From scratch to storyboard: Incorporating techniques for novice users

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Abstract: In multimedia, storyboards are utilized as a graphic organizer that comprises of illustrations or pictures showed in sequence to show how a story or plot unfolds and to arrange the scenes. It is a basic method to convey designer ideas to others. However, the development of a storyboard is a regularly neglected part of advanced digital storytelling and it may appear to be a tiresome task for those who involve in multimedia projects and also an illiterate user who has little knowledge of the techniques used to develop a storyboard. These paper objectives intend to give an overview and guidance on the idea of creation, techniques and tools used of a storyboard and its significance for novice users who involve in Multimedia venture. As an outcome, the knowledge of techniques and methods of storyboarding obtained from this paper may help to support novice users to come up with a good storyboard design that utilized some or all the techniques described and acknowledge how important it is to be applied in a multimedia project. This paper will help novice user to comprehend and implement the techniques described to increase their abilities in developing any multimedia project in the future.

Keywords: Iconic, schematic drawing, storyboard, storytelling, written description

1   Introduction

Today, with the emergence of new digital technology, the definition of storyboards has somewhat reverted back to its broader original meaning as a visual way to tell stories. A storyboard is a documentation for interactive multimedia production [1] that can be defined as an illustration of images displayed in sequence for pre-visualizing a story, animation, motion graphic and interactive media sequence that can easily convey the main idea of video or animation production. The storyboard becomes the key design document that the entire production team uses as a guideline for developing the interactive program [2]. It shows how the content of various course elements such as content, graphics and animation will be organized (module by module, screen by screen), and how it will be integrated into a seamless final product. The information on the storyboard is often reviewed and approved by the customer before the start of the development effort.

In animation history, the first storyboard was developed at the Walt Disney studios during the early 1930s, when animator Webb Smith came up with an alternative to describing a cartoon plot with words. He drew sequential scenes on separate sheets of paper and pinned them up to the walls of his office. Similar processes being in use at Walt Disney and other animation studios. One of the earliest and most well-known uses of modern storyboard was for the animated feature film Snow White and the Seven Dwarfs. Not only in the animation field, but also in other research domains, the storyboard is utilized in many studies as a tool for assisting the design and development of game [3]. Nowadays, as people can connect to stories, and often remember information better when it is wrapped up in a story, some film projects greatly benefit from storyboarding such as commercial advertisement, television show (with or without commercial breaks), instructional video, even YouTube and Vimeo videos. Hence, it seems that storyboards make the design and development process much more efficient, as they do not only help professionals to illustrate their ideas, but also to deliver engaging and visually

rich e-learning experiences to the audience. The next sections discuss in detail the significance of the storyboard in developing the subject matter.

A The Importance of Storyboarding

Creating storyboards is an often overlooked component of digital storytelling and for many students, storyboarding may seem like a tedious extra step. However, storyboards can be a valuable component in the creative process of new ideas by allowing the developers to organize and compile the existing resources in a blueprint before final development begins.

In animation production, story design is an important stage that determines the success of the movie. Many advantages have been reported through the implementation of storyboarding. Since a storyboard is visual, it simply makes it easier to explain the idea and narrative flow of the animation or video to the audience. Besides, it is very useful for the team production involved in the development process and all the stakeholders, as everyone can get the idea of how the idea of the design will be developed and accomplished most efficiently within the realistic timescale on a project. Although it has been acknowledged that making a storyboard takes time, but if we plan production with an initial sketch of the storyboard in the beginning, it will save a lot of time in the future, as you do not have to make changes once the training has been developed. This is because, while making the storyboard, we will be able to identify the weaknesses of the product or internal inconsistencies or other problems and correct it in the early stages of its development. From another point of view, an expert being consulted on the subject matter can see how their content will be delivered to the learner, and whether key learning objectives are being met through the proposed learning activities. They can advise of any changes and can make any alterations before development gets underway.

[4] mentioned that storyboards can provide an overview of the application to be produced and can trigger the reaction and interest of users in more depth. It's known that integrating a story within a course can lead to increased learner engagement. Besides, storyboards also help to check whether the narrative in the script makes sense once it's translated into a series of visual shots. Storyboards are critical for validating the potential story behind the video is realistic or relevant to the industry, but also for determining the direction the production team should take. Using storyboards allows a lead designer to outline the learning objectives early on in a project, meaning a larger team can all work towards meeting them further down the line with minimal confusion. This will reduce wasted time where unnecessary features would have to be removed if they weren't to the client's satisfaction.

