2006-1723: IDEA DEVELOPMENT AND COMMUNICATION THROUGH STORYBOARDS

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Idea Development and Communication through Storyboards

Abstract

Storyboard creation can be an alternative way of teaching visual problem solving. Expressing a concept or idea showing action, or thinking a problem through from start to finish can be done through storyboards. The very name 'storyboard' implies the ability to tell a story or communicate an idea. The story can be abstract or concrete, however, it requires the student to think through the process and figure out how to present the idea. It can be serious or it can be fun, however, storyboarding asks a student to present an idea in an interesting and carefully crafted manner. This can be done with a pencil or on the computer; however, the tool is not the emphasis. The focus is on the process of developing an idea and communicating it visually.

Introduction

As educators, we attempt to teach students to become problem solvers, and as graphics instructors we use a variety of complex, technical tools to help us achieve this purpose. CAD, parametric modeling, animation, 3-D modeling, web, and multimedia are now being taught in many of our classes. While not always intuitive, these packages allow us to teach students to solve complex engineering problems through graphical means.

The design process often includes brainstorming and/or multiple solutions or attempts at solutions as a part of the process. We ask engineering students who have spent their academic lives studying calculus, physics, and the like to be creative or to think on the right side of their brain. Storyboarding can be another tool for developing visual problem solving and communication skills.

Laseau describes *Graphic Thinking as "thinking assisted by sketching*." He further states that graphic thinking is usually "…associated with the conceptual design stages of a project in which thinking and sketching work closely together as stimulants for developing ideas." (Laseau, 2001) According to Barr (1999), sketching is a quick and easy way to express ideas manually. It is a natural psychomotor process of ideation in which design ideas are generated in one's mind and expressed through the process of sketching. Sketching is a part of most engineering graphics programs and has been identified as a valuable asset in the Engineering Design Graphics curriculum (Barr, et. al. 1999, Branoff, et. al. 2001, Myers 2000, Sorby 2003).

Teamwork has also been identified as an important aspect of the Engineering Graphics curriculum (Barr (1999), Myers (2000), Smith (2003). Being able to communicate with team members in your own discipline is important, being able to communicate with team members from other disciplines may be much more important.

Most of us are familiar with storyboards as a tool used in creating movies. Many disciplines including multimedia development, web, and animation design also rely on storyboards as a planning and communication tool. In a professional environment where interdisciplinary collaboration is commonplace, communication between individuals can be difficult due to the "language barrier" that exists between engineers and designers. (Rivera-Chang, 2002) He suggests that sketching is a common skill, which can be used to "bridge" the communication gap. Storyboards can be used as a tool to develop ideas and processes as well as to explain and share ideas with project team members. Interdisciplinary teams communicate through both verbal and visual communication that may include numbers, words, drawings, prototypes, 3-D models, and statistics. Rivera-Chang suggests that this lack of communication may not be as pronounced in the academic setting where interdisciplinary collaboration is not a common practice, however, in the professional environment, interdisciplinary collaboration is common.

Storyboards

Fraioli (2000), defines a traditional description of storyboards as "…a visual reference depicting a particular scene or action, usually taken from a screenplay or some other form of written story line." Storyboards are used as a communication tool to prevent costly mistakes due to disappointing or unexpected results. Storyboards can also be used to communicate with a broader audience in terms that anyone can understand. Storyboards can address complex concepts and process through the use of images and text.

The underlying purpose of storyboards is ideation. Just as sketches are used for brainstorming, storyboards can be used to outline a process—how something will be built, assembled or modified. Storyboards show the stages of a story or a sequence of events. For a TV commercial, the story would show how the scenes unfold and the changing viewpoints. Storyboards for a website or multimedia project would show each screen in order to show content and links to subsequent screens. Knowledge management solutions use storyboards to capture the real-world context in which new technology will be used in order to convey "…functionality of a proposed solution, product or service."(Wallace,1997) Business groups use storyboarding as problem-solving and strategic planning tool.

