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Using 2D Animation with Interactive Elements to Create a Culturally Interesting Web Experience

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USING 2D ANIMATION

WITH INTERACTIVE ELEMENTS TO

CREATE A CULTURALLY INTERESTING WEB EXPERIENCE

by

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ABSTRACT

Despite efforts to introduce Vietnamese culture to a global audience, most Vietnamese folktales and legends stay rooted within the country. When looking for examples of animated or interactive media, related to Vietnamese culture, the results often fall short. This project exists to fill that deficiency and teach aspects of Vietnamese culture through interactive storytelling.

This project aimed to retell a culturally significant Vietnamese tale, the Legend of Hoan Kiem Lake, while providing a visually stimulating and interactive web experience to those not familiar with Vietnamese culture. The project also aimed to determine if an interactive website can be more informative through engagement, as opposed to a static web presence. The project utilized Webflow as the bridge to integrate illustration and animation into an interactive web experience. “The Tale of Hoan Kiem Lake” started off as a passion project and remained such until the end.

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INTRODUCTION AND BACKGROUND

For the last decade, web animation has evolved more than ever and is being used widely for various purposes, from educating and explaining abstract concepts to promoting and branding. While there are many studies addressing the effectiveness of using web animation and interactive websites in an academic setting, there have been few diving into the potential of using web animation's intractability to promote cultural values. This capstone project aims to explore more about such a possibility.

For research purposes, this paper surveys the different forms of media that are often used to introduce cultural heritage, the effects of combining moving images and text compared to static elements, and the potential of using a digital multimedia option to explore a more engaging way to tell a story.

The project started out because of my personal experience with the lack of interactive websites, or interactive experience in general, that promotes cultural values without being either too information-heavy or not educational enough. Through further research, I find out that web designers, who want to create a visually stimulating website to offer an exploration of cultural heritage, often shy away from interactive web experiences as they are complex in nature and demand advanced knowledge in computer coding. However, in the last few years, there have been more and more web design tools that provide the experience of designing a personalized website with little to no prior knowledge (e.g. Wix, GoDaddy, Squarespace,...). The rise of these tools encourages me to create a website that can produce an enchanting visual journey while still being educational. Hence, I will be using Webflow as the main tool to construct a website as well as the transitions between pages for a parallax scrolling web experience.

Setting out for this project, I prioritize looking to answer the following research questions:

R1. How effective is using an interactive scrolling web experience compared to static websites in conveying information?

R2. What are the effects of interactive web animation on learning in teenagers?

R3. Is it possible to encourage teenagers to learn more about a foreign culture using only web animation and interactive elements?

PROBLEM STATEMENT

This interactive web animation's main purpose is to propose an opportunity for local teenagers to learn more about a foreign language through a visually stimulating and interactive web experience. Through this limited exposure to an animated culturally significant story, the project aims to encourage teenagers to engage and learn more about a foreign culture in a fun and charming way.

INITIAL DRAFT REFLECTION

Initially, the project was going to be an animated retelling of Hoan Kiem Lake, a Vietnamese legend taking place during the war against the Ming dynasty in the early 1400s. This animation was planned to be done using mostly hand-drawn frames, and other Adobe programs (After Effects, Photoshop,...) for effects and compositions. Through research and personal experience with the Vietnamese folktale and history, the Legend of Hoan Kiem Lake successfully captured the essence of Vietnamese culture while still maintaining the grandiosity of the historical significance.

The Legend of Hoan Kiem Lake consisted of three different settings: 1) the chance discovery of the legendary sword, 2) the gifting of said sword to the army of General Le Loi, and

3) General Le Loi returned the sword to its rightful owner, Hoan Kiem Lake. Using the movements and visuals of a 2D animation, the project aimed to express what traditional oral storytelling is incapable of.

After consultation and further research, this initial idea was replaced with a revised draft that promoted more interactivity but remained somewhat animated.

INITIAL ASSUMPTIONS

Although there has been plenty of research comparing the effectiveness of using digital storytelling and traditional documents to convey information, little is known about the connection between interactive storytelling and static websites. To find out more about this, the project provides an option to read the embedded information in related websites that are mainly static and records the attention span difference, if any, when going from one experience to another. The initial assumption is that the interactive scrolling web experience is more effective in conveying information but is less effective in presenting information.

Since interactive web animation is fairly alien to most researchers, this project aims to be one of the first to explore the effects of interactive web animation on teenagers' learning in this digital age, where most of the media and information exist on the internet. As there has not been sufficient research prior to this, I do not know what to expect as the outcome of this project.

While there are many researchers studying the potential benefits of encouraging young children to learn about a foreign culture, there are not many focusing on teenagers who are transitioning into adults. Furthermore, as mentioned in R1 and R2, since the combination of both web animation and interactive elements still have much to explore, there is not much to learn from previous research about their effects on learning in teenagers. The ideal outcome is that it is indeed possible to encourage teenagers to learn more about a foreign culture using only web animation and interactive elements.

LITERATURE REVIEW

1. Introduction to Web Animation

1.1. History and Analysis of Web Animation

Using motion to create an animated image sequence, web animation is a tool generally used to draw attention to marketing messages, and to visualize different stages of a complex process or idea, while still maintaining a natural and fluid transition as users scroll through the website. Moreover, web animation is considered one of the multimodal options by combining both text and graphic elements, used mainly for web navigation and digital storytelling.

The first form of web animation was implemented in Jeffrey Zeldman's Batman Forever website in 1995 as a GIF of Batman. As a result of the website's roaring popularity, more and more web designers and developers looked into ways to incorporate GIF animation as " a quirky, eye-catching element into their websites." However, with the dial-up and slow internet speeds at the time, GIFs were considered "bandwidth hogs."

As the internet becomes more high-speed and common, GIF animation in websites gradually died down and was eventually replaced by a smoother form of animation with higher frame rates: Flash. This big web animation was first announced by Macromedia in 1996 along with their web plugin and accompanying frame-based animation tool. With the capabilities to include audio, animation, video, and interactivity in the web experience, Flash was said to help push the Internet forward. Unfortunately, Flash animation wasn't intended to be responsive; it didn't function properly on different devices and was ultimately dropped from all popular mobile devices, with the first being Apple.

"While the file size was relatively small, Flash was not well-optimized and ended up CPU hungry, which was a problem on mobiles as well." (Gregurec, 2016)

1.2. Web Animation and Its Purposes

In the beginning, web animation was mainly used as an attention grabber for graphic-focused websites. In the contexts of Web applications, television advertising, and educational multimedia, computer-based animation is increasingly making its mark as a basis for effective information delivery (Weir et al., 2011). As Flash animation gained more traction, web animation gradually grew more popular with internet users. Evident by the increased demand for more television animation using techniques for pre-existing animation for websites, thus creating a new visual style altogether. One prevalent example of this new "crude" animation style was John Kricfalus's "The Goddamn George Liquor Program" in 1997, an animation for adults distributed strictly on the internet.