2 Techniques of Storyboarding

The implementation of the storyboard will employ a better understanding and the designers will realize the complexity in visualization areas for improvement. Hence, the techniques of storyboard need to clear for novice users before implementing them in design. Techniques often describe concepts that are not apparent at first sight (e.g., techniques to reveal the individual behind a data point) [5]. Some techniques can only be used to draw the scenes of a storyboard; while other techniques can be employed the ease of use. Storyboarding relies heavily on the designers' imagination. Letting the designers use the imagination without knowing the techniques in creating storyboards would bias in representing outside the box thinking. The novice users are recommended to implement written description, schematic drawing and iconic in the draft of storyboard and scenes. Scenes were described with words or pictures embedded in the storyboard so that designers recognized the areas and objects that the team of interprofessional storyboard writers was portraying[6]. Therefore, all novice users need to know about implementing the storyboard either using the techniques individually or hybridize in the project This also allowed comparing the effective result based on users' requirements before implemented to a system or prototype.

A Written description

A written description is the easiest way to getting started in drafting the idea in the storyboard. Written descriptions in all the subjects need to be clear and simple and these descriptions would not make the actor or actress confused with the instruction[7]. The goal of using a written description is to determine how many scenes are needed and break up the elements of multimedia in more detail. In explaining the scenes, the designers choose the background music, suitable images and elements of multimedia based on the themes in developing the prototype. Figure 1 shows the first scene of a storyboard that consists of the written text to explain the scenario in a simple way, the background suitable to the themes and also the type of sound and video use suitable for the scene.
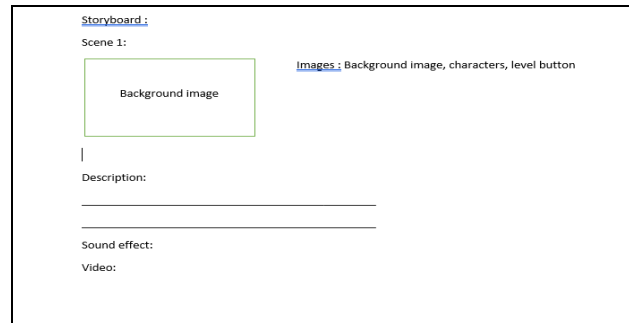
Figure 1: Linear multimedia storyboard

B Schematic drawings

Schematics drawing practically famous in the area of video visualization and editing that focuses more on the linear presentation multimedia elements. Schematic drawings are composed of multiple input frames and annotated using outlines, arrows, and text describing the motion in the scene[8]. Figure 2 implements scenes from *The curse Prince* storyboard. These sketches help identify the elements that will go into each scene to another scene. This storyboard is very typical of beginners and might be enough to establish as the basics idea.

Figure 2: Schematic sketches

C Iconic

Once the sequence of flow was identified, the focus will be on gathering the raw materials. Iconic materials currently used by developers are iconic pictures and iconic characters. Iconic pictures are used because can increase the ability to recognize and understand the meaning of the content[9]. This creation of iconic pictures in the service of the pleasure principle serves as a prototype of thinking [10]. Meanwhile, iconic characters are used to identify the actors of a story. Iconic characters implement in designing comics style. Several comics' styles combine iconic characters with very detailed and realistic backgrounds. This situation stimulates the readers to identify with the character and to imagine

that they enter the world that is presented in the background. The sample of iconic pictures and characters used in the storyboard.
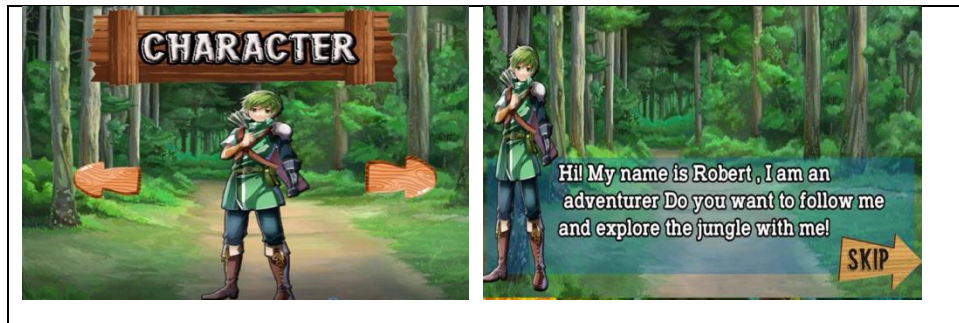