"Graphic thinking can open up channels of communication with ourselves and those people with whom we work. The sketches generated are important because they show how we are thinking about a problem, not just what we think about it." (Laseau, 2001) By using storyboards, students can visualize their ideas and use them as a forum for discussion with others to evaluate, validate and suggest changes.

Uses for Storyboards

Storyboards can be used for a variety of purposes beyond movie making. In the book *Show Me: The complete guide to Storyboarding and problem Solving,* Forsch (1995) advocates the use of storyboards in a broader arena. Following are other uses for storyboards that he suggests;
- stimulating creative thinking
- planning a project
- collecting ideas

- exploring an organization
- communicating a concept
- illustrating a briefing
- understanding the big picture

His definition of storyboards is broader than the traditional one, "A series of panels showing clearly, using pictures, numbers and words, important changes, in order of occurrence, that taken together tell an interesting story" (Forsha, 1995). A brainstorming storyboard might include a series of features required for a new product or several alternate ways to implement a feature. Whereas a planning storyboard might document the development stages of a product including team members, resources and tasks required at each stage. Storyboards can be the venue for Laseau's (2001). "graphic thinking." To communicate with drawings aids the thought process, exposes flaws in thinking and invites others to scrutinize one's ideas.

Within engineering, storyboards can be used to demonstrate process or configuration. They can be used to define the steps of a manufacturing process. Each frame can be a snapshot of the process showing different viewpoints, details, or problem areas. A storyboard could be used to think through and visualize the steps for assembling a complex assembly. See Figure 1.
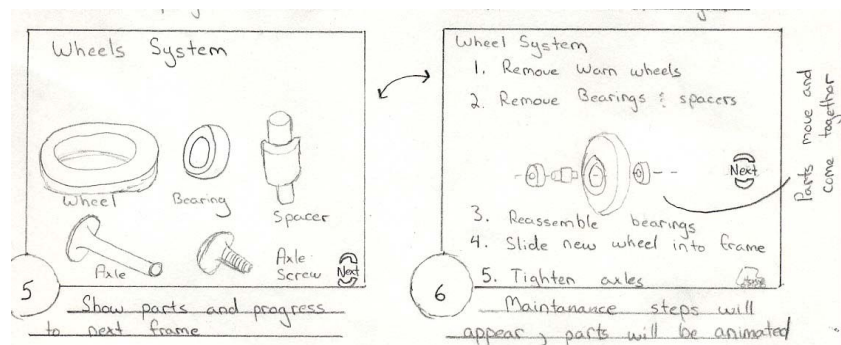
Figure 1. Assembly

Characteristics of Storyboards

All storyboards have certain characteristics that can be enhanced by a variety of graphic and visual techniques. The characteristics include sequencing, visuals, framing, and storytelling. (Wallace, 1997). A variety of techniques can be used to achieve a visual story. A storyboard can be complex with many details for a movie or simplified for problem solving. When trying to develop storyboard skills in your students start with the basics adding more elements as the students become more proficient.

Simon (2000) describes a list of thirty-four design elements that can be used to create effective and exciting storyboards. While not all of these are appropriate for engineering students, many of them have universal application. Following is a list of characteristics with some examples that can help students achieve a visual story.

❖ Use extreme close ups. (Figure 2) This will draw attention to the frame and help the viewer focus.

