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in candidacy for the degree of
Master of Fine Arts

**Storytelling of the Korean Traditional Dance "The Hahoe Mask"
Using Interactive Multimedia**
by Lee, Hee Jung

June 30, 2006

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Storytelling of the Korean Traditional Dance "The Hahoe Mask" Using Interactive Multimedia

Abstract

The project, 'Storytelling of Korean traditional dance "The Hahoe mask"'is the cultural collection using interactive multimedia. It provides a way to keep our intangible properties and interpret Korean cultural performances to users who are interested in Korean culture. This thesis is developed in two categories: three stories and one game.The three stories are the Mudong Play,the Monk Play and the Yangban Play and the game is the Butcher's shooting game, refering to the Peakchong Play.

This project has presented a way to keep Korean cultural resources in an entertaining and user-friendly way. Through this project, users can participate in storytelling as if facing with real cultural events and can be exposed to creative aspects, not only to develop valuable cultural experiences but to rediscover our hidden cultural values.

Thesis Website : *http://www.heejunglee.com*

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1. Introduction

The major goal of this thesis is to provide a way to present cultural information in an entertaining way and establish an effective digital collection of cultural resources. One of the Korean cultural genres called the "The Hahoe mask" dance is a performance which is an intangible cultural property. This has become a serious issue, since these kinds of performances depend on successors' dancing and telling the stories by word of mouth and passing them down to each generation. Therefore, Korean organizations and cultural communities have tried to preserve these intangible properties. In 1980, the government designated the mask dance drama as Important Intangible Cultural Property No. 69, to ensure its preservation and transmission to future generations.

-Why does Korean intangible culture need to be kept using multimedia?

The stories of the Hahoe dance were made during a time when oral tradition was more powerful then the written word. Based on the records of the Hahoe Mask dance, the dance was revived by the performer Chang Hee Lee, who could dance with a manuscript of the mask dance collected through the Andong Hahoe village where the dance had been created and performed. Since most of the restoration and revival had relied on collected information, the condition was poor. For better cultural collection in the future, there is a strong need to find an effective way to preserve our valuable and worthy properties. Furthermore, it is becoming necessary to interpret cultural performance as cultural resource to improve audience's understanding.

-What is the benefit of using multimedia for cultural resources?

Computer graphics has been a more effective communication method than verbal language and gives the user a chance to more easily understand information. The online book is a good example representing an attempt to transform information into virtual multimedia using computer graphics. Through a users' response on the screen, the environment or certain changes such as sound effects and user location is consistent. These visual functions increase the meanings of origin and help users to reach out to the point the designers intend to be. For these reasons, I want to demonstrate that the effectiveness of multimedia can enhance comprehension of the Korean mask

dance story, one of the most important Korean cultural resources. In this thesis, users who are interested in Korean culture, especially Hahoe mask dance, can interact with stories easily through computer graphics. At the same time, they can comprehend the artistic themes stylized by of Korean traditional drawings, enjoy the stories of Hohoe mask dance (with the correct explanations), watch recorded movies, and enjoy a game inspired by the stories in an entertaining way.

-What is the limitation of telling the story of the Hahoe mask dance in this project?

The Hahoe mask dance is popular story in Korea. Since it originated from Korean historical background, some parts are difficult to translate into a foreign language and correctly interpret the meaning. Consequently, some aspects of these stories are modified intentionally to assist a user's understanding, using contextual graphics, instead of text only.

-What is the scope of this project?

This project is experimental in terms of interpretation and the expression of dance movement. It is focused on the themes of the original stories - user interactivity has been added to display information effectively as an entertainment tool.
This project includes three stories and one game using design software such as Macromedia Flash, Adobe Photoshop, Adobe Illustrator, Adobe Audition and Adobe Premiere.

2. Research

2.1. The Role of Mask Dance in Korean Cultural Properties

 The Hahoe mask is the wooden mask selected as Korean national treasure No.121, made during the Koryo dynasty. The Hahoe mask has become the legendary masterpiece in the world of the mask arts due to its unique carving technique and facial expression at that time. One of the outstanding points makes the Hahoe mask unique is that it enables us to show our ancestor's various facial expressions. Because the Hahoe mask consists of two linked parts - a face and a chin with strings, it has different expressions depending on the angles from which it is viewed. It contains our ancestor's mind and personalities with various expressions. For instance, it can be viewed with a bright smile when the face moves upward and it also can be shown sad with emotion when the face moves downward.

During the research, I discovered that three of Hahoe masks disappeared in for unknown reasons. Originally, fourteen Hahoe masks were created. Today, there are only ten kinds of masks in existence.These masks were managed in the Korean national Museum until now. The six plays include the Mudong play, the Chuji play, the Paekchong play, the Halmi play, the Pagyesung play and the Yangban & Sunbi play. <Figure1.>

The Hahoe mask dances have three major meanings for the next generation. First, the Hahoe mask dances reflected the unfairness of the social system between the noble and the common class through satire. These dances have been the greatest way to naturally observe social structures at that time. Second, the Hahoe mask dances had played the very important role connecting with each level of social system, and as a result, these dances had become a powerful force for maintaining social structure. The humble and common people could release their discontent created by the unfairness of their social class and sublime their emotions into the dance movements. Lastly, the village culture had transferred strongly and united them in a ritual dancing ceremony. These dances can play prominent roles in uniting the world in educational and cultural purposes today. Based on my research, I chose to develop the Hahoe mask dance into a multimedia project to preserve our cultural collections and to further support these roles.

- Name – Kaksi T'al
- Status – A Bride
- Role – The local goddess
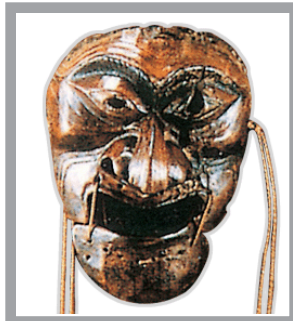- Used in the Mudong Play

- Name – Halmi T'al
- Status – A old widow
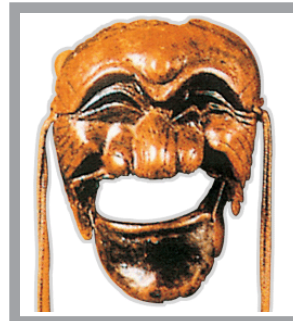- Role – A common people
- Used in the Halmi Play

- Name – Yangban T'al
- Status – A aristocrat
- Role – Noble class
- Used in the Yangban Play

- Name – Imae T'al
- Status – A fool
- Role – Humble class
- Used in break

- Name – Sonbi T'al
- Status – A scholar
- Role – Educated class
- Used in the Yangban Play and the Sunbi Play

- Name – Chung T'al
- Status – A monk
- Role – A corrupt monk
- Used in the Pagyesung Play

- Name – Bune T'al
- Status – A young woman
- Role – A entertainer
- Used in the Pagyesung Play

- Name – Paekchong T'al
- Status – A Butcher
- Role – Humble class
- Used in the Paekchong Play

- Name – Cholangi T'al
- Status – A servant
- Role – A humorist
- Used in break

- Name – Juji T'al
- Status – A Lion
- Role – Imaginative creature
- Used in the Juji Play

<Figure1: Ten kinds of mask features, with brief information about each one.>

From : Hahoe Mask Dance Drama(2005), *Hahoe tal,* Retrieved September 28, 2005, from http://www.hahoemask.co.kr/

Storytelling of the Hahoe Mask

2.2. Advantages of Interactive Multimedia

Multimedia, defined, is the combination of various digital media types such as text, images, sound and video into an integrated multi-sensory interactive application or presentation to convey a message or information to an audience. In other words, multimedia means "an individual or a small group using a computer to interact with information that is represented in several media, by repeatedly selecting what to see and hear next" (Agnew et. al, 1996).