Figure 3: Implementing iconic pictures and characters

D Tell a story (storytelling)

The benefits of stories as ways of communicating information in a short yet memorable fashion and discuss an example of how storytelling concepts can be applied to a hypothetical command-and-control situation[11]. Usually, in storytelling, the elements are represented in the form of diagrams and charts embedded in a larger body of the text. Within these, the text elements were used in conveying the storyline and the images will be provided in supporting the texts in more detail. Although the storytelling and design domains produce different kinds of outputs, the early design process where they create their conceptual backgrounds share common tools such as scenarios and role-playing to envision future experiences [12]. As seen in figure 4, the concept used is a sample of a bedtime storytelling scenario.
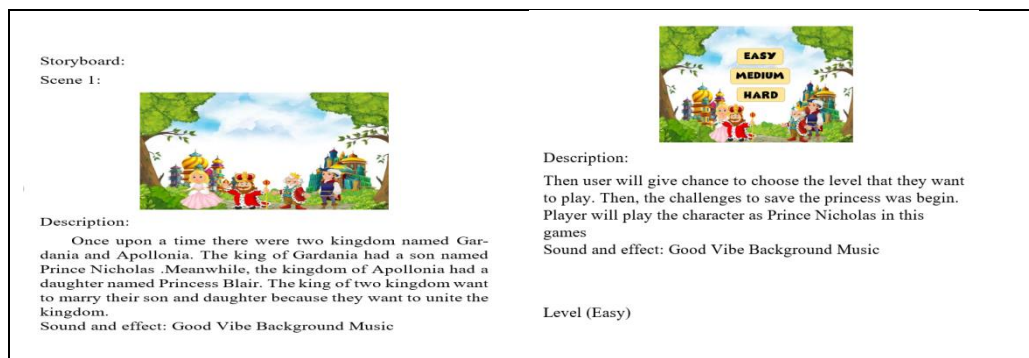

Figure 4: Bedtime storytelling scenario

E Visualization

Static visualizations have long been used to support storytelling[5], usually in the form of diagrams and charts embedded in a larger body of text [13]. The common narrative visualization used by developers comes from three dimensions which are; genre, visual narrative tactics and narrative structure tactics. Figure 5 showed a sample of narrative visualization.

In the genre dimension, visualization was applied using magazine style, annotated chart, partitioned poster, flow chart, comic strip, slide show and film. The genres vary in representing the number of frames and the ordering of virtual elements used in subject materials. For example, the developers need to study the target output by the user such to display in television standards, developers need to know broadcasting standards like National Television Standards Committee (NTSC) and Phase Alternate Line (PAL). These standards will control the rate of frames per second display to the user's output. The second dimension covers visual narrative tactics. In this dimension, techniques more focus on data graphics. Visual dimension can further establish the order in which the eye visits elements in the scene.

According to [14] iconic visualization tactics is the most spontaneous approach to a drawing because an object and shape used is similar to an already known object. Lastly is the narrative structure tactics dimension is an initial story, often involving dialogue and characters, which presents a microcosm of the larger news story. The Oxford English Dictionary defines narrative as "an account of a series of events, facts, etc., given in order and with the establishing of connections between them"[13].
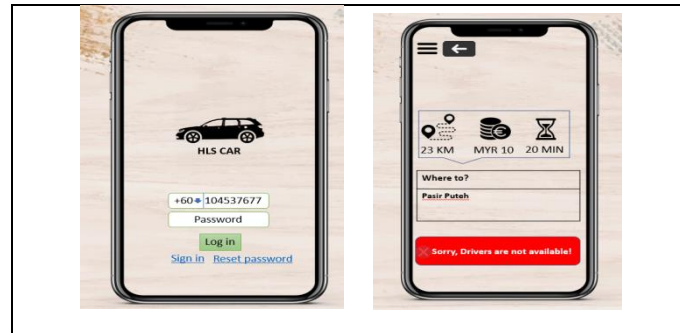

