: Submit the 3D animation character "Chananchida," developed from a giant character in Thai literature to promote Thai culture, to 3 experts. The evaluation is divided into three parts: the character design data assessment, the character design evaluation, and the 3D character production technique quality evaluation. The feedback is used to assess the design and development quality of the 3D animation character, which is then refined based on the experts' suggestions.

4.5 Satisfaction Assessment Stage: Present the 3D animation character "Chananchida," developed from a giant character in Thai literature to promote Thai culture, to a sample group of 70 individuals to evaluate their satisfaction with the design and development of the 3D animation character.

Research Results

1. Results of Designing and Developing a Character Sheet for 3D Animation Characters Based on Giant Characters from Thai Literature to Promote Thai Culture in a Senior project course.

The researcher studied the style, history, background, and structure of giant characters in Thai literature. The prototype characters from Thai literature were Nonthok, Totakan, and Thao Virulhok from the *Ramakien* epic. This was done by reviewing relevant documents, research, and consulting experts on giant characters in Thai literature to gather guidelines for designing

and developing the 3D animation characters. The researcher also reviewed relevant documents and studies on the concepts and theories of 3D model design and development, preparing character models and equipment that would be appropriate for 3D animation development. A table was created to analyze factors related to storyline and content design, which was used as the basis for character design information. The artistic aspects of character design were used to create a content analysis framework and 3D character design based on selecting options related to key analysis points for design and development.

Physical traits, personality, and important symbols for identifying the characters, as well as the equipment and weapons used by the characters, were studied to create background information for the characters. This information was then used to design the characters' personality traits, which were developed into a Character Sheet and later turned into a 3D character model.

The analyzed content was then used to create character design information, which included the storyline. The storyline was used to define the direction for creating character background information, such as the character's mission, profession, past life struggles, happiness, sadness, pride, family relationships, abilities, special powers, or weaknesses, ensuring that these elements aligned with the overall storyline. The background information was then used to define the character's personality traits, such as age, gender, shape, color, clothing, tastes, habits, and unique personality traits. These aspects were designed to align with the artistic dimensions of the character design, such as the use of color, lines, shapes, and aesthetics. The results of the content analysis were used to develop the storyline, the character's background, the design and development of the Character Sheet, the design and development of the animation character, and the development of the 3D model, as follows.

1.1 Character Background

"When Chananchida was a child, she was the last and only giant left, living alone in the forest. One day, she encountered a girl of the same age in a nearby city. Upon entering the city, she found herself to be strange, cursed,

and bound due to a prophecy and legend. In her rage, she destroyed the city and sealed her power, identity, and even her memories into a giant mask made from her own fangs. When she awoke, she had no memories and wandered aimlessly without a purpose."

1.2 Character Design Data Table

The researcher developed a character design data table for experts to evaluate the quality of the character design data, as shown in Table 1.

Table 1 Character Design Data Table for the Design and Development of 3D Animation Characters Based on Giant Characters from Thai Literature to Promote Thai Culture in the Undergraduate Project Course.

Character design	Name : Chananchida
Guidelines for Designing the Personality of the Main Character in the Role: Female Teenager / Age 1000+ Years	
Concept Idea The character design is inspired by the <i>Ramakien</i> , with prototype characters including Nonthok, Totakan, and Thao Virulhok. The design incorporates their distinctive costumes, along with the use of a half-mask from the traditional <i>Khon</i> giant masks, which are popular in contemporary designs. The character is a teenage girl with a ponytail, wearing traditional Thai attire. Her upper body is dressed in a <i>tabengman</i> chest wrap, adorned with intricate Thai-patterned jewelry, and she wears a <i>chaykhrang</i> or a wrap-around cloth at her waist. Around her neck, she wears a shackle, and Thai <i>kanok</i> patterns are painted on her cheeks.	
Concept	
1. Identity code	Female teenager / Age 1000+ years / Giant race / Female giant (Yakshini)
1.1 Physical appearance	- Thai female teenager. - Weight: 72 kg, Height: 170 cm. - Fair skin.

	- Hair tied in a ponytail, with bangs revealing her forehead, green hair with blue highlights. - Indigo eyes (purple). - Sharp teeth with fangs protruding from her mouth. - Thai <i>kanok</i> patterns are painted on her eyebrows and cheeks.
1.2 Clothing	Adorned with golden ornaments, restrained by a collar, wearing a green tabengman (chest wrap) with a crimson wrap-around cloth.
1.3 Personality	Moody, rebellious, isolated, unaccepted, angry, hurt
1.4 Emotional wound	Lost memories, blames herself for being a giant, does not accept her true identity
2. Objects	- Giant mask - Spear / Hammer (resembling a combination of a spear and a hammer, but replaced with a drum-like musical instrument)
3. Super power	Power of Virulhok, Weapon control of the gods, immortal
4. Culture code	- <i>Tabengman</i> (traditional chest wrap) - Double-sided hammer with drum faces on both sides (traditional thai instruments) - Thai patterns, <i>Kanok</i> design - Giant features, such as fangs

1.3 Results of Designing and Developing the Character Sheet

The details include illustrations of the character from various perspectives, expressions displaying different emotions, the character's clothing, weapons or equipment, and the colors used in the character development. Experts were then asked to evaluate the character design, and their feedback was used for revisions. The final design was developed into a 3D model based on the information in the Character Sheet. The design and development of the

"Chananchida" animation character was based on the analysis of the storyline, character background, and personality traits, which were compiled into the Character Sheet, as shown in Figure 2.

