

**FORM PERCEPTION:  
AN INTERACTIVE GUIDE TO THE GESTALT PRINCIPLES**

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## **Abstract**

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The term Gestalt literally means “form” in German. In the early 20th century, the Gestalt Principles of Perception were developed by German psychologists from the Berlin School. These principles describe the different ways the human mind organizes visual elements into groups or unified wholes. The definition of Gestalt in relation to these principles is “unified whole.”

This thesis is an endeavor to examine the five major principles of Gestalt perception through the use of short animations and illustrated examples, presented in a website. It will also allow the user to test the knowledge provided through a short multiple-choice quiz and an experimental workshop section. The website will essentially be an educational tool for students and teachers alike, helping establish a strong visual and aesthetic awareness and improvement in design choices.

Thesis URL

<http://hxa3529.cias.rit.edu/thesis>

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## I. Introduction

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The average human is exposed to more than 5000 images (Burnett) per day. All imagery is composed of the same basic components; visual elements. The Gestalt Principles of Perception that were developed by psychologists in Germany in the 1920s categorize and describe the different ways the human brain perceives these different visual elements into unified wholes, and thus meaningful information.

This thesis is an educational reference to the basic Gestalt principles of form perception: Closure, Continuity, Figure – Ground, Proximity and Similarity. It is an interpretation of these theories through the use of short instructional animations, which will be a starting guide and an explanation to the nature and relationship of shapes in design. In addition, enabling the user to experience digital brainstorming through the use of a canvas and default shapes - that will allow for a drag and drop function, amongst other tools - will make for easier understanding of how shapes work and relate together. The user will be provided with optional short exercises that will work as 'brain stimulus' because they target the right side of the brain, which is the creative side, and will hopefully encourage the synthesis of different design solutions when presented with a visual problem.

The medium for this thesis will be web-based. Ideally, the website - both instructional and interactive- will be used by design instructors and students. The rationale behind choosing this medium is that a website can be easily incorporated into a classroom or any study program related to design, and because the web is easily accessed by millions of people everyday, it will reach many people. It is also easily changed and updated, providing the option of expansion and renewal. A website is also a medium in which the user can interact and submit their ideas, sketches, and comments, advantages that cannot be found in books or most other mediums.

## II. Relevance

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This project is relevant and important to the art and design fields, as it provides a reference to the Gestalt Principles of Perception. Although these principles were developed in the early 20th century, they continue to be an essential framework that visually enhances all artworks and designs. This project will guide the young designer or student into creating stronger and more effective design solutions through the implementation of the Gestalt principles.

### III. Precedence

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At the early stages of this thesis project, extensive research took place to identify and study the existing projects and case studies that have a similar scope to this project, in terms of content and interactivity.

This research proved useful in two ways; first in finding out if there was a surplus of projects (websites, books, brochures) about the Gestalt Principles of Perception that were animated and allowed the user implement the principles online (which in that case might have rendered the thesis project simply redundant). Secondly, it helped discover what existing projects were missing and how they could have been more effective.

#### Case study I Motion Gestalt

*Motion Gestalt for Screen Design:  
Applied Theory of Grouping Principles for Visual Motion Integrity*  
URL: <http://www.motiongestalt.com>

This website was perhaps the closest precedent to this thesis project. It featured several short animations that explained visual motion in relation to the Gestalt Principles of Perception. The animations were accompanied by a short paragraph that explained the principles presented in each one. The website however was strictly academic, and does allow for any user interaction except for the viewing of the animations.

#### Case study II Art Pad

*Art Pad*  
URL: <http://artpad.art.com/artpad/painter/>

The simplicity and intuitiveness of this website makes it enjoyable to use. It basically consists of a drawing pad and several tools. The website features options like save, print, hang in gallery and browse themes. I would like to incorporate some of these options in my thesis project.