Figure 5: Narrative visualization

F Interactivity

The construction of storyboard panels can be deploys based on the subject topics, their assembly into complete storyboards and changing or adding to panels should all be interactive processes. Panel content should be capable of interaction to explore the data in depth. For instance, we treat each of the panels as a zoomable interface, they have all the functionality of the large interactive windows, but they are merely smaller[11]. Interaction is provided through various means including the user can choose what data to display through searching the data for different words [13], can choose the level to play, to start and to stop the application they used. Figure 6 showed the option to identify the users' identities.
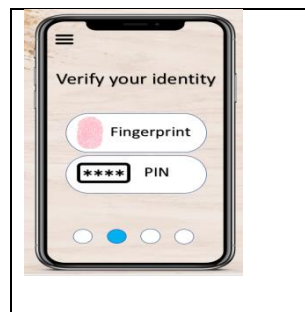

Figure 6: Interactivity features

3 Methodology of Storyboard Model

The characteristics of the storyboard are seen from the aspect of appearance, the development team, and the design of learning based on the ADDIE model consisting of the stages of analysis, designing, developing, implementing and evaluating [4]. To reduce storyboard development time and arouse new story ideas [3] has examined a new method of storyboard creation in the production process, as shown in figure 7 below.
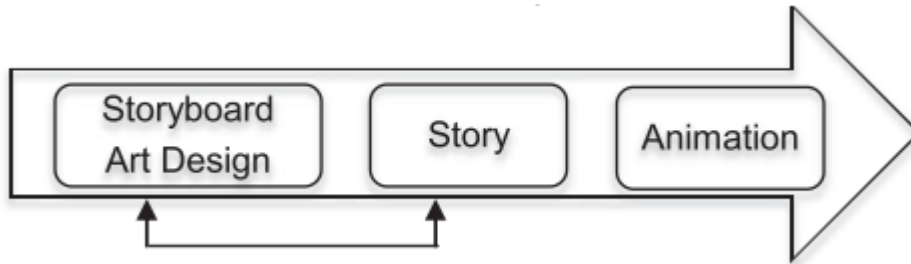
Figure 7: Model of storyboard [3]

Most of the storyboard techniques discussed above follow the standards of this model. The model starts with making a storyboard to developing stories. In this way, designers could directly use the storyboard pictures to express their creative ideas about the story or content to be delivered in many ways as explained in the storyboarding techniques above. In the process of storyboard creation and storyline development, designers could smoothly modify their ideas to check the story plot arrangement such as in a storytelling technique above. This way could save time in transforming ideas into written scripts, and conceptual words to images.

Storyboards are usually created before the actual work to create a digital story begins and written descriptions and graphic illustrations of story elements, such as images, text, narration, music, transitions, etc. are added to the storyboard. These elements are organized and rearranged in chronological order for maximum effect.

4 Discussion

Storyboarding considers important because it guides designers with a common point of reference to validate the structural and contents elements [15]. The designers will express their creative ideas of the story through the story plot arrangement in the storyboard [3]. For novice designers, it is advisable to understand the techniques of storyboard before implementing them in design. Since creating the last product in the interactive multimedia is a time consuming process, the drafting storyboard process needs to be clear in reducing the time to develop and repeating the same processes.

In general, most of the storyboards generated by novice users merely applied a part of the techniques. The creation of their storyboard sometimes practiced the written description technique or schematic drawing technique or iconic scenes technique or storytelling technique or visualization technique or interactivity technique or combinations of two or three techniques. This is since most of them, as a novice, are not familiar with the possible techniques that could be used in drafting the storyboard.

However, novice designers are capable of producing a storyboard design that fulfills almost all the techniques mentioned above. Accordingly, most designers are exposed to these techniques when navigating any multimedia presentation, in most cases implementing almost all the techniques, whether through an interactive application, a website, or even through a smartphone. Ultimately, this multimedia presentation could entice the idea of using, for example, iconic scenes or visualization or interactivity techniques in storyboarding.