"Collectively, they explain a complex and layered transition from "kid-vid" cartoons to short and crude forms of sophomorically humorous animation produced specifically for an adult audience" (Baldwin et al., 2017).

As time went on and technology evolved drastically, interactive web animation is being implemented more and more academically, mainly for scientific courses that need visuals to explain difficult and abstract concepts. For example, Kodali founded the interactive website www.Capnography.com in the hope to use Macromedia programs to facilitate an "easy understanding of complex principles." The site includes animated capnograms as true to those normally seen in operating rooms, as well as a forum for constructive exchanges and critical ideas. The user experience involves presenting the

highlights of capnography's clinical applications, an encyclopedia of capnograms, tips on using capnography, and a capno-quiz designed to test one's understanding of the topic. "The amazing feature of web technology is that the desirable changes or ideas can be implemented immediately, unlike textbooks or scientific journals" (Kodali, 2001).

Another example of educators using web animation as a supplement tool for lectures is HistoQuest. The development team consists of a content expert, medical illustrator, programmer, and graphic designer who all have input into the development and production of animations for the Web-based course (Brisbourne et al., 2002). During the planning of the website, Brisbourne's team considered different animation programs available at the time and decided that using Macromedia plug-ins, or Flash animations, worked best with what they intended. In an informal survey conducted in September of 2000 testing the effectiveness of HistoQuest, the team found that first-year medical students at the University of Alberta strongly preferred the Web-based course featuring animation to the traditional lab-lecture format.

1.3. Using Interactive Web Animation to Convey Information

To create an interactive web animation, the project is using embedded elements in illustrated segments that become visible once hovered with the mouse. An embedded element refers to an element that is "embedded," or in other words, incorporated into the web page. The element is inserted into the content of the existing webpage, and as a result, it affects whatever is located before, after, and around it (PSAI, n.d.)

There are a few reasons behind the decision to use interactive web animation as this project's medium: ease of use and benefits for long-term learning. While there has been a

lot of research done on the latter, few mention the former; this lack of sources is also one of the goals this project aims to cover.

A series of experiments done by Wright and her team confirmed that compared with static diagrams, animation increased readers' willingness to study a variety of graphic genres. An experiment done later by the same team also found a strong connection for picture memory when the illustrations were animated. As the project mainly focused on introducing a culturally significant story through animated illustrations, this finding furthers the project's chance of effectiveness.

It is important to note that for digital presentation, readers tend to take time to inspect the graphics "if visually salient markers were included within the text denoting that explanatory information was available rather than being told to click on words whose meanings were unfamiliar" (Black, Wright, Black, & Norman, 1992). Consequently, one strategy that this project will employ involves having users hover and discover informational elements that are embedded into the graphics rather than encourage self-exploration during the web experience.

According to a paper by Sawert and Riempp in 2019, viewers are drawn more intensively into the stories and topics through the use of multimedia mediums, in this case, an interactive web animation. Additionally, they concluded that incorporating multimedia options into digital storytelling is "particularly interesting from a cognitive-psychological point of view." It was also found that the human brain processes and retains information far more effectively when multiple, different senses are addressed simultaneously. In addition, the term storytelling also depicts the way the media is

consumed, by scrolling. As a result, for the user experience, web animation focuses more on parallax scrolling than static web pages.

Furthermore, research showed that about "90% of information processed by the human brain refers to visual information," and that "images are processed 60,000 times faster than text" (Heimann and Schütz, 2017). In addition, combining both moving images and audio represents "a medium which lends itself to engaging narratives" (Samčović, 2022).

"When people watch videos, it relaxes them while giving them control of both their cognitive area as well as their feelings" (Cavanagh, 1992).

Web animation has also been well-recognized within academic settings for its ability to "help students visualize complicated biological processes and concepts" (Veselinovska and Stavreva, 2020). Compared to static text and images, animations facilitate understanding of complex spatial and temporal relationships that are challenging to visualize otherwise. Education research also supports the claim that animations can lead to increased student learning and has come to identify features that make animations effective. Further research has shown that by using well-designed visual tools, students can digest large amounts of information in a relatively short period of time, as well as construct their personal visualization of an abstract concept or a process (Kraidy, 2002; Linn et al., 1996).

2. Cultural Visualization and Presentation in New Media

2.1. Movies and Television Animation

As cultural values can only be presented and comprehended through traditions and behaviors in specific contexts, movies and animation are some of the more popular

ways that are able to capture and emulate these. According to Jia and her discussion on Chinese cultural values observed in movies, "the thought of "Love and Charity" exists in different spiritual fields such as politics, philosophy, ethics, and art and it is the organic integral part of the Chinese core value system" (2014). In many examples that she mentioned in her research, Jia referenced Wu Xia
(Martial arts, 2011) and how different scenes in the movie help illustrate and highlight the Chinese cultural value of "the will of Heaven."

"It was thundering and lightning when the villain fights [sic] a duel with Liu Jinxi (the protagonist), finally the villain was hit by a lightning. This seemingly accidental ending shows the will of Heaven that villains are doomed to destruction."

While traditional storytelling encourages mental visualization, 2D animation utilizes the impracticality of the motions to promote emotional reactions.

"Because natural laws do not bind an animation to interpret motion, there are no restrictions on motions that cannot be performed in the actual world or captured in a live-action film. So, in the animation, the characterizations may be quite loose and give up a lot of possibilities for investigation (Ardiyansah, 2012)."

A study by Tira Nur Fitria using culture-based animation, specifically Indonesian Local Culture in Animation Series 'Si AA,' explores the connection between preserving cultural and traditional values through animation and the general audience's appreciation of said method. Fitria's study mentions other precedents that have successfully incorporated traditional values using 2D animation. One of the examples mentioned was written by Shang (2015) discussing the use of Chinese traditional cultures, such as ink

painting, paper cutting, Chinese opera, shadow puppetry, and Chinese architecture, which are used in the creation of animated films.

2.2. Digital Games

Another popular medium to incorporate cultural values in an engaging way is digital games; this section discusses the research findings of different game genres and how effective they are at educating the players about the games' cultural values. Most of the games included in the cited papers were made with educational intentions in mind, while the other few articles also take into account the games favored by the papers' respective audiences.

In a study conducted by Mortara et al., games for cultural heritage often include additional multimedia content whose goal is to provide more in-depth information (e.g., History of Place, Africa Trail, Expedition-The Game, and others). This project also strives to achieve this balance between fun, appealing visuals and multimedia content that allows for further explanation of the context.

"Empathy with a game character and plot may be very helpful for understanding historical events, different cultures, other people's feelings, problems, and behaviours, on the one hand, and the beauty and value of nature, architecture, art and heritage, on the other one."