### III. Precedence

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**Case study III**  
**Snowflake**  
**Workshop**

*Snowflake Workshop*

*URL: <http://www.snowflakeworkshop.com/>*

This website - a flash creation - utilizes different tools and features that guide the user to create a snowflake, which can be then viewed and saved in a gallery. It is very similar to my thesis project in terms of user interactivity, and the employment of real life “tangible” elements; scissor, paper, pen, eraser etc. It is visually pleasing and easy to use.

**Case study IV**  
**Visual Thinking**

*Visual Thinking:*

*Thinking and Gestalt Theory*

*URL:*

*<http://www2.spsu.edu/cteacad/bseaboltx/3000/Visual%20thinking/>*

This website is a series of slides that walks the user through the process of visual thinking and theories that are related such as Gestalt’s principles of perception. It is fairly useful with plenty of good information, but it lacks images and the design of “slides” is quite dated.



## IV. Research

---

### Inspiration

The inspiration that led to the development of both the content and the visual style of this thesis project was a series of short exercises I created for undergraduate design students while working as teacher assistant from 2007 until 2009. These exercises were comprised of different questions that asked the students to utilize specific shapes to create a meaningful image under a certain amount of time. They were designed to target the right side of the brain – the creative side – and act as a stimulus, helping students brainstorm and develop visual skills (please see Appendix II for examples of these exercises). Most of the exercises employed all of the Gestalt principles, and the students who showed stronger understanding of these principles, boasted more creative and diverse design solutions.

This project is essentially revolved around the understanding of the Gestalt Principles of Perception and their application in design, achieved through interactive exercises, which will be visually presented in a metaphoric classroom, as were the original exercises

### Literature Review

Research for this thesis involved an examination of different books, journals, articles and websites that were written on the subject of visual perception, and specifically, the Gestalt Principles of Visual Perception. The research encompassed many resources about psychological perception (Arnheim), and the relationship between the brain and visual information (Berger). The Gestalt Principles of Perception were discussed in various texts, but there was not a clear definition of how many principles exist. Some resources cited more than six (Lidwell, Holden & Butler), admitting that some of those principles are new additions, while most of the resources referenced the five major Principles of Perception; Closure, Continuity, Figure-Ground, Proximity and Similarity, all of which are incorporated into this thesis.

## IV. Research - *continued*

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### Literature Review

Also, researching literature about effective animation, graphic design, web design and interactivity was necessary in order for successful completion of this thesis. The multiple components of thesis (animation - design – interface – user interactivity) all have different subcategories, which needed profound understanding of how they can all work together effectively to reach the user, and ensuring a return visit.

Books such as *Design Principles, Usability Testing and Guidelines to Online Success* proved extremely helpful. A major part of the research done for this thesis was reviewing books about ActionScript 3.0 and Flash CS4 & CS5. These books weren't entirely useful, because although they did provide a base structure for the coding of the website, updates were released rather quickly, and information found online was much more accessible.

## V. Preliminary Evaluation

---

After examining the effectiveness and number of precedents, and researching the related literature, the following step was to evaluate how well this project would be received from a user's perspective. The following survey was completed by 27 individuals (please see Appendix III for actual survey format).

### Background Information

1. *Work / study area*
- 10 respondents answered Computer Graphics Design
  - 5 answered Graphic Design
  - 2 answered Interactive Design
  - 2 answered Design
  - 1 answered New Media
  - 1 answered Art Education
  - 1 answered Art Therapy
  - 1 answered Music Composition
  - 1 answered Architecture
  - 1 answered Art
  - 1 answered Writing
2. *Gender*
- 16 respondents were female
  - 11 were male
3. *Home country*
- 14 respondents were from the USA
  - 4 respondents were from Kuwait
  - 3 respondents were from India
  - 2 respondents were from Taiwan
  - 1 respondent was from China
  - 2 respondent was from Korea
- Age Group**
- 19 respondents were between ages 20 and 29
  - 6 were between ages 30 and 39
  - 1 was between ages 40 and 49
  - 1 was above 50 years