Figure 2. Close Ups

❖ Using an establishing shot can help give the viewer an overview of the scene and a sense of place. (Figure 3) This technique is often used in one of the first frames.
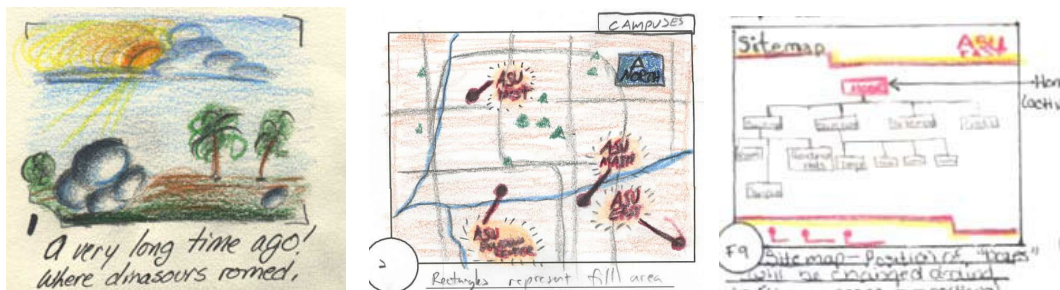

Figure 3. Establishing the shot

❖ Words with graphics can convey action or description. (Figure 4) Cartoons and comics are known for the use of words like POW!!! And WHAM!!! To give the viewer as sense of action. In a technical the words can describe parts or relationships. When placed within the frame, these words become part of the graphic.
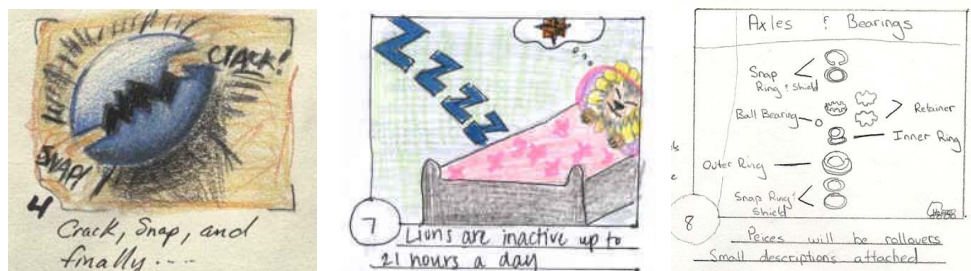
Figure 4. Using words

❖ Add depth by placing objects in the foreground. (Figure 5) Putting something up close makes smaller objects appear to be further in the background creating depth within the frame.
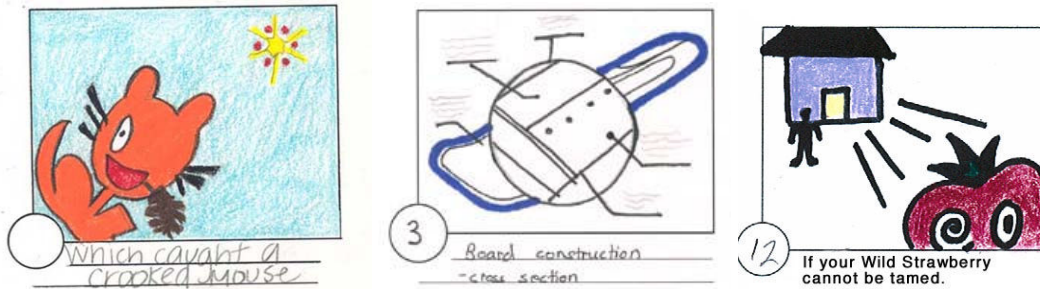

Figure 5. Foreground object

❖ Don't place everything in the middle of the frame. (Figure 6) Beginners tend to think of frame as a boundary. Try to think of it as a snapshot. As a photographer, we don't always get things centered in the viewfinder, and there are things that don't fit within the frame.
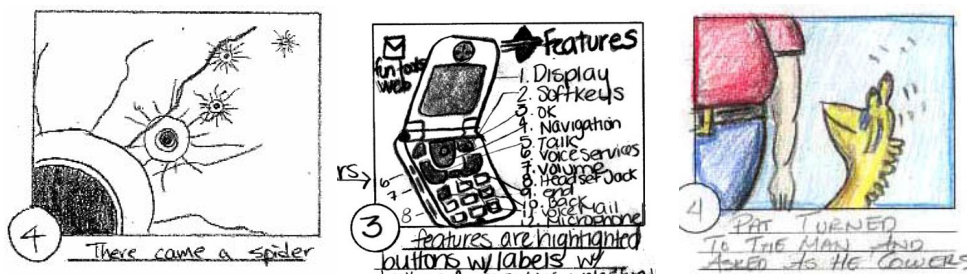