Ever since the computer graphics and interactive multimedia were first used in the educational genre, these methods have made it possible for users to participate not only in e-business and e-learning but also in cultural learning for educational purposes and computer – based collections. These methods could further contribute to widening the cyber space world into a more interesting genre as embodied by theater, film, literature and cultural performance.

Through computer graphics and interactive multimedia, users can save time and view only what they want. Moreover, users are able to explore historical events or happenings in real time depending on what they click. Based on the book <Interactive Dramaturgies> "interactive storytelling also encompasses the conveying of knowledge, the reporting of facts and their didactic presentation, in other words narration in the widest sense of the word." Interactive multimedia with computer graphics is the cutting-edge technique that provides diverse benefits to users in terms of cultural collections.

With multimedia, information can be delivered more effectively as an instructional medium. A multi-sensory experience can be created for the audience, which, in turn, elicits positive attitudes toward the application. Multimedia has also been shown to elicit the highest rate of information retention and result in shorter learning time (Ng and Komiya, 2000; Hofstetter, 1995). For the designer a multimedia application that is interactive and multi-sensory can be both a challenge and a thrill. Multimedia application design offers new insights into the learning process of the designer and forces him or her to represent information and knowledge in a new and innovative way (Agnew, Kellerman & Meyer, 1996).

2.3. Cultural Examples Using Multimedia

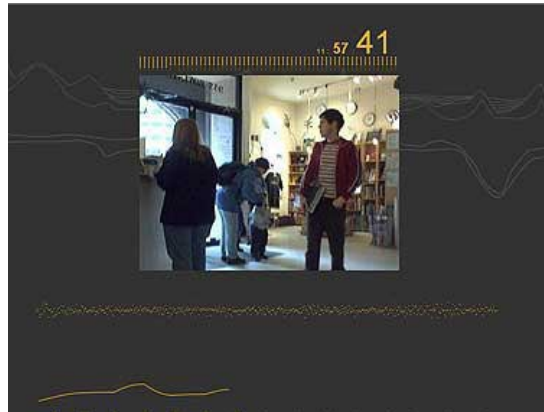### 2.3.1.Art Access Kiosks - J. Paul Getty Museum

The J. Paul Getty Museum built Art Access kiosk systems using multimedia in 1996-1997. Through this challenging application, user activities were changed from just reading data to high quality video, images, and text that responded to the audiences needs. Art Access used interactive multimedia to meet the widely varied interests of visitors and the system's easy access is successfully linked with information whenever the visitor wishes to explore.

Access Modules consisted of a main menu, indexed menus, artist screens, a glossary, videos, audios, tour, help, and credits. With detailed and appropriate media, this user-centered system provided a user interface that was intuitive and quickly understood. Also the system could be connected with other application to share data. During this time, the use of multimedia was expanded in terms of collecting and clearly sharing cultural data**.**
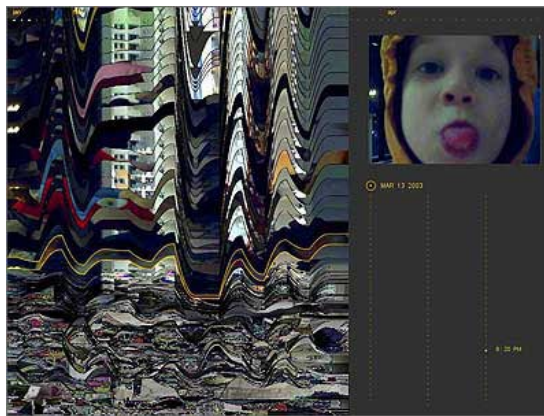
2.3.2.Artifacts of the Presence Era - MIT Media Lab

The MIT Media Lab created a visualization project for a historical museum gallery called "Artifacts of the Presence Era." This project used the applied mode of developed and combined multimedia. The project recorded all movement, images, and sounds produced during the exhibition through a camera and a microphone. The images and sounds were captured, and then visualized as accumulating layers of data. Visitors could navigate the captured images and sounds into the history of the gallery. Every five minutes recorded data was produced into a new layer line, merging the images and audio. Using a knob controller to navigate up and down, a user could choose a specific layer, and then see the images and audio from that layer.

<Figure 2: Present (Real time) Display>

<Figure 3: Images from the layer that time the layer was created>

<Figure 4: Artifacts of the Presence Era(2006) MIT Media Lab >

From : Viegas,F., Perry,E., Howe,E.(2003-2005), *Artifacts of the presence Era,* Retrieved June 28, 2006, MIT Media Lab from http://alumni.media.mit.edu/~fviegas/ICA/

Storytelling of the Hahoe Mask

2.4. Inspirations

I inspired by a project "Samorost2" in terms of the artistic elements and backgrounds they created and the gaming structure for the narrating story. For the project structure, during the research, I found the adventurous points as the user finding way in this website. The user finding way became my direct motivation to make thesis project at that moment.
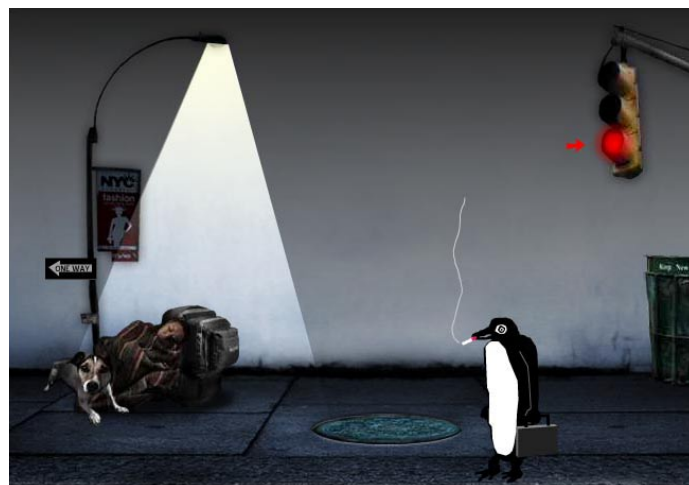
For the interactivity, "the American Penguin Project" and "L'experience PSP" gave me the creative thoughts to explore the navigational aspects and the main navigational structures.

For the main design style,I got inspirations of the caligraphy styled images from the Korean traditional painting such as "Kumkang jeondo" and "Inwang jaesakdo"painted by Jung Seon.

<Figure 5: The main navigation of the L'experience PSP (2005) created by Duke Paris >

From : Paris, Duke (2005), *L'experience PSP* , Retrieved June 29, 2006, from http://www.yourpsp.com/experience/

<Figure 6: The directional arrow in the American Pen-guine Project(2005) created by Minki Park >

From : Park, Minki (2005), *The American Penguine Project,* Retrieved June 29, 2006, from http://americanpenguin.com

Storytelling of the Hahoe Mask

3. Process

3.1.Prototype 1

First I struggled to find a visual style for the main scene reflecting Korean traditional style. During my research, I found the image of Andong villages in Korea, where the Hahoe mask originated. The village is surrounded by mountains and clouds, thus it has been an isolated from other communities and villages. I was visually inspired to design the main stage as the landscape of villages. In prototype1, every house becomes the navigational buttons to explore each mask dance in the main stage. Additionally, the visual depth was necessary to recreate the feel of the isolated Andong village.So I created images with perspectives

For smoother dynamic interaction in the finished application, I planned on using Macromedia Flash. Therefore, I had created every source file with Adobe Illustrator software. For technical reasons, I took advantage of Illustrator and high resolution photo image I took in Korea.