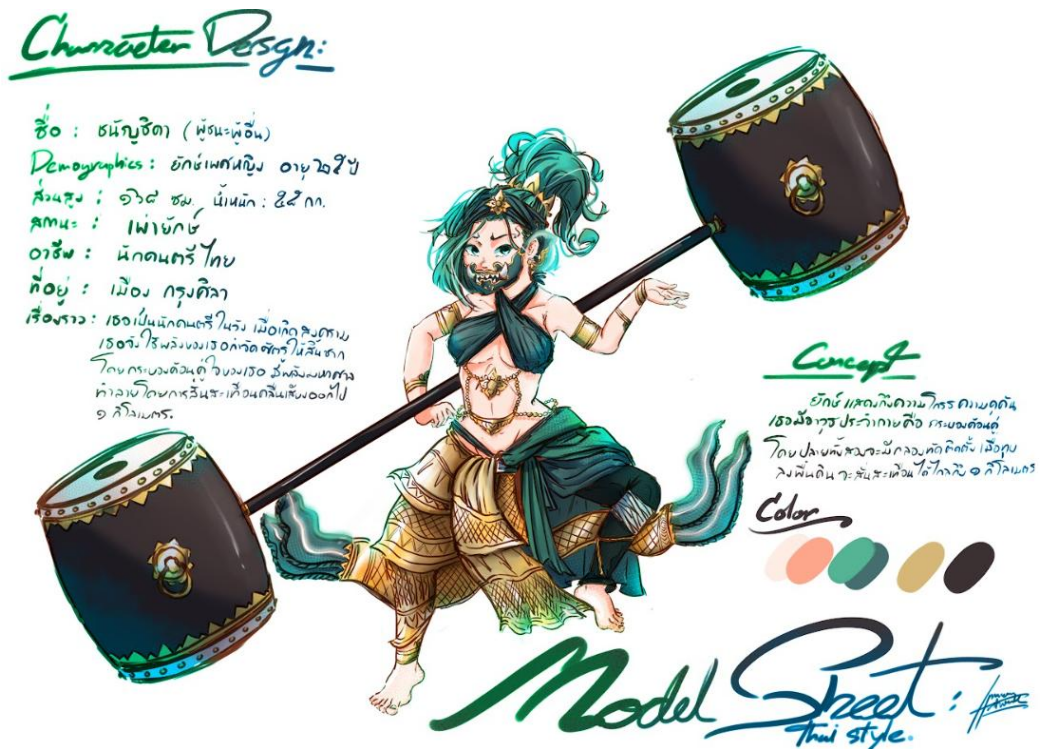


Figure 2 Character Sheet of the Character "Chananchida"

The various facial expressions of the character "Chananchida" are shown in Figure 3



Figure 3 Facial Expressions of the Character "Chananchida"

1.4 Results of the 3D Model Development

The design and development of the 3D animation character "Chananchida" was based on the information from the Character Sheet, which was used to create the 3D character model. Experts then evaluated the technical quality of the 3D character production, and their feedback was used for further improvements. The researcher summarized the design results based on the experts' recommendations to enhance the technical quality of the 3D character production, as shown in Figure 4.



Figure 4 Poses of the 3D Model in Motion

2. The evaluation form for assessing the design and development of the character for experts is divided into 3 sections: the character design data evaluation, the character design quality evaluation, and the technical quality evaluation of the 3D character production.

The tools were validated using the Index of Item- Objective Congruence (IOC) by 3 experts, with an average score of 0.83.

Table 2 shows the results of the experts' opinions on the evaluation of the design and development quality of the 3D animation character "Chananchida" by three experts. The evaluation is divided into three sections: the character design data evaluation, the character design quality evaluation, and the technical quality evaluation of the 3D character production (n=3).

Sections of assessment	$\bar{x}$	S.D.	Quality level
1. the character design data	4.39	0.50	High
2. the character design quality	4.61	0.50	Highest
3. the technical quality of the 3D character production	4.83	0.38	Highest

From Table 2, it was found that the experts' opinions on the evaluation of the character design and development quality, in terms of design data, had an overall average score of 4.39, which is at a high level ($\bar{x}=4.39$, S.D.=0.50). The quality of the character design had an overall average score of 4.61, which is at the highest level ($\bar{x}=4.61$, S.D.=0.50). The technical quality of the 3D character production had an overall average score of 4.83, which is also at the highest level ($\bar{x}=4.83$, S.D.=0.38).

3. The satisfaction results regarding the 3D animation character design for the sample group were obtained using instruments validated through the Index of Item-Objective Congruence (IOC) by three experts, with an average IOC score of 0.85.