Figure 6. Off center framing

❖ Give the viewer perspective by tilting the frame up to emphasize tall objects, down to emphasize short objects. (Figure 7) Try to show things from different viewpoints. You can also use foreshortening so that one element in the frame is featured prominently in the foreground
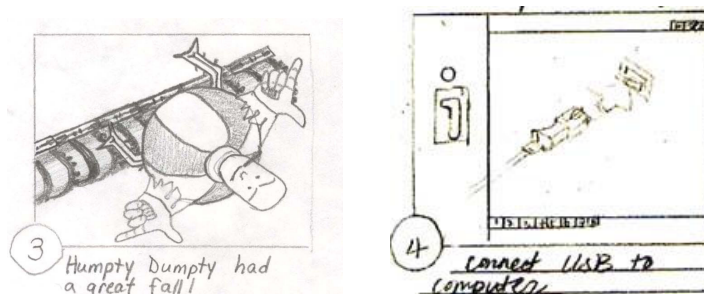

Figure 7. Viewpoint

❖ Use as much or as little detail as necessary to make the point. Some storyboards demand more details then other. Storyboards can be effective in a wide range of styles and shown in Figure 8.
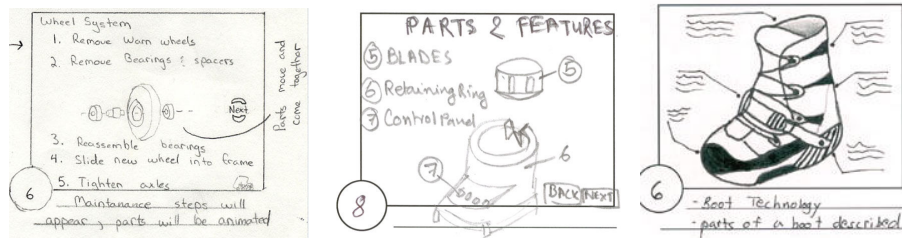

Figure 8. Details as needed

Techniques for Getting Started

Getting students to sketch is always a challenge. In their book "Draw!", Hanks and Belliston (1977) state that, "To draw is to see. Visualization is a method of expressing and evaluating what our mind conceives." In his case study of a team project between industrial design and engineering students, Rivera-Chang noted "resistance from students" when asked to develop ideas using a sketch overlay technique because they were not "comfortable" with the technique which was not specific to their discipline (2002).

First, start out by discussing the use of drawings as part of the inventive process throughout history by people of all disciplines. Leonardo daVinci, Thomas Edison, Disney animators, Pixar artists have all used drawings a visual means of describing their ideas.

Second, discuss the idea of storyboards as a tool. Storyboards are a means to an end. Their purpose is twofold 1) To allow one to previsualize ideas and refine them and 2) To communicate ideas to the production team (Katz, 1991).

Third, and most importantly, get the students drawing! Each scene of a storyboard represents a frame. Students can use index cards, post-its or boxes on a page to sketch out key scenes, concepts or processes. Following are examples of different techniques suggested for helping students become proficient in storyboarding.