It is worth noting that Mortara mentioned the ability to maintain a balance between such values across a variety of topics is difficult to achieve, even in games. However, there is a significant example that fulfills both good game design and valuable learning material introduced in Mortara's paper, Playing History. The game, in fact, has been "grounded on accredited pedagogical theories for the formal education context, and

the suggested lesson plan is based on an experience-oriented approach inspired by David A. Kolb's theory of learning." As a result, Playing History is largely diffuse; it has also been adopted by more than 70 schools only in Denmark.

Another research done by Malegiannaki and Daradoumis showed that by using spatial games, the audience is often offered an overall interaction with cultural content through exploration. As for the genre, adventure game design is mostly chosen to satisfy this need while offering greater challenge, one of the basic game elements (Garris et al., 2002). Using a pure role-playing or simulation game design, on the other hand, facilitates a first-person interaction with roles or processes of cultural interest.

"The use of complex storytelling in spatial games for culture constitutes one of the axes that can be further exploited and evaluated. This inherent cultural information element can keep players concentrated on the narrative content of the game and discourage the mechanical carrying out of learning tasks (Akkerman et al., 2009)."

It is important to remember that, although impressive in visualization and delivery, digital games still have their limitations compared to traditional games. In an experiment where preschool children are exposed to traditional games in the hope to promote socio-cultural values, it is concluded that traditional games taught the necessary rules of social life at an early age which are often neglected in the virtual world (Yeniasır and Gökbulut, 2019). As intangible cultural heritage elements of society, traditional games ensure cultural transition and preserve and sustain local-nation cultures (Öğüt, 2010). Keeping this in mind, this project hopes to promote traditional values through the chosen visual style inspired by the familiar pop-up storybooks and paper cut-outs.

TARGET AUDIENCE

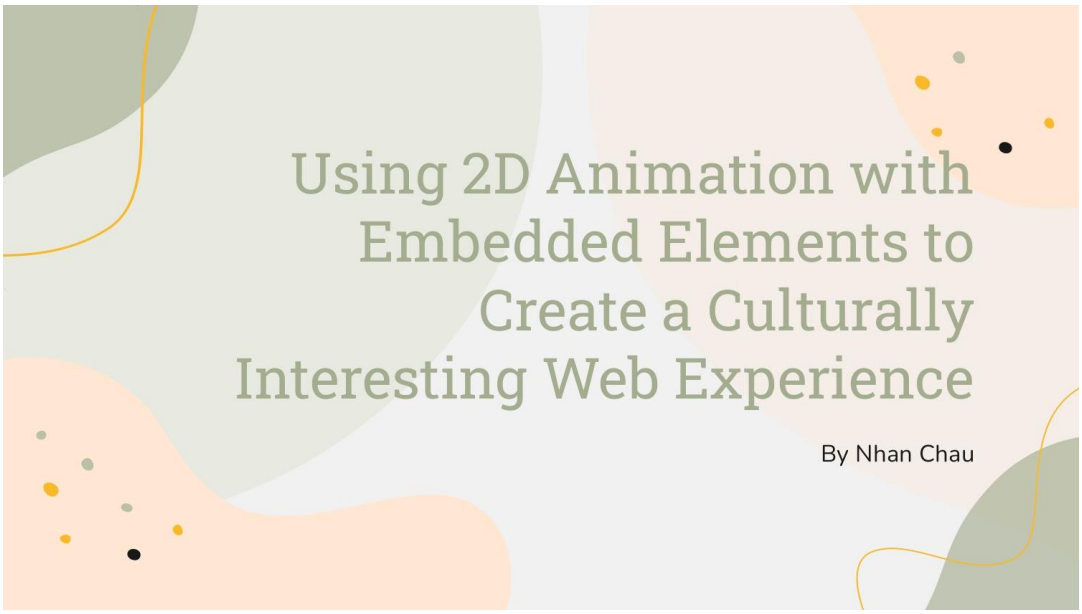
The target audience is primarily teenagers, aged 17–19; regardless of sex, gender identity, nationality, and preference of studies; who are pursuing education from high school senior to college sophomore; familiar with the digital web; and are interested in learning about different cultures and stories around the world. The reason for this age group is the fact that most of these teenagers are transitioning into higher education or are still fitting into the college setting, making the concept of exploration and discovery of new information exciting and appealing, or in this case, the chance to interact with an animated story from a foreign culture.

SCOPE

The project mainly focuses on the ability to retell a culturally significant story in an appealing and interactive way, as well as introducing the use of no-code web-building tools to further the intractability of the web experience. For the project production, this web animation also involves research and practice in various fields, such as visual design, graphic design, UX and UI design, and animation.

Furthermore, as the project leans more towards educational than purely entertaining, I hope to be able to implement the web experience into an academic setting to help students learn more about different cultural stories and/or values around the world in a fun and engaging way. I also hope to encourage others who are interested in creating a memorable web experience to showcase their cultural heritage to utilize web builder tools such as Webflow.

FIRST PRESENTATION SLIDES



Slide 1

Slide 2

Research Questions

1. How effective is using interactive scrolling web experience compared to static websites in conveying information?
2. What are the effects of an interactive web animation on learning in teenagers?
3. Is it possible to encourage teenagers to learn more about a foreign culture using web animation and interactive elements?

Slide 3

Project Goals

Creates a visually stimulating web experience.

Encourages like-minded creators who shy away from coding.

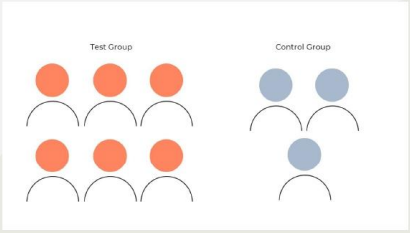
Introduces an aspect of a foreign culture.

Compares and contrasts effectiveness between storytelling methods.

Slide 4

Project Method

1. Control group vs. Experimental group
2. Post-event survey questions:
   a. Attention retention
   b. Information retention
   c. Overall satisfaction
   d. Interest Check



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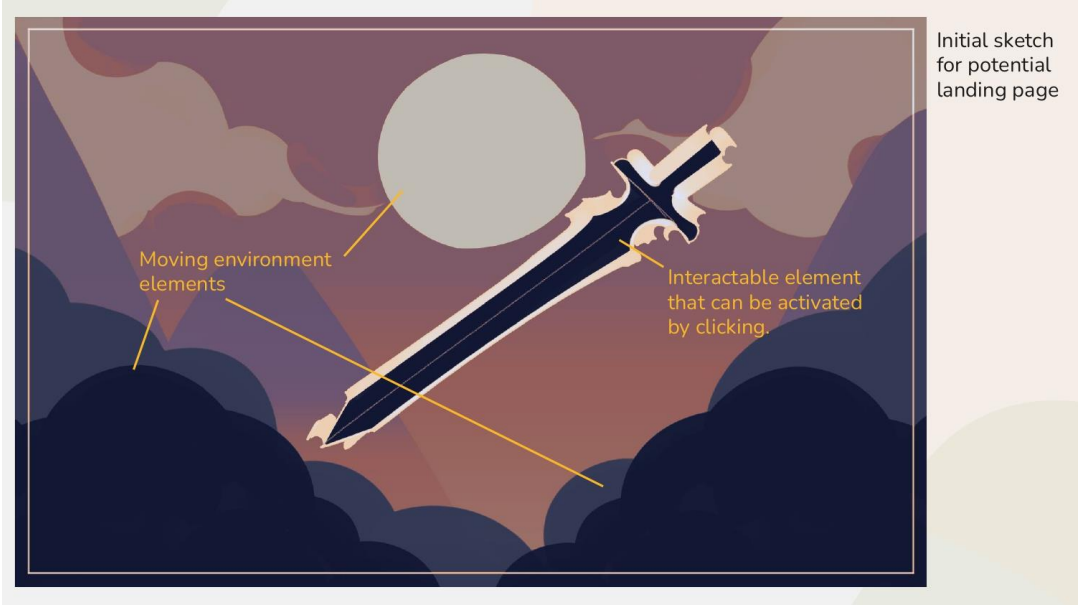
Storyboard sketches for tentative important scenes