<Figure 7: The first design comp of the main page>

Problem

- The drawing style gave an impression of modern times while the story was based on a traditional cultural story.
- Combining images I took with vector images in Illustrator created visual problems after compositing them together.

Storytelling of the Hahoe Mask

Solution

- I changed the drawing style to calligraphy, since the various stroke weights and light colored scenes can express Korean tradition and cultural emotion more effectively. So, I started drawing with an ink on the Korean paper to reflect scene of the original Andong villages.

3.2.Prototype 2

Compared with the version of prototype1, prototype 2 was designed like the Korean painting with considering user's perspectives. In the main scene, along with the path, houses are located in center and surrounded by mountains. A traditional Korean painting is two dimensional described by ink lines and dots in a flat space. Therefore, every graphic element drew in the main stage were stylized with shades of color and ink. For instance, the further away objects were located in a stage, the lighter the color used in order to demonstrate depth. I designed the main scene as if user was standing on top of the mountains look down at the villages. As a result, I could visualize my concept including the silent sea and calm paths along the typical Korean mountains.

<Figure 8: The main design comps by the Korean painting style>

Problem

- The user viewpoint limited the main stage in prototype2 while the drawing style representing shade of ink dots and lines was closer to the my initial concept.
- The houses (functional buttons), are hard to notice as buttons.

Solution

- To make full use of limited stage size, I used QTVR (Quick Time Virtual Reality), allowing the user to move around with a mouse. After that, stages could be wider than the previous version and it unexpectedly added an adventurous feeling as well. Also I added Korean painting-styled trees and ornaments along the path in the main center stage.
- For the main navigational buttons, I attached pop-up balloons to better identify houses as functional and navigational buttons.

4. Construction

4.1. Final Design Style

4.1.1.QTVR Scene of the Main Page

Mostly, the final design style reflected prototype 2. Using QTVR, I realized that the expanded main stage needed to be designed in terms of aesthetic perspectives and layout. In the Korean painting, one of the most important philosophies takes advantage of blank spaces, for the purpose of maintaining systematic balance and flow in drawing paper. Thus, with this philosophy, rather than fully design the main stage, I intentionally designed my project regarding blank spaces just like the scenery of the Korean painting. Since the theme of my design style was focused on the traditional Korean style, I had drawn calligraphy, one of the closest artistic methods to the Korean painting, not only for the main stage but for the other sections, three stories and a game.


<Figure 9: The final main scene>

Storytelling of the Hahoe Mask

4.1.2.Double-check of the Title

Furthermore, I changed the title of my project from "The Visualization of the Korean Traditional Mask Dance 'The Hahoe Mask' Using Interactive Multimedia" to "Storytelling of the Korean Traditional Mask Dance 'The Hahoe Mask' Using Interactive Multimedia." While making prototypes of the main page, because every mask dance has their own story, I thought that "storytelling" is the most appropriate word embracing visualization and narration. After changing the title, I could better focus on both my mask dance story and visual aspect.

4.1.3.Flowchart

<Figure10: The Flowchart of entire-project>

Storytelling of the Hahoe Mask
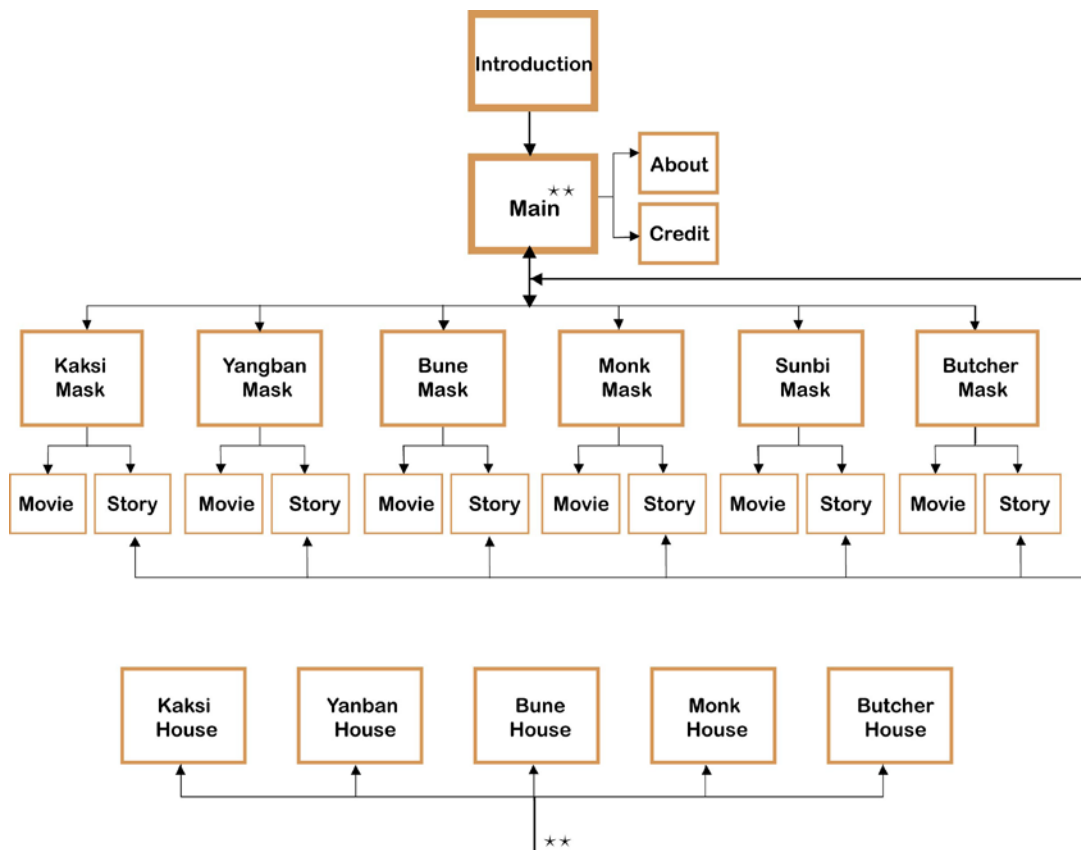
4.1.4. Contents

This project consists of three stories, the Mudong story, the Pagyesung play, the Yangban play, and a game (the butcher's shooting game refering to the Peakchong's story). To explore the stories in the main page, a user can choose either mask icons in the jokja drop down menu or main navigation. In the main navigation, if a user clicks one of the houses, the user goes directly to see the story written on a pop-up balloon. On the other hand, in the sub navigation, if a user selects one of the mask icons in the jokja drop down menu, the user can learn mask general information in the message box slides in. Later, the user can see original mask dance movie recorded in Korea and characterized mask stories or a game depending on user' selections.