Written Descriptions
A simple way to get started is to have students storyboard a written description that they find or you supply (Katz, 1991). The goal is to determine how many scenes are needed and break up the text to focus on important features. Students can use a nursery rhyme, a song or a passage from a book. Figure 9 show the first four frames of a storyboard that will be developed for an interactive multimedia project.
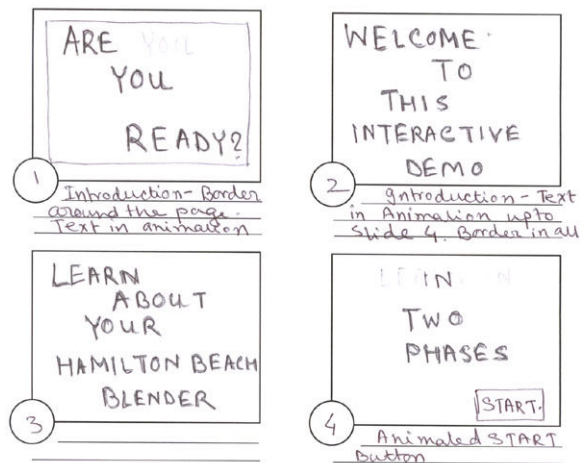
Figure 9. Interactive Multimedia Storyboard

Schematic Drawings

Students can then move on to a more schematic approach (Katz, 1991). Simple 2-d views that show what elements might be included in each frame. For example, the first frame of the Jack & Jill sequence might show two stick figures with a hill in the background. The drawings need not be in perspective or even show a viewpoint. Figure 10 shows schematic frames from Little Miss Muffet. These rudimentary sketches help identify the elements that will go into each from. frame.. This storyboard is very typical of beginners and might be enough to establish the basics
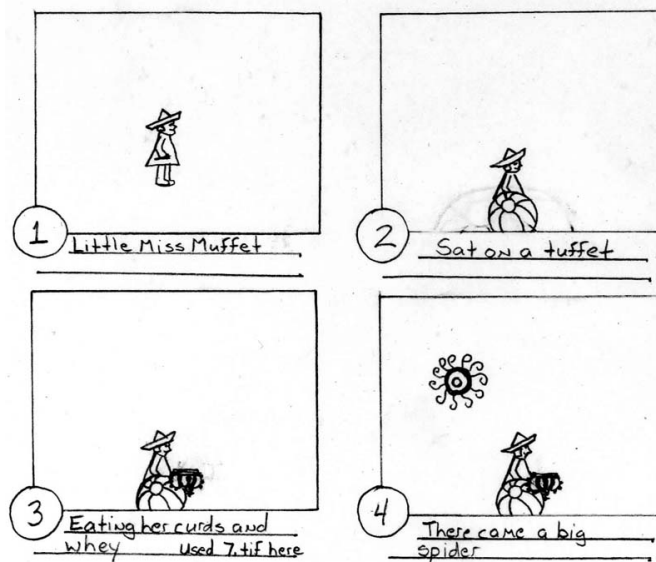
Figure 10. Schematic Sketches

Iconic Scenes

Once the sequence of events is laid out a one way to help students understand the process and further develop skill in developing storyboard is to have them create a storyboard using only icons to create the scenes. This gives the students a framework to work from and isn't as daunting as staring at a blank page and trying to create all of the visuals to tell a story. Provide a collection of icons which they can trace or modify using a pencil, marker, or basic drawing

software and ask them to illustrate the story. Along with the icons provide guidelines that delineate what they can and cannot do. The guidelines for a first storyboard could include:

- Overlap items
- Allow things to run off the page
- Think about the concept you are illustrating
- Use large and small images
- Image must be recognizable
- Don't use little bits of the images
- Be less concerned with the actual storytelling

In the following case, the students were given a nursery rhyme and told to create a visual storyboard. All the students were given a set of visual icons and told to use the icons to create the story. The emphasis is on creating the storyboard and developing visual storytelling skills. Given the basic story (rhyme), the storyboard layout, and the icons, the students can concentrate on the creating the frames.