Table 3 Satisfaction Results for the 3D Animation Character Based on Giant Characters from Thai Literature to Promote Thai Culture (n=70)

Evaluation list	$\bar{x}$	S.D.	Satisfaction level
The storyline aligns with the topic of development and design.	4.71	0.46	Highest
The storyline is complete and well-structured.	4.54	0.50	Highest
The storyline is engaging and captivating.	4.31	0.79	High
The character background aligns with the topic of development and design.	4.66	0.51	Highest
The character background is interesting and captivating.	4.57	0.50	Highest
The Character Sheet is consistent with the character information.	4.63	0.49	Highest
The Character Sheet is complete and comprehensive.	4.69	0.47	Highest
The 3D character model is appropriately aligned with the storyline.	4.73	0.51	Highest
The 3D character model has a unique identity and charm.	4.74	0.47	Highest
The character model accurately reflects the design information.	4.69	0.47	Highest
The proportions, shape, and colors of the 3D character are appropriate.	4.67	0.57	Highest
The textures and patterns of the 3D character model are complete and well-executed.	4.54	0.61	Highest
The 3D character model is well-suited to being a 3D animation character.	4.54	0.54	Highest
average	4.62	0.54	Highest

From Table 3, it was found that the overall satisfaction with the 3D animation character based on giant characters from Thai literature to promote Thai culture had an average score of 4.62, which is at the highest level ($\bar{x}=4.62$, S.D.=0.54).

Discussion

The results of this research indicate that the design and development of the 3D animation character "Chananchida," based on giant characters from Thai literature, were highly effective in promoting Thai culture. The average satisfaction score from the sample group was 4.62, which is classified as the highest level. This suggests that the character design, storyline, and cultural elements incorporated into the character were well-received by the audience. The alignment of the character's design with traditional Thai elements, such as the integration of the "kanok" patterns and traditional attire, contributed to the cultural appeal. The use of both modern and traditional elements in the character's appearance, such as the half-mask and the incorporation of contemporary fashion in her normal form, helped create a balance that made the character relatable to a younger audience while still preserving cultural heritage. This approach corresponds with Panyawanun's perspective, which emphasized that effective 3D character design must integrate visual form, cultural symbolism, and personality traits to achieve both artistic appeal and meaningful cultural representation [5].

Experts also rated the technical quality of the 3D model highly, with an average score of 4.83, indicating that the character was well-executed in terms of its visual design and technical aspects, such as textures, proportions, and animations. These findings are consistent with Kumpai et al., who found that students engaged in character design activities especially those inspired by interactive media such as computer games demonstrated improved modeling skills and creative output when developing 3D characters in animation courses [6]. The study also reported high levels of learner satisfaction, reinforcing the importance of learning through hands-on character development experiences that closely resemble real production processes.

The unique identity of the character, combined with a well-structured storyline and the thoughtful design of her background, further enhanced her appeal. These findings highlight the importance of combining traditional cultural elements with modern design techniques to create characters that are both culturally meaningful and engaging for contemporary audiences. This approach not only preserves cultural identity but also increases its relevance and appeal in today's digital media landscape. Additionally, the high satisfaction scores reflect the effectiveness of the design process and the importance of expert feedback in refining character development.

Conclusion

The results of this study demonstrate the effectiveness of designing and developing 3D animation characters based on giant figures from Thai literature in promoting Thai culture among younger generations. The character "Chananchida," created through a process grounded in cultural research, character design theory, and expert evaluation, was rated at the highest level in both quality and satisfaction assessments. These findings underscore the significance of integrating traditional Thai design elements—such as the use of “kanok” patterns, traditional attire, and symbolic cultural traits—with contemporary digital design techniques to create characters that are both culturally meaningful and relatable to modern audiences. This approach aligns with the work of Worasamutprakarn, who highlighted the importance of infusing Thai cultural inspirations into animation character design to preserve and promote cultural heritage [8].

The development process, which applied project-based learning (PBL) strategies, enabled students to engage in every stage of character creation, fostering skills in critical thinking, creativity, and technical execution. The use of a structured Character Sheet guided the design process, ensuring that personality, background, and narrative coherence were preserved throughout the 3D modeling and animation phases. Expert feedback contributed to the refinement of both visual and technical components, and the high satisfaction ratings from students confirmed the effectiveness of the final product.

In conclusion, this research affirms that the fusion of cultural content with modern animation technology can be a powerful medium for cultural communication. It not only preserves the essence of Thai literary heritage but also inspires student engagement and learning in the field of animation design. The methodology and results of this study can serve as a model for future educational and creative initiatives aimed at cultural preservation through digital media.

Suggestions

1. Creation of Cultural Learning Media

The designed character and its storyline can be expanded into animated content, interactive media, or digital books to promote Thai culture among youth through modern platforms.

2. Commercial Adaptation into Multimedia Products

The developed character and concept can be adapted into commercial multimedia formats such as animated shorts, VR/AR experiences, or mobile games that highlight Thai identity, potentially contributing to the creative economy and soft power.

3. Reference Model for Character Design in Creative Industries

The design framework can serve as a reference for creators and studios aiming to produce culturally inspired 3D characters for animation, games, or promotional content with Thai identity.

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