## V. Preliminary Evaluation - *continued*

---

**Are you a designer or design student?**

25 respondents answered yes  
2 answered no

**Do you research online?**

27 respondents answered yes

**Have you heard about the Gestalt Principles of Perception: Similarity, Closure, Proximity etc?**

20 respondents answered yes  
5 answered I think so  
2 answered no

**If you answered yes to the last question, have the theories helped you make better design solutions?**

22 respondents answered yes  
2 answered no  
2 skipped the question

**If you answered no to the question before last, would you like to learn more about these theories if you they would help you make better design choices?**

8 respondents answered yes  
2 answered no  
17 skipped the question

**Would you like to see an interactive website that explains Gestalt's theories in motion and allows you to apply what you've learnt on the spot?**

27 respondents answered yes

## VI. Parameters

---

### Thesis goals

Based on the feedback received from the preliminary evaluation, the thesis parameters started to take shape. The goals of the project, supported with the evaluation findings, were to create a website that would fully explain the Gestalt Principles of Perception through short animations and illustrated examples, that would increase visual literacy and awareness for the user (by understanding the principles, and how they work within a design context), which would result in better design solutions and problem solving skills.

### Website Content

The content of the website is composed of three main parts. **First**, it will feature an instructional section that will explain the five major principles of the Gestalt Principles of Perception: Closure, Continuity, Figure-Ground, Similarity and Proximity. The user will be able to view each principle's definition, an example of the principle animated, explanatory images of the animation, and several illustrated examples that will reinforce the animation (figure 6.1).

Figure 6.1  
Animated  
principles



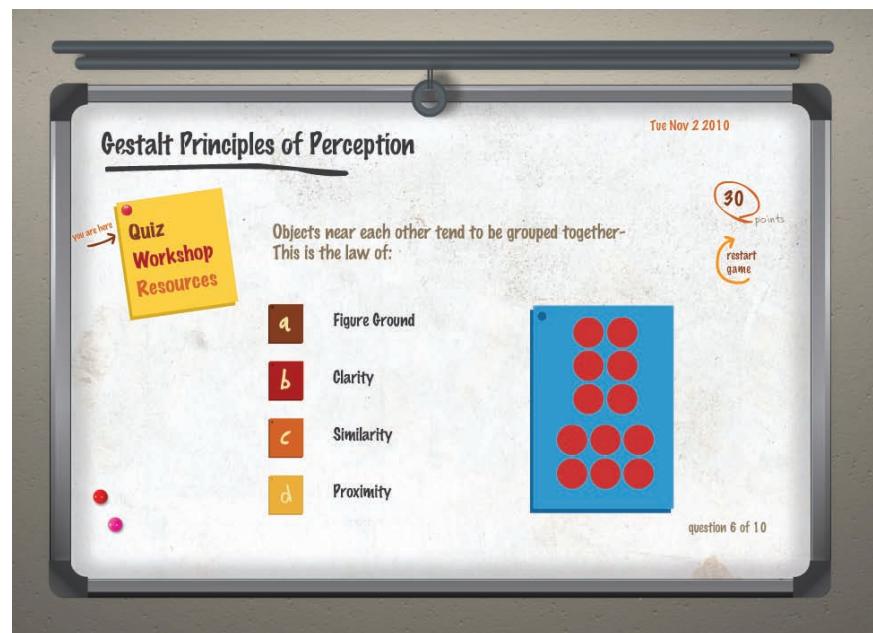
## VI. Parameters - *continued*

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### Website Content

The **second** part is the interactive part, which is divided into two sections. The first is where the users will be able to test the information they were exposed to in the first part through a series of questions. (figure 6.2), and in the second section they can draw and create design compositions (figure 6.3). The canvas that the users can draw on features six draggable shapes that are resizable and can rotate and change colour. Also available to the users is a pen tool, with several strokes and colours to choose from. In this interactive section, the users can opt to start a “workshop session” in which a series of timed randomized design problems will appear, guiding them to utilize the Gestalt Principles of Perception. This will further reinforce the knowledge they gained from the instructional section. The users can also print their artwork created if they wish to do so.

Figure 6.2  
Gestalt quiz



## VI. Parameters - continued

---

### Website Content

Figure 6.3  
Workshop  
section



The **last** section of the website will be a resources section, where a list of books, periodicals, and other literature will be displayed pertaining to Gestalt theory, design, and art and visual communication.