Figure 11. Sample Icons for storyboard development

Figure 12 shows more fully developed storyboards for Little Miss Muffet. The students used the icons that were given, hand sketched in black and white.
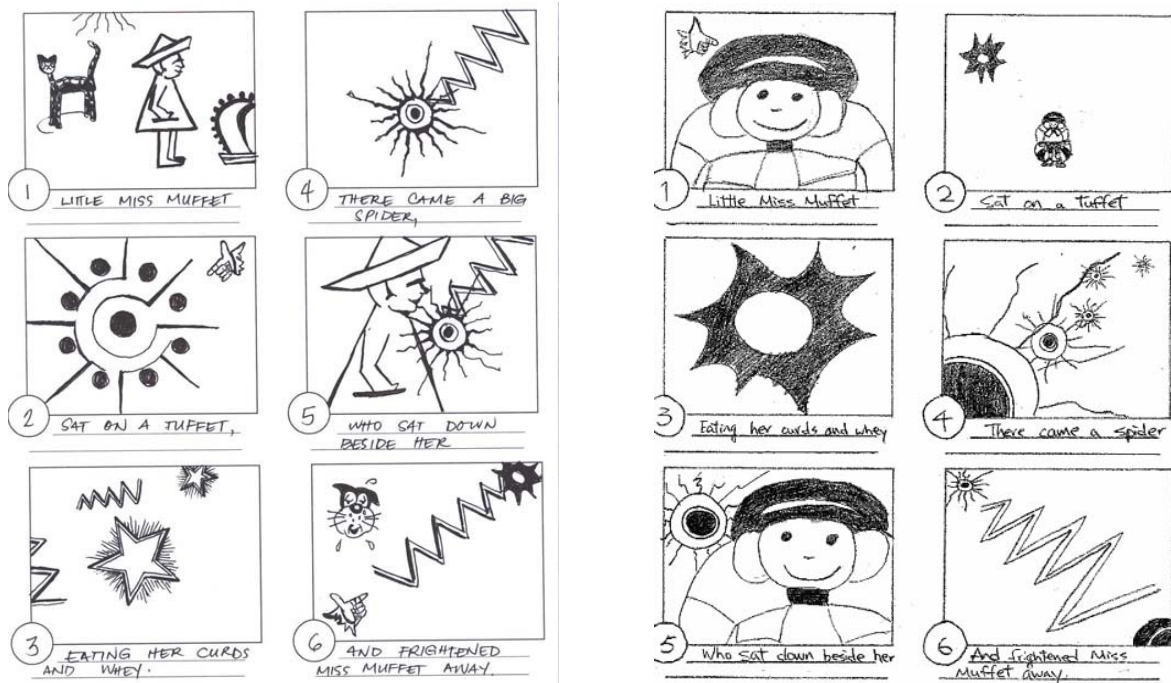

Figure 12. Little Miss Muffet Storyboards

Prior to the second attempt, further discuss framing, viewpoint and showing depth and motion. Show and compare some of the frames from the first exercise. A good basis for discussing these concepts is a comic book sequence or the daily comics. For the second attempt suggest that the students try to incorporate more of the techniques and possibly color. The results of their second attempt will show better use of these concepts. Figure 13 shows two examples of student work illustrating Wee Willy Winky.