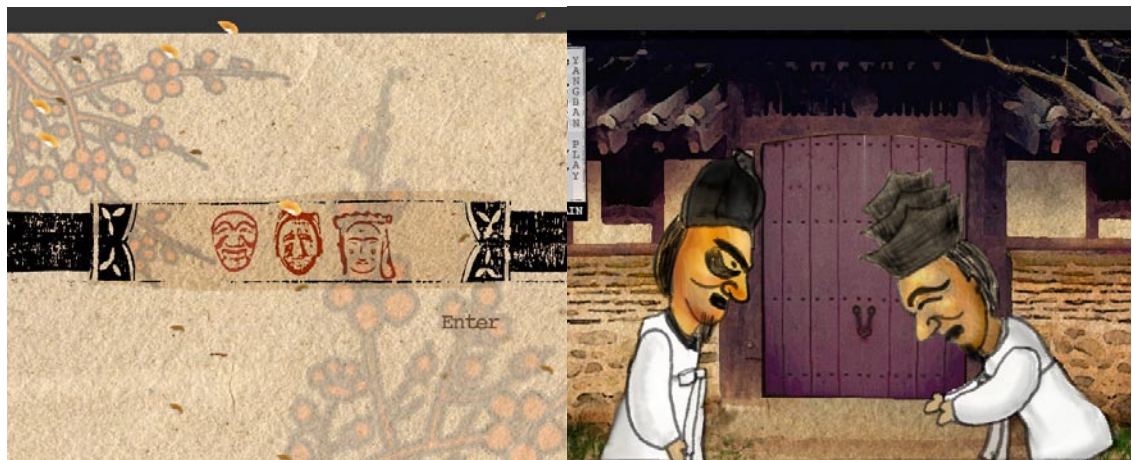| Section	Composition	Contents	Elements
Intro	Title + Enter button	Storytelling of the Korean traditional Mask Dance Using Interactive Multimedia.	
Main	Kaksi House	The Mudong Play Arrow directed - 4clues to see the story. Information button for users Main button to return the main stage.	Kaksi (unmarried woman), Ritual tree, Musicians (servant), House, the Sun
	Monk House	The Pagyesung Play, Arrow directed - 4clicks to see the story. Information button for users Main button to return the main stage.	Pagyesung (monk), Bune (young woman) Ritual tree.
	Yangban House	The Yangban Play Arrow directed, 3clicks to see the story. Information button for user Main button to return to the main stage.	Yangban (aristocrat) Sonbi (scholar) Bune (young woman) Door
	Bune House	The Pagyesung play Arrow directed, 4clicks to see the story Information button for user. Main button to return to main the stage.	Pagyesung (monk), Bune (young woman) Ritual tree.
	Butcher House	The Butcher's shooting game The shooting game to target cows by weapon chosen by user. 1. how to play – A description how to play 2.Choose the weapon- 4 kinds of weapon 3.Game scene + point.–targets to be shoot, points to get score. 4. Main & Replay buttons. - User can click to play game again or go to main stage.	Peakchong (butcher) cows
Mask menu	Kaksi mask Yangban mask Bune mask Chung mask Sunbi mask Pagyesung mask		Message box pops up.
Credit	Designer.Helper, Sound,Software,		
About	Project description		

<Figure11: The Contents of project>
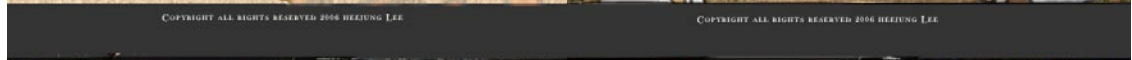
4.1.5.Visual Design Concept

The theme of my thesis follows concepts set forth by traditional Korean painting. Conceptual ideals, such as antiquity, far east and the orient, tradition and texture are used to reinforce the messages of my thesis. Main and secondary characters are portrayed in bright, primary colors and white, while backgrounds are rendered in earth tones and colors with low saturation. The basic color concepts are based on ancient lifestyles and social statuses recorded in the record of Korean History. The pictorial elements are used to supplement the audio and the base story in strengthening the metaphor.

> *"Good language alone will not save mankind, but seeing the things behind the names will help us to understand the structure or the world we live in."*
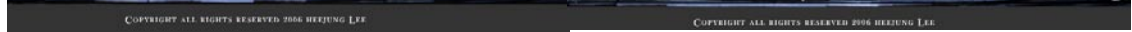> *(Stuart Chase, The Tyranny of Words)*

<Figure12: The infrodution of Pro-ejct stylized by the Korean Painting>

<Figure13: The Yangban social status costumes in the Yangban Story >

<Figure14: The religious gray wear and colorful wom-ans wear in the Monk Story >

<Figure15: The example of using metaphor for knowlegde by chairs in the Yang-ban Story

Storytelling of the Hahoe Mask

4.1.6. Character Design

> *In How many ways and with what techniques can one produce variations on the human face seen from the front? The graphic designer works without set limits and without rejecting any possible technique. His experiments in the visual lead him to try out all possible combinations and methods in order to arrive at the precise image he needs for the job in hand, and no other.....We may also look for all possible linear connections between the features, and we may try to do this with straight lines, curves dotted lines, parallels, with one unbroken line or with a fragmented one.*

"Variation on the Theme of the Human Face" Design as Art Munari.p55. Penquin book

Each story has different characters and themes. Masks are used to show social classes, and the differences in facial expressions used by each class; whether dominant, common, low and the educated classes. Thus in detail, I attempted to design each character to include their personalities and lifestyle using specific costumes unique to each social class. For example, Sunbi, whose social class is a scholar, is not of the leading class, but of the educated class. To be one of the leading classes of the time, he needed to pass a government administered test, or to be born of the noble class. Because the social level is revealed by the person's hat and costume, the Sunbi's hat is different from one worn by Yangban, who is of the leading class. I intended to reveal Sunbi's personality, stubborn and discontent from being unsatisfyed with his social level by using thick wrinkles under his eyes. Using the same concept of Sunbi's, I tried to characterize other character masks.

In characterizing each individual character in the story, I kept with the main themes. For the dominant characters, they were rendered in bright, saturated colors, while common classes wore white costumes. Religious figures were colored in tones of grey. In keeping with paradigms of traditional Korean painting, all characters have a high contrast value against the muted backgrounds.

For the interactive design elements of my thesis, characters would animate when activated by a user-defined input, such as clicking the character with the mouse. Character animation and interactivity was produced with a combination of Macromedia Flash, hand drawing and Adobe Photoshop. Each character was individually created using ink brushes and then scanned at high resolution into Photoshop. Each character was colored in Photoshop using a filter that resembled hand coloring.

Kaksi : bride mask

A young lady has very small eyes to show her shyness and a tiny mouth indicating that she does not often speak. She plays the role of the local goddess in the first act, Mudong Play and the bride in the last.

Chung : corrupt monk mask

A monk has a greasy, grinning face to show his dissimulating behavior. The crescent -shaped eyes reveal a depraved man who wander begging from village to village

Bune : bar waitress mask

A Flirtatious young woman mask has a heavily makeup oval face with a smiling mouth, She plays the role of a professional entertainer in the Yangban play and a lover with the monk at Pagyesung play.

<Figure16: The design process of the characters of each story>

Storytelling of the Hahoe Mask

Yang Ban : aristocrat mask

A man of high position has a long, black beard to show dignity, and an expressive smile that reveals both generosity and smugness this mask is believed to represent the highest artistic value of the Hahoe masks.

Sun Bi: scholar mask

A Sunbi has wide nostrils and well-developed cheek bones to show that he is a scholar, full of discontent and unable to adjust to society. In the play, Sunbi is severely satirized.

Peak Chong : butcher mask

Depending on how it is seen, the face either appears to be mad with the pleasure of killing living creatures or comical character, the butcher's true nature.

4.1.7. Background Design

In general, the background style blends with the characteristics of the other screen elements. Based on an article of "A Scene Design Within the Animation" which is about animation style of the Disney movie "Mulan", it explains the reasoning for using the color white. White in Chinese painting, represents the truth. Background settings within the movie focus on color contrast using simple colors, and the blending of comfortable colors. With this method, Disney's "Mulan" was able to give consistent hints to the audience about scene dramatics.

For my backgrounds, I designed imaginary landscapes relating to the stories, as the Mask Dance is usually performed in the baregraound of village. In conceptualizing the backgrounds, I first imagined which setting would be ideal for each story. According to the Korean village structures, I sketched each background. In developing the color schemes of the backgrounds, I was inspired by a exhibition of cut paper collages at the Korea Folk Museum. In refining my methods, I used a Photoshop filter in creating the textures for the clouds and the backgrounds and character message boxes. Additionally in rendering the backgrounds in Flash, I made secondary animations, such as swaying braches and moving clouds.