### Target Audience

This thesis is targeted for individuals with an interest in art, design, and visual aesthetic. There are no age limitations as long as the user can understand the language, and the technology behind using the computer, and access the internet. Ideally, however, the thesis would be utilized in an educational environment, such as an undergraduate design/graphic/art program, when students are beginning to learn about art theory and visual literacy, and have a strong desire to enhance the effectiveness of their designs.

## VII. Design Approach

---

### Design & Layout

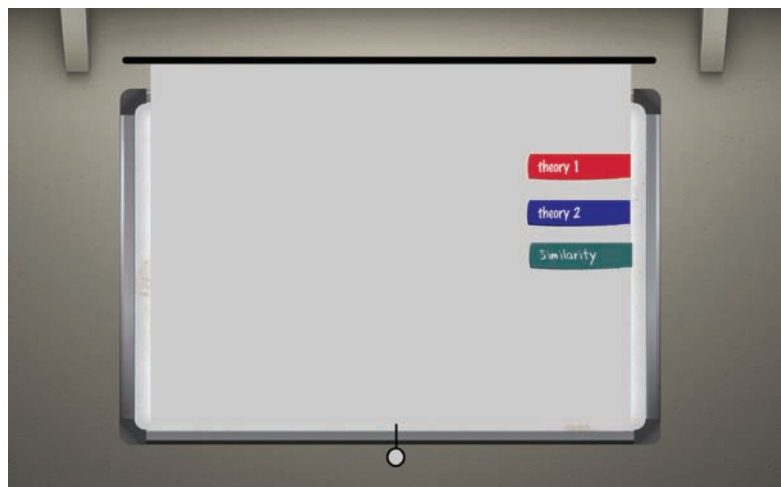
The final design of the project underwent major changes and revisions, resulting in a drastically improved look from the proposed one. Extensive committee feedback and user testing shaped the design, content and user interactivity of the project. The following images depict the highlights of the design and layout process.

Figure 7.1.1

*These images represent how both design and content were planned at the early stages of the project.*



Figure 7.1.2





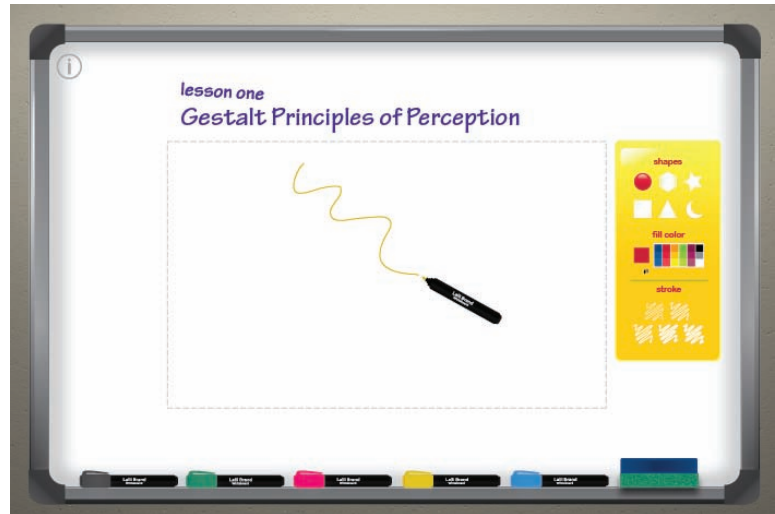
## VII. Design Approach - *continued*

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Figure 7.1.3



Figure 7.1.4



## VII. Design Approach - *continued*

---

### Color Scheme

The final colour scheme for the project - revised numerous times - reflects a deep warm palette (focused on shades of red), which according to current educational theory (Floch) is recommended when creative stimulation is desired. The color scheme also features neutral and lighter colours, mainly used for the navigation elements and images such as the background and the drawing board.