Slide 6



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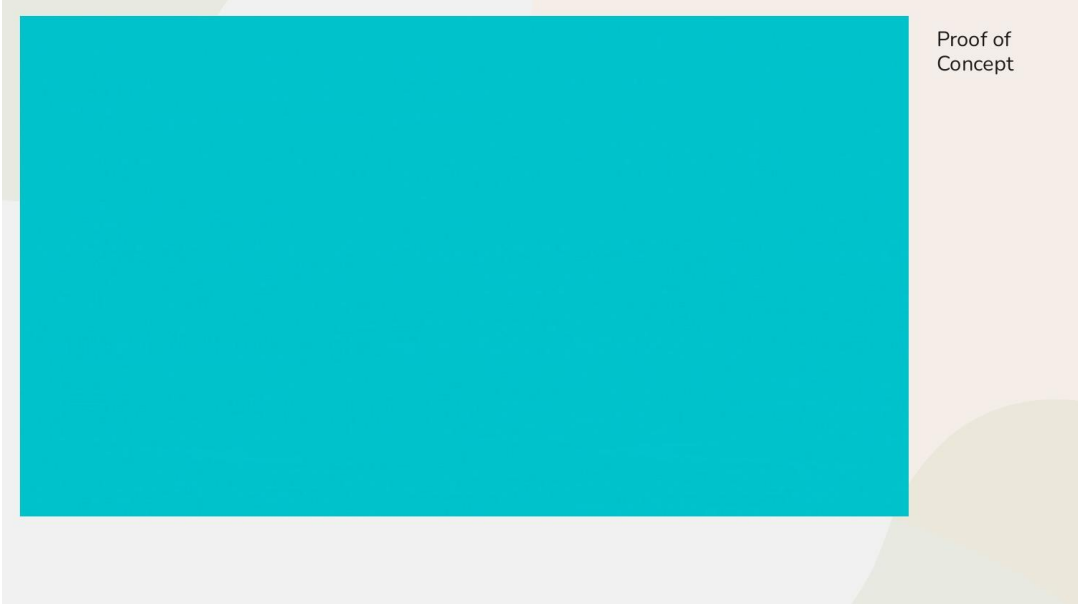

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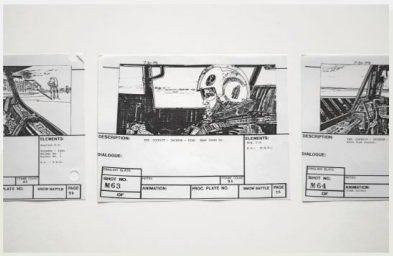
Project Deadlines

1. **Planning** (November 2022)
2. **Storyboard** (mid January 2023)
3. **Animating** (mid March 2023)
4. **Visual Review** (late March 2023)
5. **Implementation** (April 2023)



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Challenges

1. Limited time (6–8 weeks).
2. Webflow unfamiliarity.
3. Adjustments to the parallax UI.
4. Reaching out to local schools.

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TIMELINE

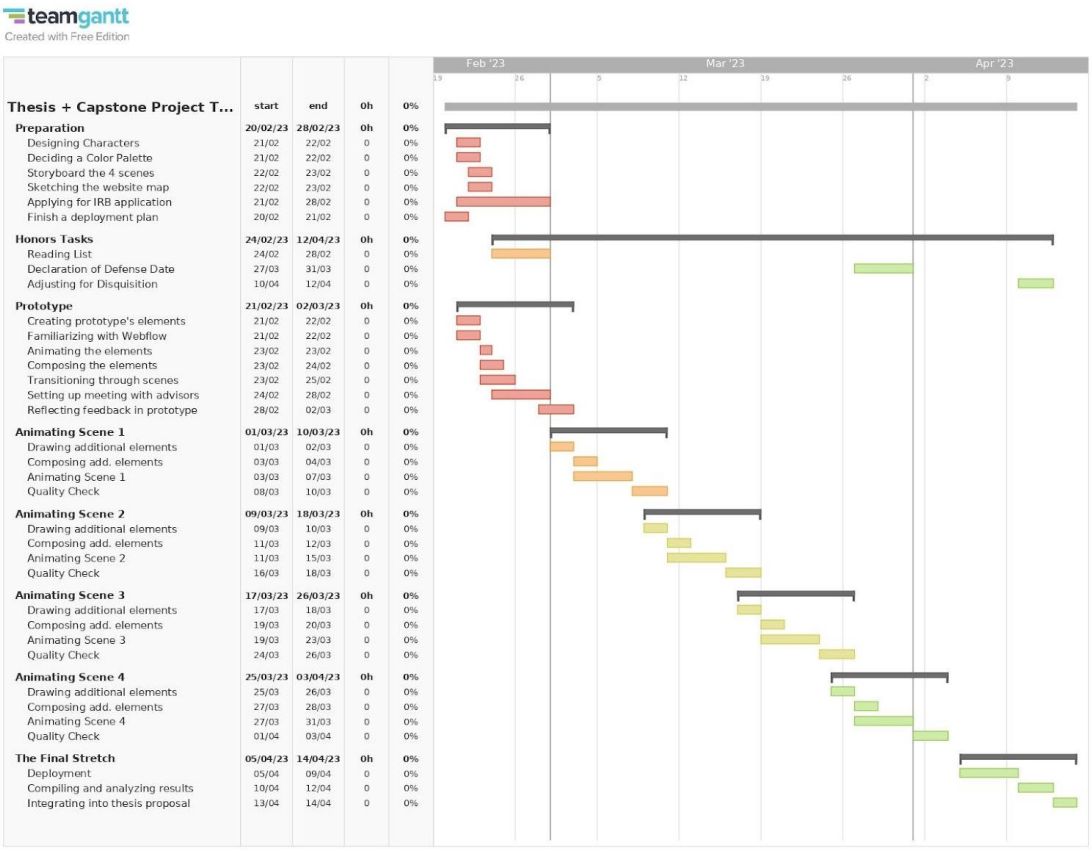
This project was carried out in five main stages: Planning, Storyboarding, Animating, Visual Review, and Implementation. The timeline is better visualized using Fig. 1.