To validate the matter, the authors found one of the storyboards created by novice designers with less technical knowledge that constructs a storyboard design effectively by using techniques *(A)* to *(F)*. The designers created a storyboard project entitled 'Hola Espanol' focuses on educational language learning with a simple game implemented. This storyboard covered only a basic Spanish language to deliver the idea of fun learning a new foreign language for a non-native audience. Here is the sample of the storyboard:

PROJECT : HOLA ESPANOL
TITLE/SUBTITLE : HOME
SCENE : 1 OF 10

(B)

WELCOME TO HOLA ESPANOL

BACKGROUND :
MULTIPLE

AUDIO :
YES

VIDEO :
NO

(D) & (F)

ANIMATION :
YES

(A) & (D)

TEXT ATTRIBUTES/COMMENTS :
The title WELCOME TO HOLA ESPANOL will spin around when the user open this program. At the same time, the narrative audio appears the history of Spanish language starts with "Spanish is the native language to 330 million people in 21 countries. It's considered the 2nd world language in international communication...". But when the user click the Spanish Flag Button, then it will go to the next scene.

PROJECT : HOLA ESPANOL
TITLE/SUBTITLE : MAIN PAGE
SCENE : 2 OF 10

(B)

BACKGROUND :
MULTIPLE

AUDIO :
YES

(F)

VIDEO :
NO

ANIMATION :
YES

(A)

TEXT ATTRIBUTES/COMMENTS :
This scene have their background audio. The beginner, medium, conversational and Spanish button video will appear smaller and bigger alternately . When the user click beginner, medium, conversational or Spanish video button, then audio for that words will appear. The home button is for go to for Home page scene.

PROJECT : HOLA ESPANOL
TITLE/SUBTITLE : MAIN PAGE-BEGINNER
SCENE : 3 OF 10

(B)

BEGINNER

BACKGROUND :
MULTIPLE

AUDIO :
YES

VIDEO :
NO

ANIMATION :
YES

(A)

(F)

TEXT ATTRIBUTES/COMMENTS :
The title BEGINNER started to appear slowly from down to up" . Then, the star button appear one by one followed by a voice read the subtitle each star button. The home button, previous and next button will appear sound when the button is clicked.

PROJECT : HOLA ESPANOL
TITLE/SUBTITLE : BEGINNER-COLORS
SCENE : 4 OF 10

(B)

COLORS

AZUL AMARILLO VERDE NEGRO
BLANCO GRIS CELESTE ROSADO
ROJO VIOLETA CAFE
PREVIOUS HOME NEXT

BACKGROUND :
MULTIPLE

AUDIO :
YES

(E)

VIDEO :
NO

ANIMATION :
YES

(A)

(F)

TEXT ATTRIBUTES/COMMENTS :
The subtitle color appear from left to center . The face button move then stop at the suitable place. The home button, previous and next button will appear sound when the button is clicked.

PROJECT : HOLA ESPANOL
TITLE/SUBTITLE : BEGINNER-DAYS
SCENE : 5 OF 10

(B)

¡Feliz

DAYS

DOMINGO (SUNDAY)	MIÉRCOLAS (WEDNESDAY)
LUNAS (MONDAY)	JUEVES (THURSDAY)	SABADO (SATURDAY)
MARTES (TUESDAY)	VIERNAS (FRIDAY)

PREVIOUS   HOME   NEXT

BACKGROUND :
MULTIPLE

AUDIO :
YES

VIDEO :
NO

ANIMATION :
YES

(A)

(F)

TEXT ATTRIBUTES/COMMENTS :
The buttons appear from down to top. Then, the audio appears when the user clicked the button. The home button, previous and next button will appear sound when the button is clicked.

PROJECT : HOLA ESPANOL
TITLE/SUBTITLE : BEGINNER-FAMILY
SCENE : 6 OF 10

(B)

¡Feliz

FAMILY

Los hermanos   La madre   El padre
La abuelita   El abuelito   El bebé

PREVIOUS   HOME   NEXT

BACKGROUND :
MULTIPLE

AUDIO :
YES

(C)

VIDEO :
NO

ANIMATION :
YES

(A)

(F)

TEXT ATTRIBUTES/COMMENTS :
The subtitle family appear from right to center . Then, the people moves and stop at the right place. The home button, previous and next button will appear sound when the button is clicked.