Figure 7.2.1  
*The final color scheme*



Figure 7.2.2  
*Examples of color schemes that were discarded*

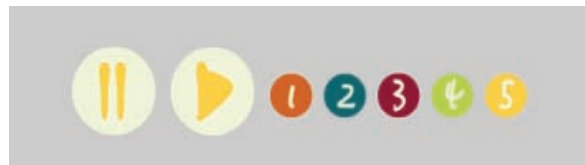


Figure 7.2.3

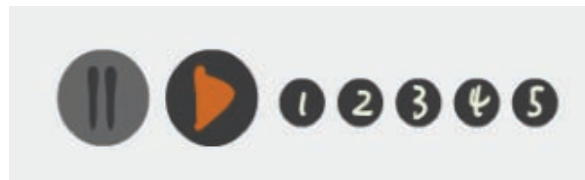
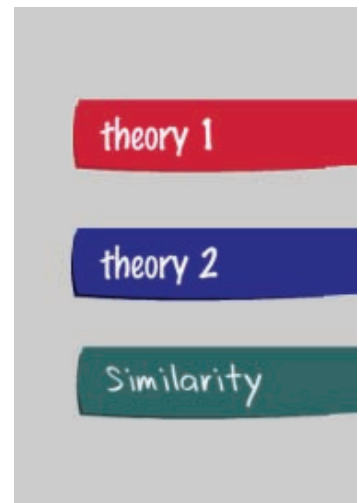


Figure 7.2.4



## VII. Design Approach *(continued)*

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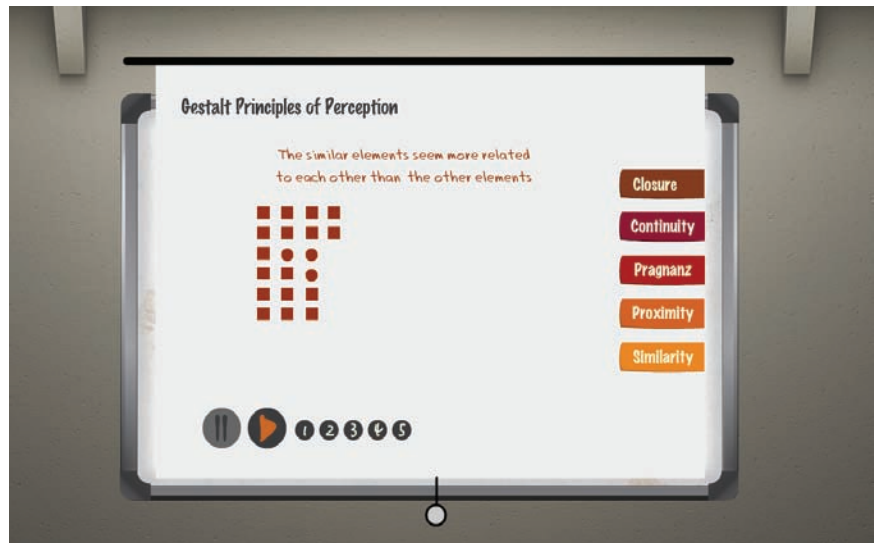
### Typography

Specific typefaces and their variables (density, color, size, etc.) were chosen to support the design elements and the general feel of the project - a familiar learning environment embodied through the use of a whiteboard and a screen projector; the typical classroom. The typefaces employed were also carefully considered in relation to the target audience.

The casual and similar to everyday handwriting "Market Felt" was chosen for the main titles and headers, while the neutral sans-serif "Helvetica" was used for the body text. In the early designing stages, another typeface was used for the body text; "Dadhand," which resembled "Marker Felt" but was less organic. However, the two typefaces were strenuous on the eyes, and thus it was replaced with "Helvetica," creating a clean legible look for the lengthier text.

Figure 7.3.1

Early typefaces  
used in project:  
"Marker Felt"  
"Dadhand"



## VII. Design Approach - *continued*

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Figure 7.3.2  
*Early typeface  
and layout  
considerations*



Figure 7.3.3



## VII. Design Approach - *continued*

---

### Final design

The graphics below are images from the finalized project, displaying the numerous design elements (layout, typography, color, etc.) that were implemented after multiple revisions and feedback from users.