Mudong Play
The users can can further experience the environment of villages including the mountains, stones and ritual tree for abandunce of harvest.

Pagyesung Play
For the religious situation, I added a temple and carving stones around the stairs. The bune appears in the village, so I recreated the entrance of the village with protecters, which stand in front of villages.

Yangban Play
The Yangban story starts near the traditional house. I created the doors and walls for the house and storages to show the high class life style.

Butcher's Shooting Game
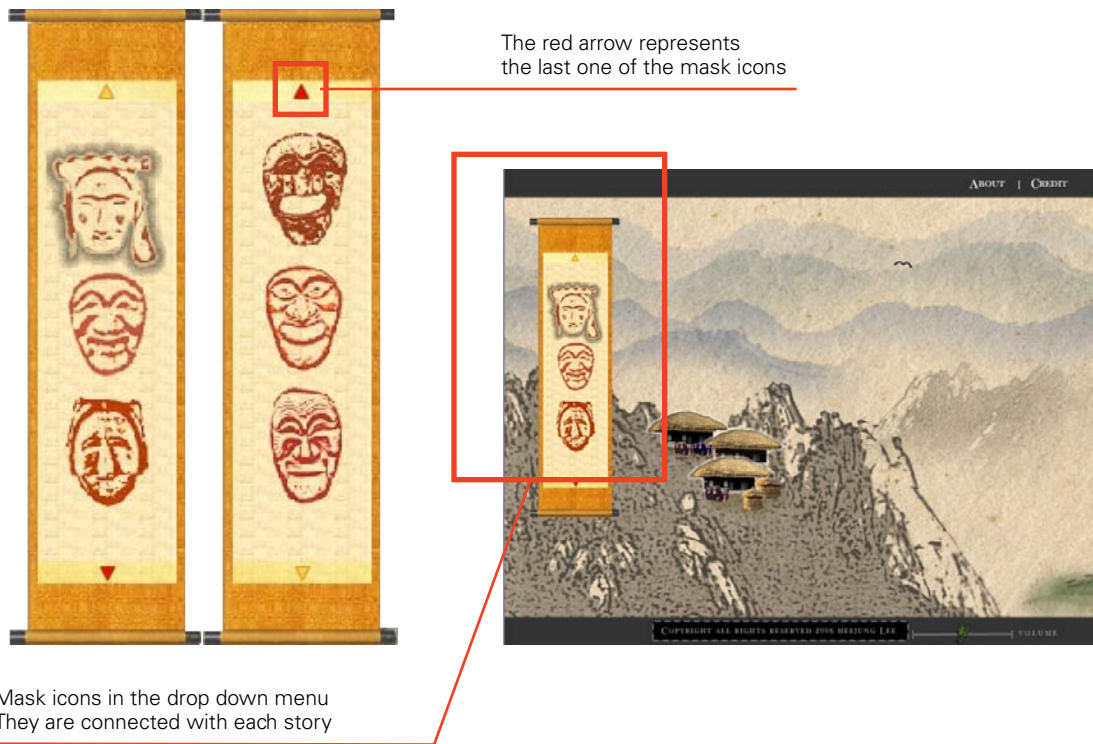The butcher's game background was painted by free hand style. I chose simple lined mountain and characters.

<Figure17: The background image of the Kaksi story>

<Figure18: The background image of the Monk story>

<Figure19: The background image of the Yangban story>

<Figure20: The background imges of the Butcher;s sh>

4.1.8.Navigational Interface Design
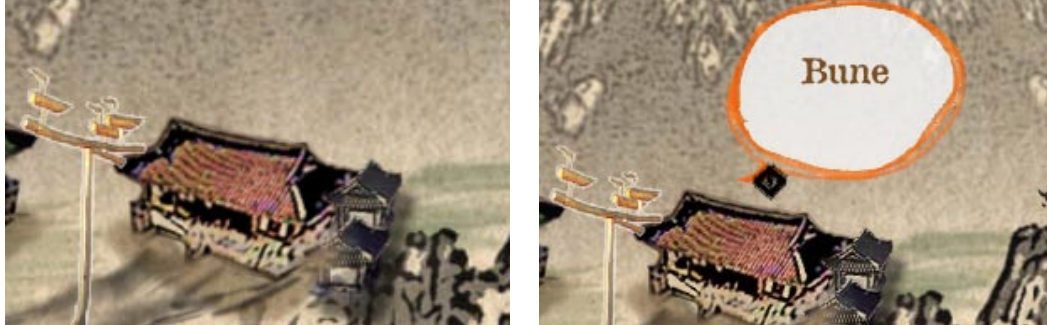
• Dropdown Menu

For ease of use, I added a sub-menu including mask images icons located in the form of Jokja, which is a traditional frame used in Korean painting. During user interaction with my thesis, if users have difficulty in finding specific mask names, the mask icons serve as a visual guide to help in the ease of use.

• Main Buttons

On the main stage, there are two ways to navigate to the three mask stories and one game. One way is to click on the house icons located on screen. The other way is by choosing one of the mask icons in the sub-menu. Each mask icon links to an information screen, where the user can learn more information, view movies and read the story behind the specific mask.

The red arrow represents
the last one of the mask icons

<Figure 21: The sub menu featured as Joksa frame>

Mask icons in the drop down menu
They are connected with each story

Storytelling of the Hahoe Mask

4.1.9. Story Design

Usually, interactions would contain multiple choices for a non-linear story format. In my case however, my aim is to interpret and preserve the original Hahoe Mask Dance story, and to produce it in an entertaining way. In the book "On Interactive Storytelling" by Chris Crawford, he points out that

> "The absolute number of choices isn't important; it's the number of choices offered, compared to the number of possibilities the user can imagine. If the user has reached the climax of the story and must choose between leaving his girlfriend for the war and shirking his duty, having only two choices doesn't detract from the power of the interaction; it's difficult to imagine any other reasonable possibilities."

Thus, I modified the stories with just minor corrections.

- **Mudong Play**
  The Mudong Play is the first story in the Hahoe Mask Dance. It shows a ritual event, in where Kaksi cannot walk on the ground, so she dances on the servants shoulders. Her dance starts at dawn, but before she starts dancing, the servants pray in front of the ritual tree for an abundant harvest. After that, Kaksi and her servants go down to the village from the mountains.

- **Pagyesung Play**
  The monk meets a woman in the mountains, and shortly thereafter falls in love with her. At last, he breaks free from the restrictions placed upon him as a monk, and dances with her.

- **Yangban Play**
  The Yangban and the Sunbi compete with each other in the Yangban house. While arguing about their knowledge and social status, they realize that the arguement is pure folly. In the end, they dance together with Bune.

Storytelling of the Hahoe Mask

- **Butcher's Shooting Game**

  While the butcher dances on stage, a cow appears. Then for the preparation of his party, he tries to kill the cow. Once the cow is slaughtered by an axe, the cow falls to the ground. Based on the theme of this story, I developed a shooting game.

4.1.10. Interaction Design

Interactions are the key ingredient to my thesis in projecting the messages contained within the stories. Although the stories are defined as to what occurs throughout, I developed the interactions to enable the users to determine the rate in which the information would be disseminated.