Figure 13. Wee Willy Winky Storyboards

Tell a Story
The final stage is to create storyboards in the true sense of the word—a series of sketches that tell a story. Remind students that the goal is to communicate the story or sequence, not to draw every detail as realistically as possible. For this stage, give the students a prop and ask them to tell a story with it. This may be an image, a character, or a concept. In Figure 14, the students were given flexible six inch plastic figure and told to use the figure in a storyboard and tell a story. In the example on the left, the figure was a lion, in the example on the right the plastic figure was a giraffe.
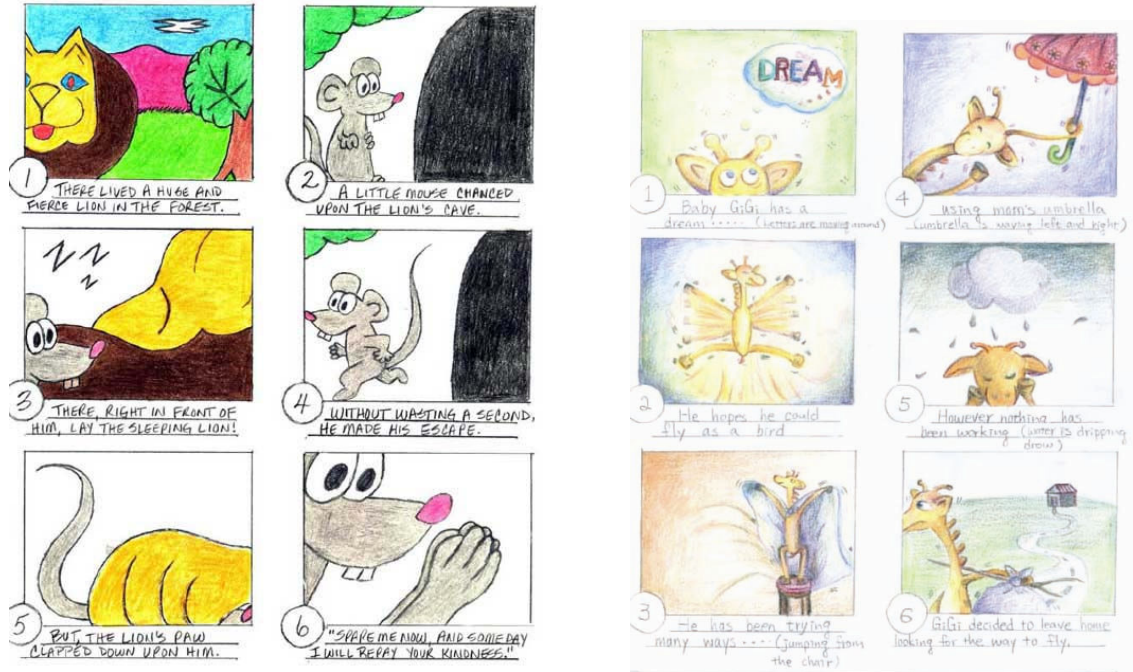
Figure 14. Telling a story

Storyboards can help students think through a problem before they jump onto the computer and use valuable time creating visuals that might not solve the problem. Figure 15 shows the first few frames of a student storyboard designed for an informative animation about the construction of a ski boot.
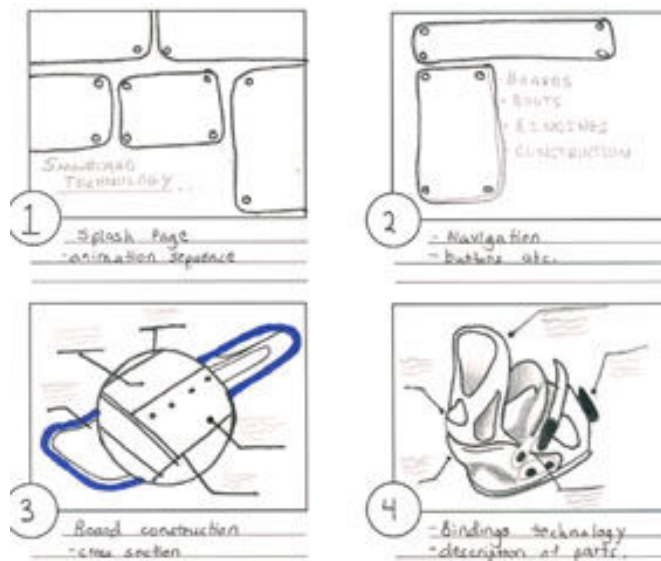

Figure 15. Product Storyboard

Conclusions

Storyboards can be a helpful tool for planning a complex project. They can be used as a communication tool for team members as well as communication for people outside the team. Creating effective storyboards is a skill that can be developed. By using the process demonstrated here, students can develop the skill and confidence to prepare storyboards that communicate a visual story for planning and communication. Although most of the examples shown in this paper are not technical illustrations typical of engineering drawing, the process is the same for all storyboards. Using some of these techniques might help students think visually and be more comfortable putting their ideas down on paper before they jump onto the computer.

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