Planning (September 2022–November 2022): This stage involves extensive research into different fields, including web design, storytelling, animation, and graphic design. The visual style and general user experience will also be decided during this stage. There should be early sketches of the character concepts, and important scenes, as well as the potential website layout and composition.

Storyboard (December 2022): The second stage will decide how the website will most likely look by the end of the project and how the story is paced out for a meaningful interactive experience. Storyboards will be done using Clip Studio Paint and other means of traditional sketching.

Animating (January 2023–mid-March 2023): This stage takes up the most time of the project, considering it involves hand-drawing different background elements, as well as the characters and other special effects. Animating also means using Webflow for the transition and embedment of information into chosen illustrated objects.

Visual Review (late March 2023): After animating, the animation will be sent to the project advisor and a selected group of New Media students for review and feedback. Final adjustments will be made during this stage.



Thesis + Capstone Project T...	start	end	0h	0%
Preparation	**20/02/23**	**28/02/23**	**0h**	**0%**
Designing Characters	21/02	22/02	0	0%
Deciding a Color Palette	21/02	22/02	0	0%
Storyboard the 4 scenes	22/02	23/02	0	0%
Sketching the website map	22/02	23/02	0	0%
Applying for IRB application	21/02	28/02	0	0%
Finish a deployment plan	20/02	21/02	0	0%
Honors Tasks	**24/02/23**	**12/04/23**	**0h**	**0%**
Reading List	24/02	28/02	0	0%
Declaration of Defense Date	27/03	31/03	0	0%
Adjusting for Disquisition	10/04	12/04	0	0%
Prototype	**21/02/23**	**02/03/23**	**0h**	**0%**
Creating prototype's elements	21/02	22/02	0	0%
Familiarizing with Webflow	21/02	22/02	0	0%
Animating the elements	23/02	23/02	0	0%
Composing the elements	23/02	24/02	0	0%
Transitioning through scenes	23/02	25/02	0	0%
Setting up meeting with advisors	24/02	28/02	0	0%
Reflecting feedback in prototype	28/02	02/03	0	0%
Animating Scene 1	**01/03/23**	**10/03/23**	**0h**	**0%**
Drawing additional elements	01/03	02/03	0	0%
Composing add. elements	03/03	04/03	0	0%
Animating Scene 1	03/03	07/03	0	0%
Quality Check	08/03	10/03	0	0%
Animating Scene 2	**09/03/23**	**18/03/23**	**0h**	**0%**
Drawing additional elements	09/03	10/03	0	0%
Composing add. elements	11/03	12/03	0	0%
Animating Scene 2	11/03	15/03	0	0%
Quality Check	16/03	18/03	0	0%
Animating Scene 3	**17/03/23**	**26/03/23**	**0h**	**0%**
Drawing additional elements	17/03	18/03	0	0%
Composing add. elements	19/03	20/03	0	0%
Animating Scene 3	19/03	23/03	0	0%
Quality Check	24/03	26/03	0	0%
Animating Scene 4	**25/03/23**	**03/04/23**	**0h**	**0%**
Drawing additional elements	25/03	26/03	0	0%
Composing add. elements	27/03	28/03	0	0%
Animating Scene 4	27/03	31/03	0	0%
Quality Check	01/04	03/04	0	0%
The Final Stretch	**05/04/23**	**14/04/23**	**0h**	**0%**
Deployment	05/04	09/04	0	0%
Compiling and analyzing results	10/04	12/04	0	0%
Integrating into thesis proposal	13/04	14/04	0	0%

Fig. 1

STORYBOARD

The project's initial storyboard (Fig. 2) included four illustrations of important scenes throughout the story. This storyboard served as the foundation to develop a more detailed storyboard later. During the first semester of the project, I also created a tentative title card for the project (Fig. 3) depicting a floating sword.

The project's working storyboard (Fig. 4–6) was a collection of illustrations of different scenes in the story. Each scene was initially planned to be at least 1080x5760, which can be seen in the storyboard as the long frames where the illustrations were contained. However, due to the number of hand-drawn elements that entailed, the final product involved scenes with various heights. There was a total of 16 illustrations, or scenes, in the storyboard with arrows indicating the desired animation and interaction. For example, the arrows outside the frames indicated that the scene transitioned by scrolling down.