Rather than providing multiple choice outcomes, I provided sequential, linear interactions to enable the user to step through the story. In developing the interactions in my thesis, I agreed with the ideas set forth by Chris Crawford and his theories on user interactions. His idea that the main purpose of interactive storytelling is not of the quantity of multiple choices offered to the user, but of the quality of the choice offered. For example, in the Kaksi story, there are four main clickable areas for the users to select in order. The Kaksi, the ritual tree, the sun and the house. It is based primarily on a game structure where the user needs to complete the story by finding clues. If however a user cannot located specific clues, I have provided information boxes to assist the user in locating the clues needed to complete the story.

Secondly, I planned interactions based upon the narration for the purpose of memorization of the story content. For example, in the Yangban story, the original story goes forward with the main performers dialogues. I made arrow symbols to guide the user through one end of the conversation to the other.

The third application of interactivity is the gaming structure itself. While users play the game, they will learn the story through the interactions, In designing the Peakchong story, by what users click, the story will continue to animate. For better movement of character, I sketched every movement and drew in Adobe Illustrators and by hand, then, converted those movements in Flash.
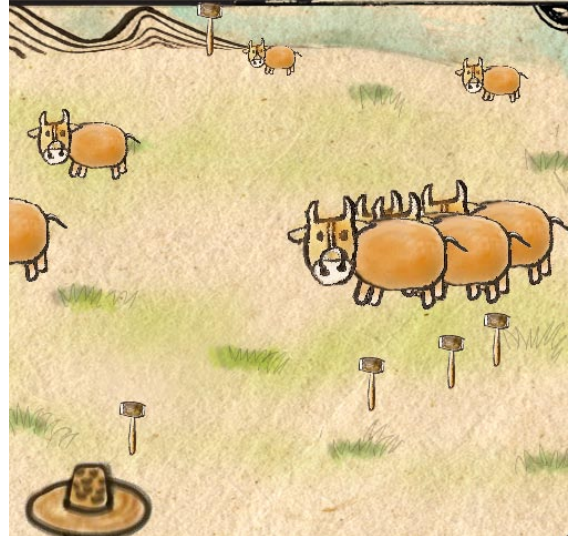
<Figure 23: The sequential hints in the Kaksi story>

<Figure 24: The story continuation by user clicks in the Monk story>

<Figure 25: The entrance in the Yangban story>

<Figure 26: The gaming structrue interactivity in the Butcher's shooting game>

<Figure 27: The narrational storytelling by user clicks in the Yangban story>

4.2. Editing

4.2.1. Sound design

The use of multimedia within the eduactional media field has been extensive, as it helps in the retention of information, and in an increase of productivity. Reseach shows that 20% of people are visual learners, 40% are auditory learners, and 75% learn by a combination of both methods. (Lindstrom, 1994)

In activating 4 sensory inputs, multimedia as a strong effect in increasing recognition and retention of information. Moreover, the implemetation of audio in multimedia has become a functional device in increasing user perception and understanding of the content. As such, I thought there was a need to find appropriate sound effects to help users better understand the content of my thesis.

Mostly, the Korean music was created by the percussion instruments, such as a drum and a gong. However I had difficulties in finding the Korean composers in US. At that time I was keeping in contact with the Andong Hahoe Mask Dance committee for getting some resources. For my asking for sound problem, they were able to provide me with a DVD of recorded dance music and movies, which they graciously allowed me to use for my thesis. From the DVD, I collected sound effects separately using the Adobe Premiere and Adobe Audition and added that music for background music.

I used Adobe Audition and Premiere, and then was able to convert the music into a usable format for Flash. Users are able to control the sound by using the provided sound controls on the main page. If users click on the embedded story links, a transitional sound plays to inform the user that a story scene will be loading.

4.2.2.Importing Movies

After thesis defense, I realized that another way of helping users understand the mask story was to import movie clips of the dance being performed. In the case study of "The Role of Interactive Media in the J.Paul Getty Museum" when the museum had built Art Access modules of Kiosk system in Getty museum, they primarily created the video segment play in pop-up window for displaying artwork and data with captioning. As it happened in Getty museum, importing movies of the performance and installation could expand the depth of user comprehension.

Besides, I found there is a certain barrier between western and oriental culture in understanding each others cultural mores. To reduce cultural conflicts and misunderstandings, recorded movies are located within the thesis. Adobe Premiere was used as a editing tool, and then was exported in the FLV format.
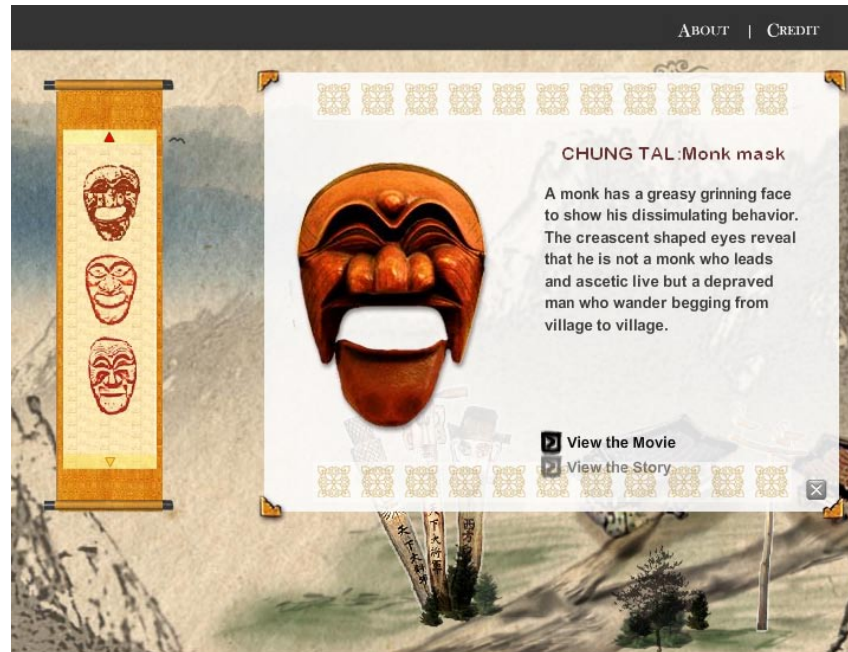
<Figure 28: The information box in the main stage>

<Figure 29: The Monk movie recorded >

Hahoe Mask Dance committee (2005), Korean mask dance: *Hahoe mask dance. [CD-ROM].Andong Hahoe mask dancecommittee, broadcasting of KyoungBuk*

Storytelling of the Hahoe Mask

5. Summary

5.1. Reflection

In order to develop my thesis, I tried to get feedback from committee members as well as students. While developing my thesis project, I collaborated with committee member to make user-centered cultural collections. Following the feedback and comments, I changed and added elements, such as importing an original movie for referral hints and directional arrows to give potential hints to users in each story.
Here are the criteria to evaluate my thesis project.

- **Cultural education** – *Are their stories understandable in this final project?*
- **Project difficulties** – *Is there any problem to see this project?*
- **Design consistency** – *Can you feel the Korean culture style?*

5.2. Thesis Show

In the thesis show, I offered to play with my project and got comments from guests. The majority of them were playful with my project, especially the gaming part and finding the key in the story. The guests liked the drawing style coming from Korea and furthermore, they were interested in Korean culture after seeing my project. The completion of my project made me satisfied and encourage my design world to go on. However, some guests found a fault, generated from certain bugs. Another problem I found in thesis show is that the guests couldn't realize the ending scene of each story, because the character is still dancing. Thus, later, I added final curtains to indicate that the story is complete and a summary with the main button returning to the main stage. Furthermore, I would like to find better solution to give hidden hints (for adventurous moments). Using the VR, I am expecting that a cultural collection will develop in effective way.