PROJECT : HOLA ESPANOL
TITLE/SUBTITLE : BEGINNER-BODY PARTS
SCENE : 7 OF 10

(B)

¡Feliz

BODY PARTS

El ojos   El orejas   El codo   El cabello
El pie   La pierna   Las mano   Nariz

PREVIOUS   HOME   NEXT

BACKGROUND :
MULTIPLE

AUDIO :
YES

(C)

VIDEO :
NO

ANIMATION :
YES

(A)

(F)

TEXT ATTRIBUTES/COMMENTS :
The picture will move from right to left and the audio will hear when the user clicked the picture. The home button, previous and next button will appear sound when the button is clicked.

PROJECT : HOLA ESPANOL
TITLE/SUBTITLE : BEGINNER-SHAPES
SCENE : 8 OF 10

(B)

¡Feliz

SHAPES

El triángulo   El cuadrado   El rectángulo
El óvalo   El círculo   La estrella

PREVIOUS   HOME   NEXT

BACKGROUND :
MULTIPLE

AUDIO :
YES

(C)

VIDEO :
NO

ANIMATION :
YES

(A)

(F)

TEXT ATTRIBUTES/COMMENTS :
The subtitle pronunciation appear from left to center . Then, the shapes will moves followed by the path. The home button, previous and next button will appear sound when the button is clicked.
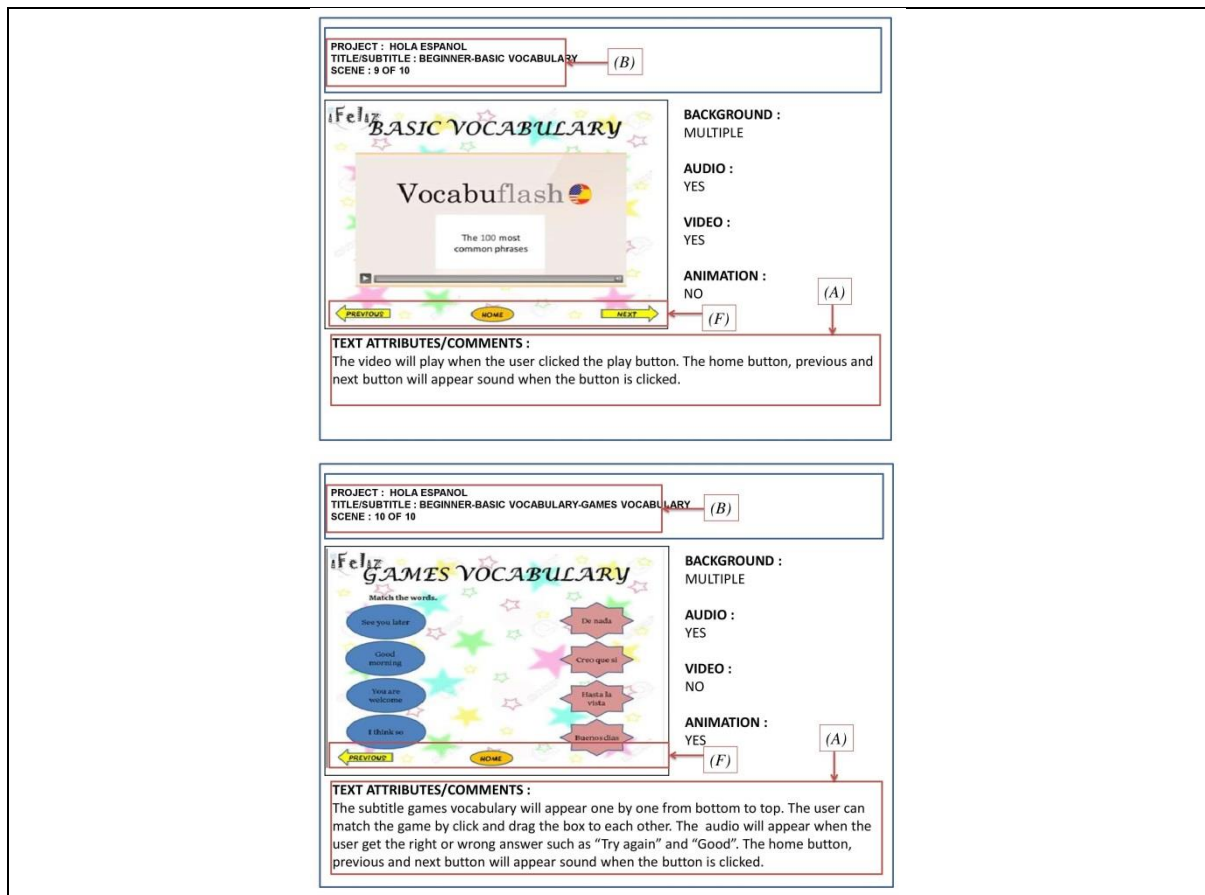
Figure 8: Educational storyboard design