Fig. 2

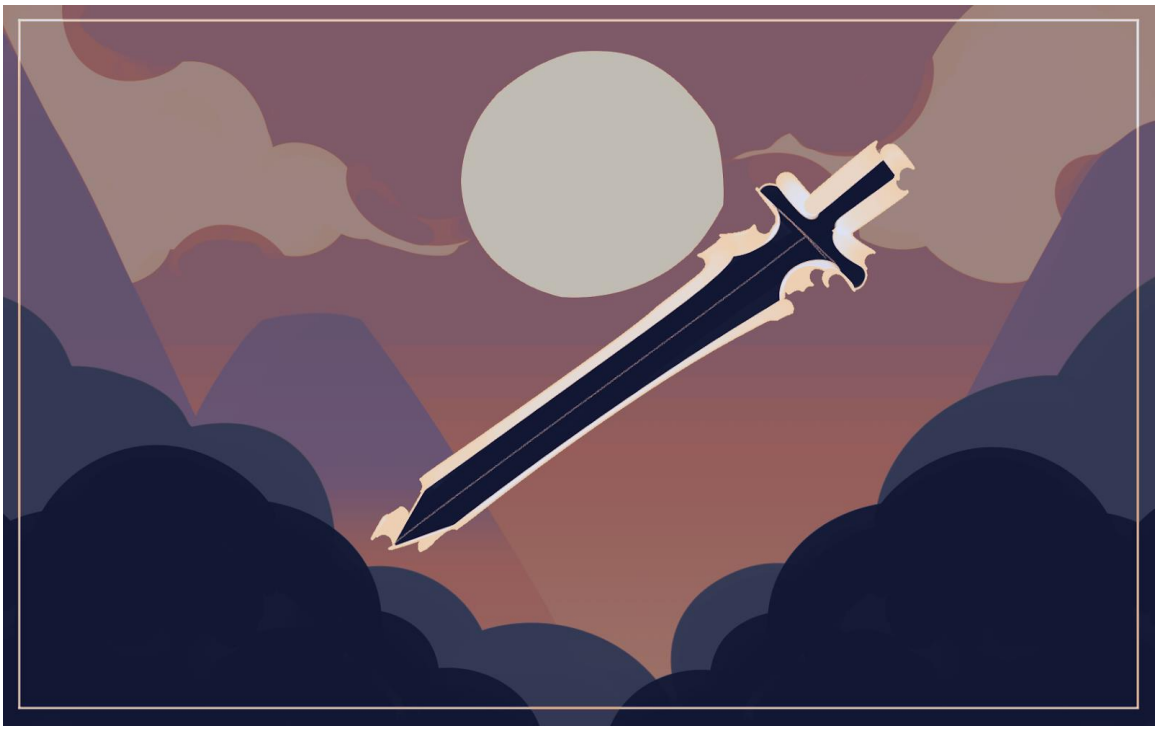


Fig. 3

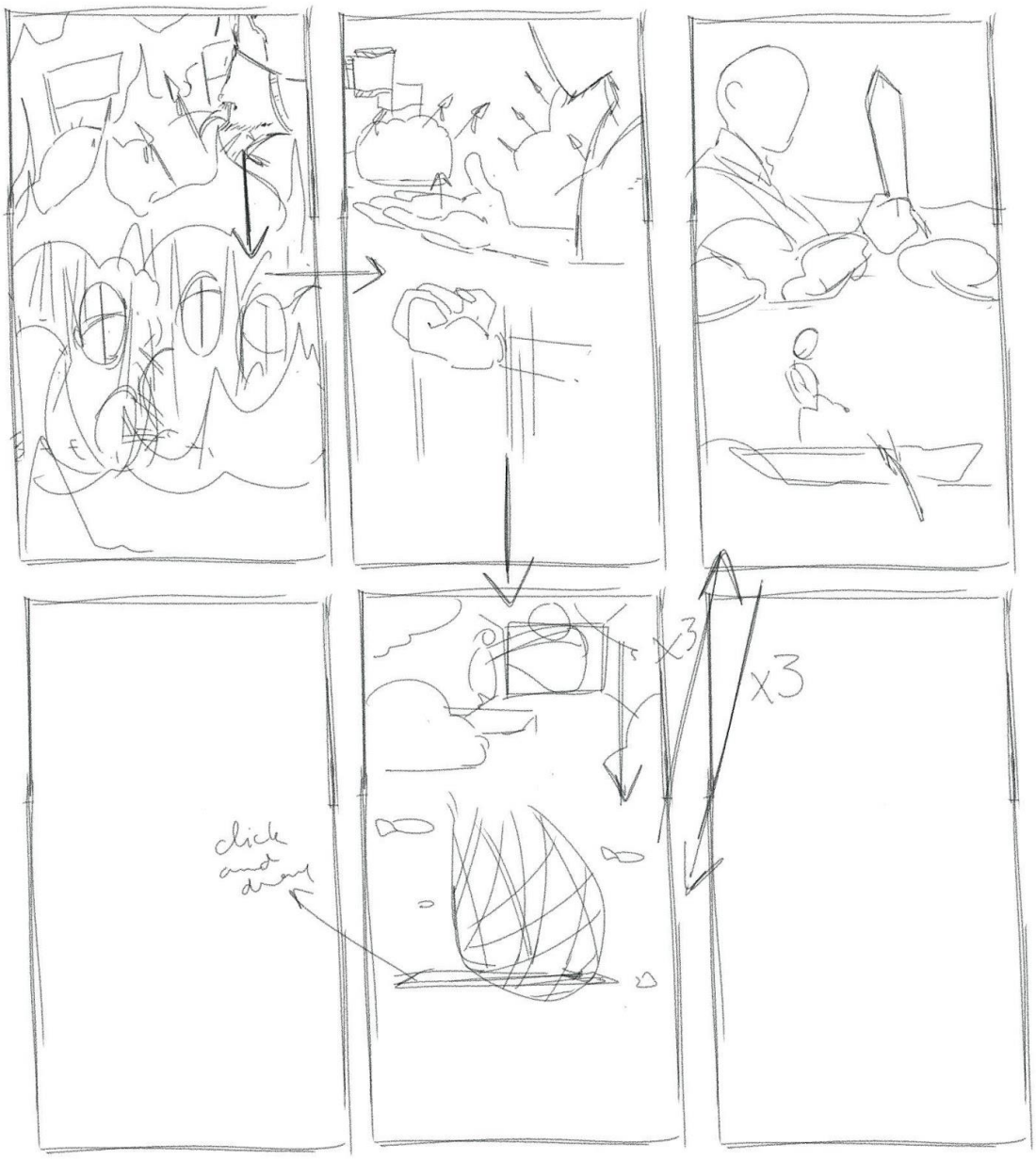


Fig. 4

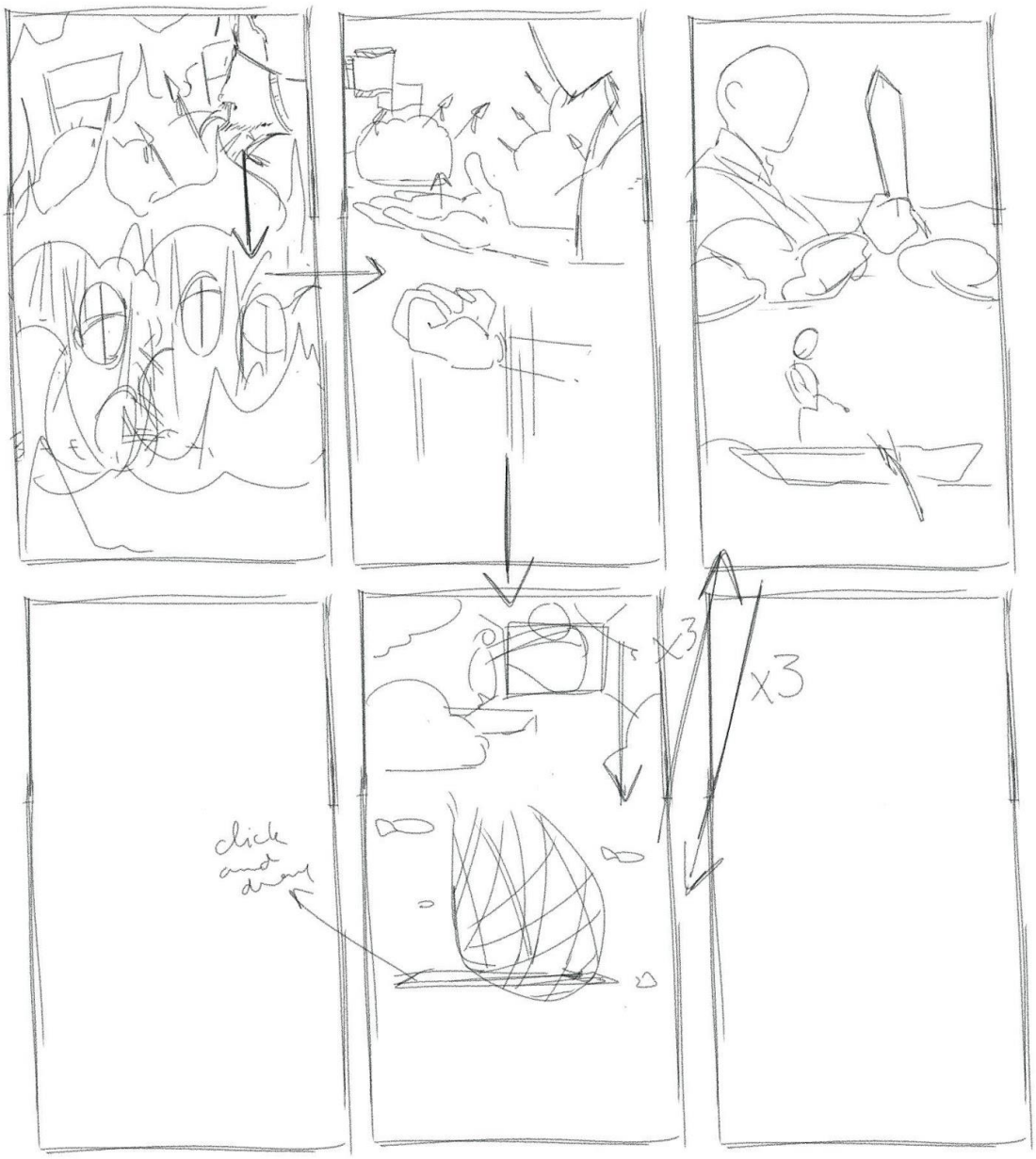


Fig. 5

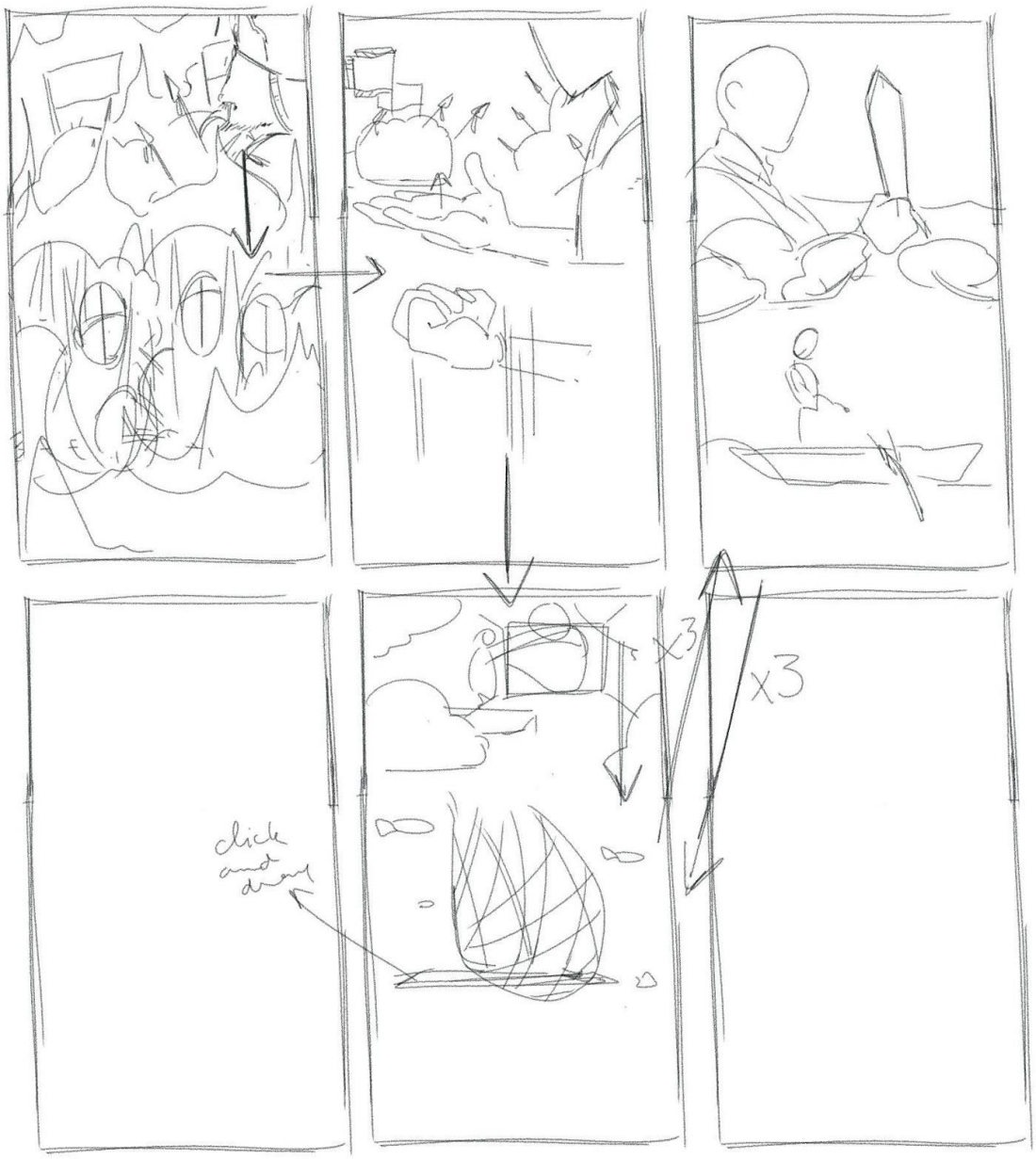


Fig. 6

SECOND PRESENTATION SLIDES

Slide 1

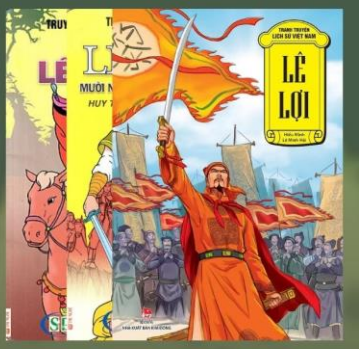
Slide 2

The reason

+ From personal experience, there has not been much recognition for Vietnamese folktales and legends.

+ Most media focusing on cultural tales often stay within the country.

+ Tools for storytelling on the Internet has evolved since the last decade, leading to more interactive ways to learn.



Comics of the legend in Vietnam

Slide 3

Inspiration

+ Webflow's collection of interactive websites and other animated storytelling websites from Awwwards.