6. Conclusion

This project has presented and developed the use of interactive multimedia to enable our intangible properties to keep cultural preservations in problem-based situation. As a result of this project, I am able to conclude that through the contribution of interactive multimedia, our valuable properties can be effectively recognized in an entertaining way and developed one step closer as one of the digital cultural collections.
In terms of educational aspect, user interactivity in cultural collections has a noticeable strength in increasing the depth of understanding, yet in terms of transferring cultural information from original cultural property, there are still rooms to be developed such as cultural background, and interpretation.

My project has dealt with the issue of presenting cultural resources in an effective and entertaining manner. Through this project, there are three advantages when using interactive multimedia to preserve cultural resources.
First, users can participate in storytelling as if they are facing real cultural events. Second, the interactive way to preserve our cultural properties is a user-friendly way to entertain and demonstrate history. Third, interactive multimedia opens a creative way to not only to develop valuable cultural collections but to rediscover our hidden cultural values.
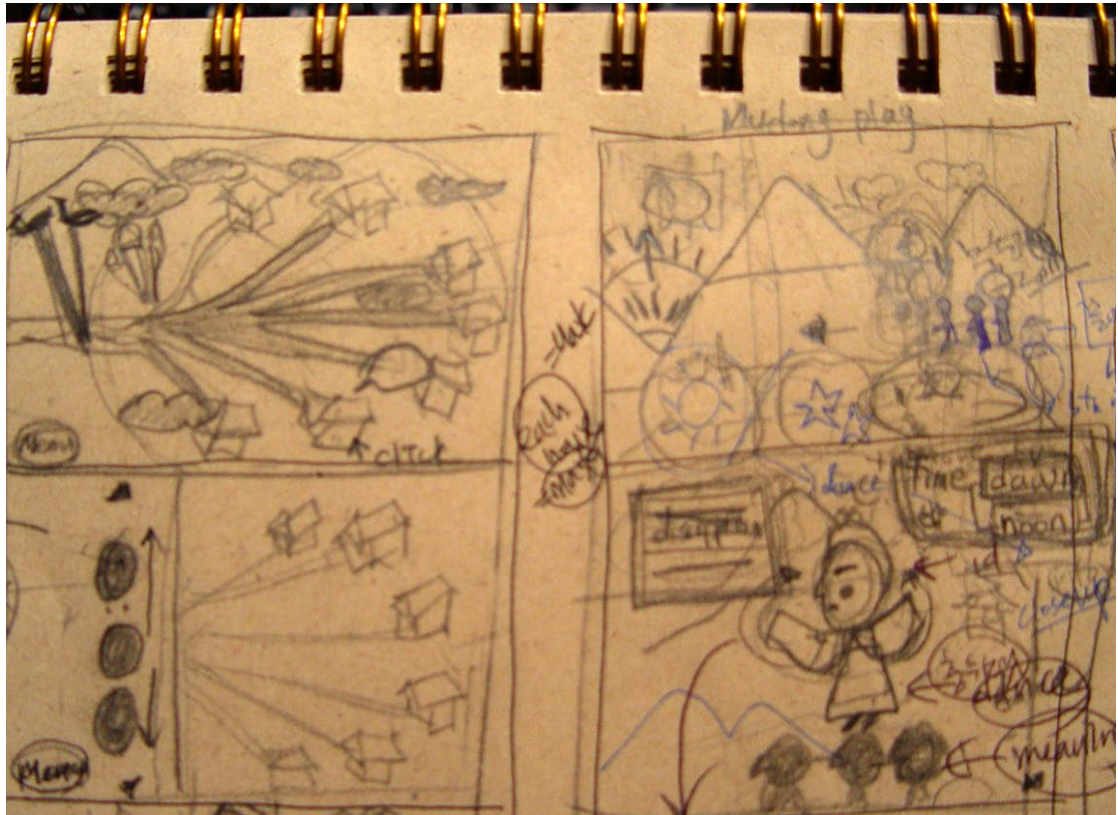
What will always remain predictable is our ability to improve current resource with futuristic and cutting edge technique. The further step I would like to do is continuously expanding cultural properties to be enabled to play with natural and creative environment created in 3D VR world.
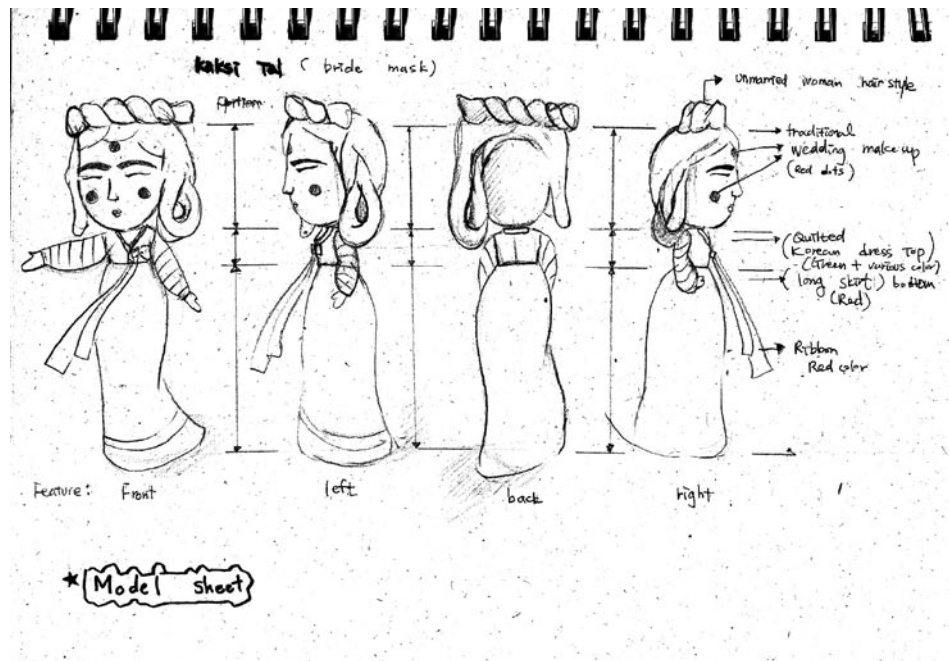
7. Appendix