This storyboard sample implemented the first technique highlighted above at (*A) Written description* technique whereby the designers described the flow of the storyboard in terms of elements structure in every scene. It also indicates the details of each scene based on the project's name, the title of the scene, the scene numbers, the audio, video and animation elements notation as well as the comments descriptions. Indirectly, it shows that the designers understood the process involved and how each element can be presented in the final product. By using this technique, the users may have a clear overview of the scenario and fully grasp the types of elements that should be incorporated in each scene.

Conversely, the 'Hola Espanol' project implemented the (*B) Schematic drawing* technique by outlining the motion of scenes based on text only. It is presented based on the number of scenes starting from Scene 1 of 10 for Scene 1, Scene 2 of 10 for Scene 2 until the last scene refers to Scene 10 of 10. This technique specifies the sequence of scenes and it helps the designers to comprehend the layout of the scene adequately.

Moreover, the designers applied the (*C) Iconic* techniques in most of the scenes. For example, in Scene 7, the designers put Iconic pictures to represent the body parts icons such as the eyes, ears, nose, hands and others. Thus, it guides the audience in identifying body parts without any specific keywords. The audience could learn the Spanish words directly from the icons. Similarly, with the next scene, Scene 8, the shapes presented in the form of Iconic pictures clearly show the indication of the triangle, rectangle, oval and others.

The sample, on the other hand, used the (*D) Tell a story (storytelling)* technique at the beginning of storyboard development. The designers provide the storytelling fashion in the form of narrative audio. It deliberately shares the history of the Spanish language to give the audience a sense of

appreciating the non-native language. From the beginning of time, the storytelling technique would always capture the audience's attention because it conveys a unique and notable vibe.

Next, the (*E) Visualization* technique in this storyboard sample dictates quite a similar concept with the iconic technique. It applied a static visualization which the text used in the forms of diagrams. For instance, in Scene 4, the colors visualized in the forms of 'smiley' are embedded with the Spanish text. Each 'smiley' represents different colors and different meanings. This allows the user to learn Spanish quickly since the notation of colors is visualized.

Finally, the (*F) Interactivity* technique was commonly applied in this sample. The designers applied the interactive buttons at each scene which allow the user to navigate the presentation smoothly. Starting from Scene 1, it provides the Click Me button that used to precede the next scene. Then at the other scenes, the Next, Previous and Home buttons were embedded to guide users in navigating the presentation from one scene to another. It is important to design as many meaningful interactivity as possible.

As discussed, various techniques were implemented in this novice's storyboard though it has some features that need to be improved. Yet, it shows that novice users can create a refine storyboard by implementing the techniques of storyboarding and these techniques are all suitable to be embedded in storyboarding for novice designers. Consequently, the use of techniques in the storyboard could promote meaningful learning and better understanding in creating the final product.

5   Conclusion

Storyboarding can be a significant segment in the innovative cycle by permitting the developer to compose pictures and text in an outline style before the development starts. As per objectives mentioned earlier in the paper which it intends to give an overview and guidance on storyboard development techniques, tools used and its importance, it allows the user who involves in Multimedia venture to envision how the project will be assembled and help outline what gaps exist since they can see the whole arrangement spread out before them. Storyboarding can also motivate novel thoughts just as lets the developer revise existing resources before the final development starts and changes might be more earnestly to make. The future directions for this exploration will include sketching and drawing as future inquiry in human computer interaction (HCI). Sketching and drawing can enlighten the worlds concerning a subject area of prototype and join different perspectives in their application. Furthermore, future works also could investigate the potential into auto generated storyboard for android as a framework to restore the envisioned storyboard of Android applications. Such a storyboard benefits different roles of project managers, User Interface (UI) designers, and developers in the application development process. The broad analysis and user study show the viability and value of "StoryDroid" to build a huge database of a storyboard to overcome any barrier across application activities (text), user interface pages (picture), and execution code.

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