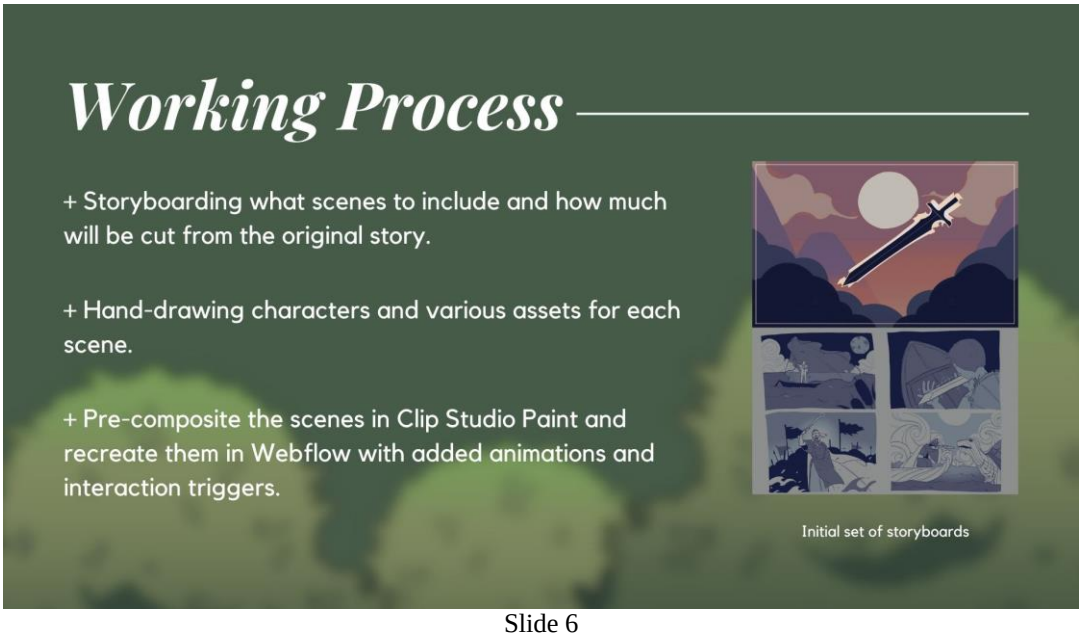
+ The idea that I can make an animated and interactive website using little to no code at all.

+ The legend is based on real events laced with fantastical elements, which I think are interesting and unique.

Thumbnails of Youtube videos telling the legend

Slide 4

Slide 5



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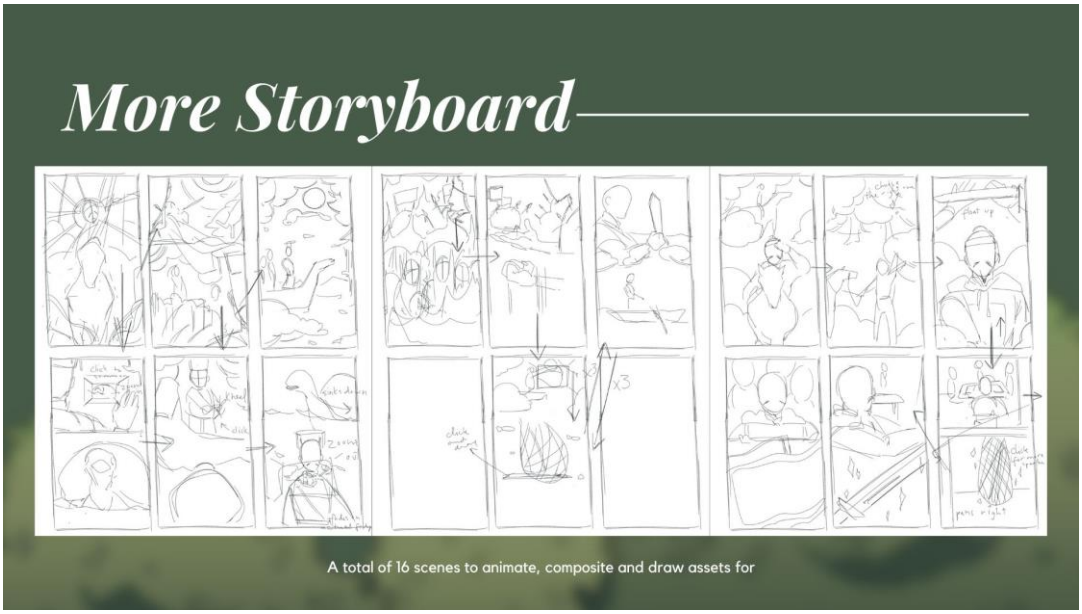


Slide 7

Slide 8

Final Product

+ Mostly animated and interactive website with some transitions.

+ Works on most browser but is not optimized for all resolutions.

+ Navigation allows the visitors to look around on their own pace but depends heavily on them to move the story forward.

More sample scenes from the website

Slide 9

Responses

+ Around 82% of the responses are satisfied with the website, with other responses reporting difficulty navigating. This was improved after the introduction of an Instructions Sheet.

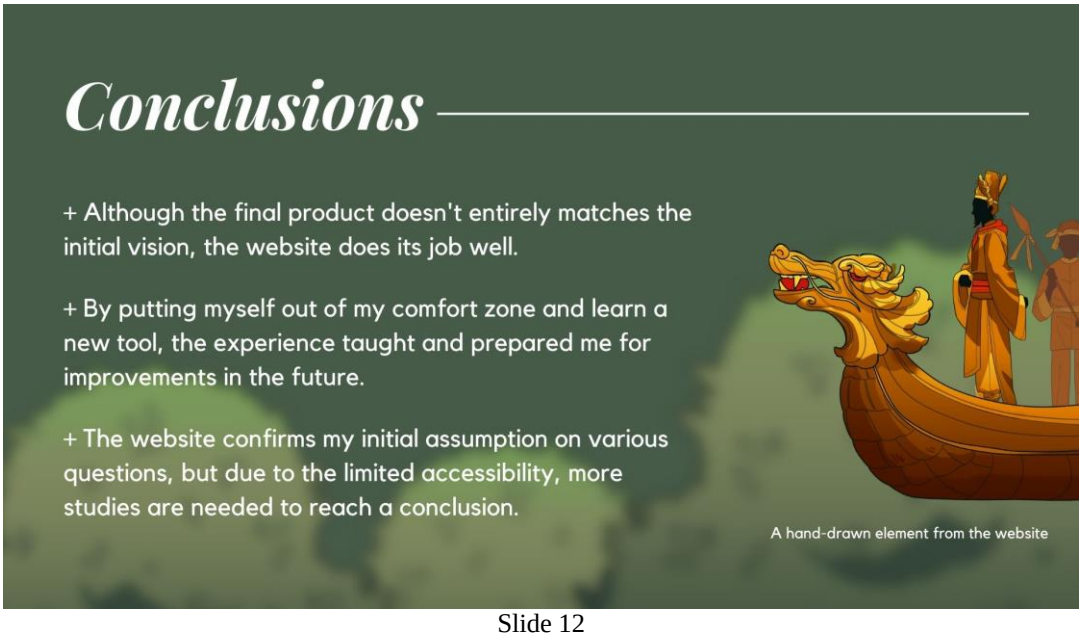
+ Most of the responses stated that the website did well on the art style and animation. They also agreed that the website is more engaging compared to a static website.

+ The number of respondents claiming that they are not previously familiar with Vietnamese folktales further strengthens my reason for this project.

Characters from the website

Slide 10

Slide 11



Slide 12

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Nhan Chau received her bachelor's degree in New Media with a focus in Storytelling at the University of Maine. Her creative work for the degree focused on 2D storytelling and how to integrate these stories into new media such as interactive web or game design. She is interested in Vietnamese folktale, Vietnamese traditional storytelling methods, and 2D animation.