7.1. Idea Sketches
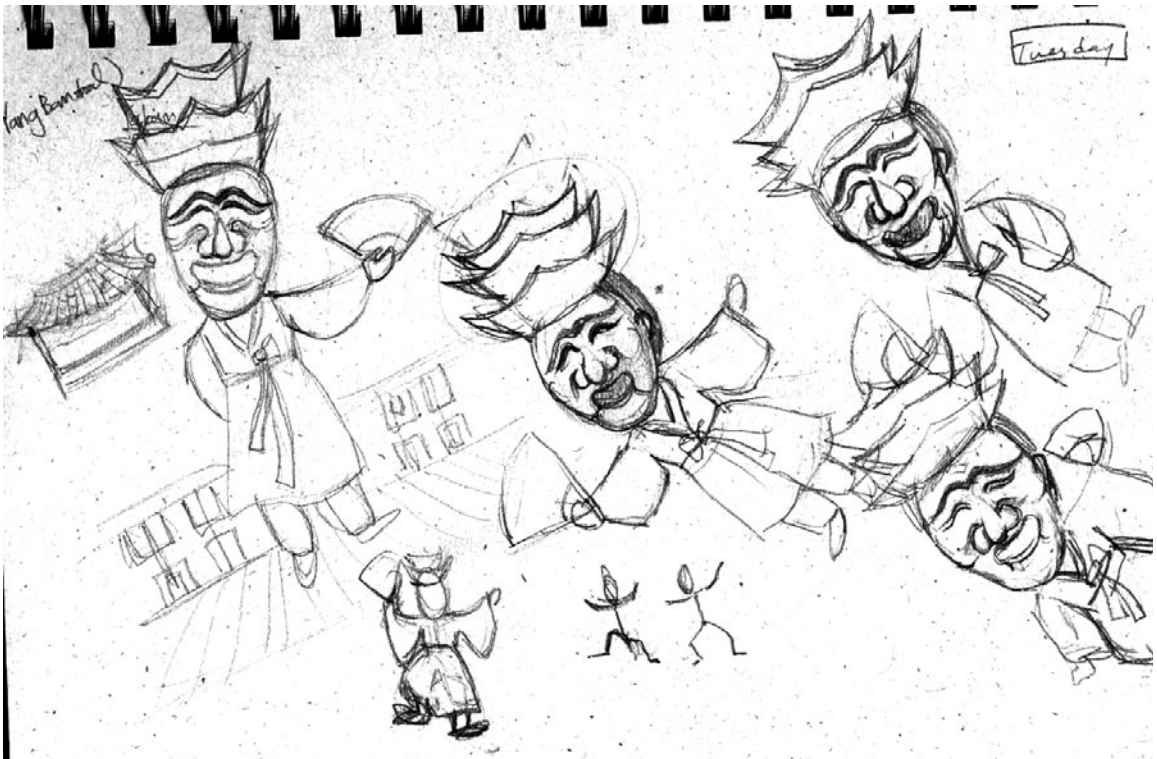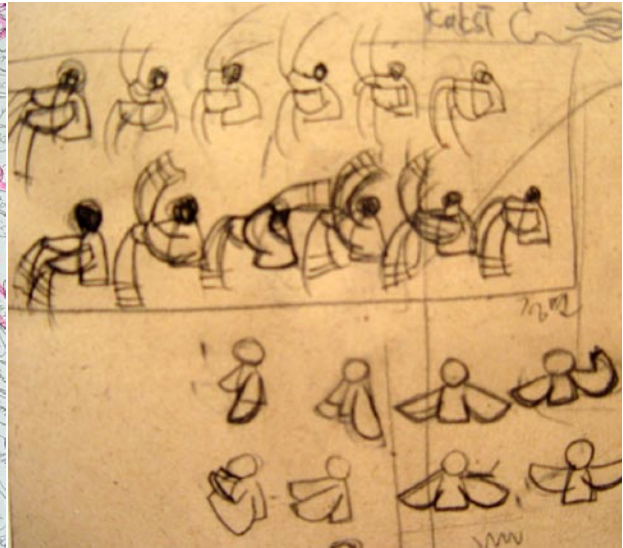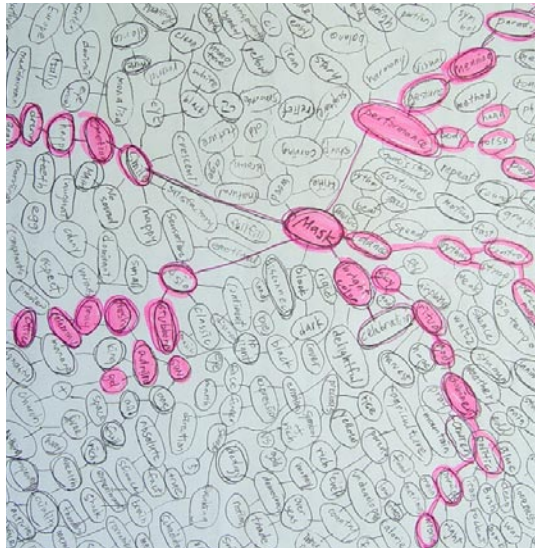
7. 2. Code Examples

Sequential part in the Kaksi story

```
value = 0
bg_mc.kaksi_mc.onRelease= function(){
        this.stopDrag();
        if(this.hitTest(bg_mc.hotspot_mc)){
                value += 1;
                this._x = bg_mc.hotspot_mc._x;
                this._y =  bg_mc.hotspot_mc._y-3;
                bg_mc.musician_mc.gotoAndStop("walk");
                }
}
bg_mc.sky_mc.sun_mc.onPress= function(){
        bg_mc.directarrow1.removeMovieClip();
        value += 1;
        bg_mc.sky_mc.sun_mc.enabled =false;
        bg_mc.sky_mc.sun_mc.gotoAndPlay(2);
        bg_mc.sky_mc.gotoAndPlay(2);
        bg_mc.kaksi_mc.gotoAndStop("dance")
}

bg_mc.hotspot2_mc.onRelease= function() {

  if (value==3)
  {
   click_sound.setVolume(50);
   bg_mc.kaksi_mc.xSlideTo(185,20,"linear")
   bg_mc.musician_mc.xSlideTo(185,20,"linear");
   bg_mc.musician_mc.onTweenComplete=function(){
   memopad.ySlideTo(-40, 0.5,"easeOutElastic")}
     }
  }
Count=0;
bg_mc.ritualtree_mc.onPress=function(){
  bg_mc.ritualtree_mc.ritualbranch_mc.gotoAndPlay();

        Count++
        for(i=0; i<leaveNum;i++)
        {
                bg_mc.ritualtree_mc["leave"+i+"_mc"]._xscale +=30;
                bg_mc.ritualtree_mc["leave"+i+"_mc"]._yscale +=30
                if(bg_mc.ritualtree_mc["leave"+i+"_mc"]._xscale>170)
                {bg_mc.ritualtree_mc["leave"+i+"_mc"].scaleTo(300,5, "easeoutelastic");}

        }
        if(Count>3){makeRainGrass();
            bg_mc.directarrow3.removeMovieClip();
             value+=1;
             bg_mc.ritualtree_mc.enabled =false;
             bg_mc.ritualgrass_mc.alphaTo(100, 2, "linear");
             bg_mc.ritualgrass_mc.onTweenComplete = function()
             bigBranchLeaves();
        }

}
```

Selecting a weapon in the Butcher's shooing game

```
//if user click the weapon, the selection is identified by its name
this["dart0"].onPress = function(){ setTarget(0); _root.selectedWeapon = "knife";}
this["dart1"].onPress = function(){ setTarget(1); _root.selectedWeapon = "axe"}
this["dart2"].onPress = function(){ setTarget(2); _root.selectedWeapon = "ax"}
this["dart3"].onPress = function(){ setTarget(3); _root.selectedWeapon = "pin"}

// identify which object should move to the spotlight
setTarget = function(i) {
        myClickedObject = _root["dart"+i];
        targetclick=1;
        move = true;

}
```

Random cow size in the stage, depending on the y-coordinates

```
//Game manager.as

class GameManager {
        var cowArray:Array;
        var pinArray:Array;
        var cowScale:Number;
        var score:Number;
        function GameManager() {
                cowArray = new Array();
                pinArray = new Array();
                //trace("game manager created");
        }
        function initGame(num) {
                for (var i = 0; i<num; i++) {
                        var nextCow = _root.attachMovie("cow", "cows"+i, _root.getNextHighest-
Depth());
                        nextCow._x = i*70+50;
                        nextCow._y = Math.random()*200+75;
                        cowScale = nextCow._y/300;
                        nextCow._xscale = nextCow._yscale=cowScale*100;
                        nextCow.swapDepths(nextCow._y);
                        cowArray.push(nextCow);
                }
        }
        function launchPin() {

                var initObj = new Object();
                initObj._x = _root._xmouse;
                initObj._y = Stage.height;
                var pin = _root.attachMovie(_root.selectedWeapon, "pin"+pinArray.length, _root.getNex-
tHighestDepth(), initObj);
                this.pinArray.push(pin);
```

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