Figure 7.4.1  
The final project

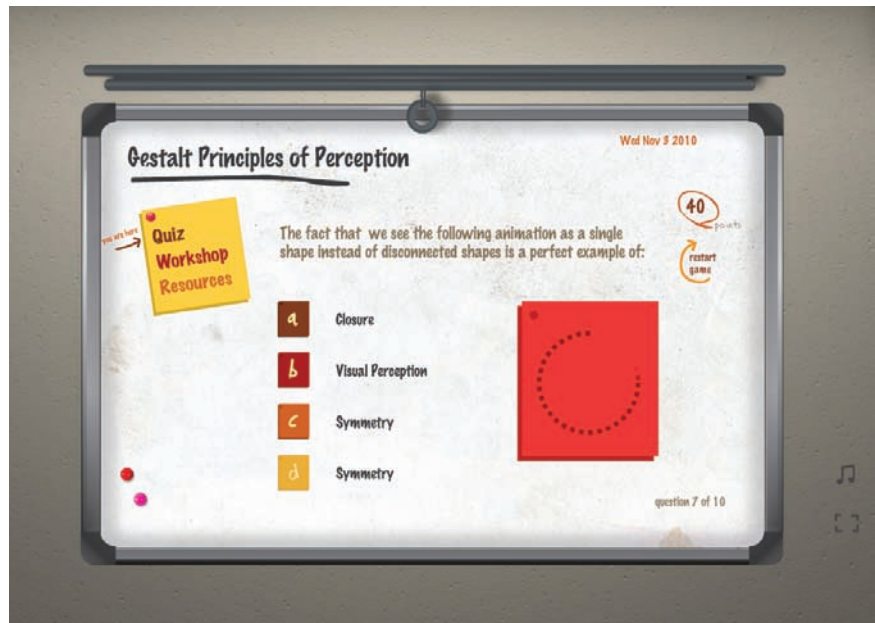
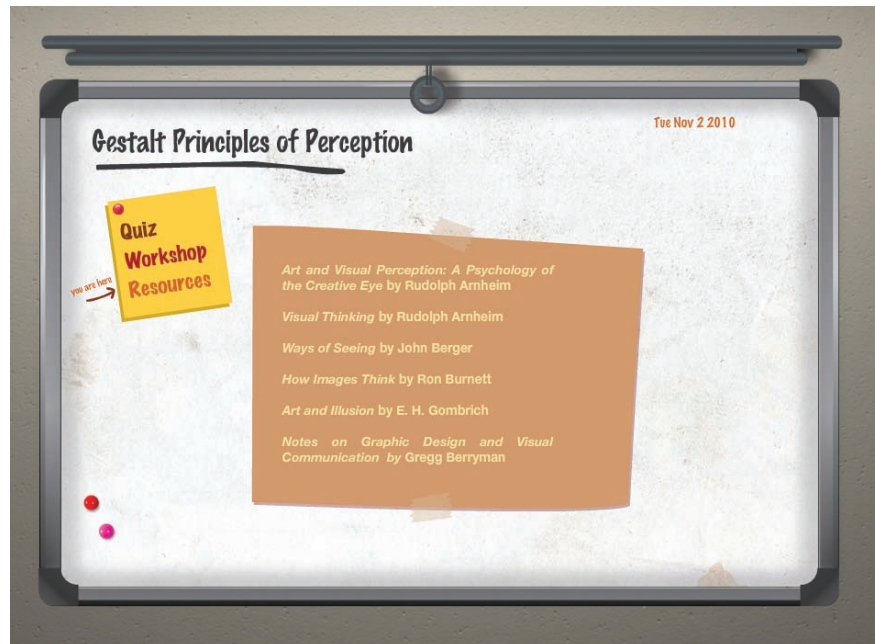


Figure 7.4.2



## VIII. Navigation & Menus

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The navigational and menu systems of the project consist of three main parts: the main menu, the controls for viewing the theories, and the workshop tools. The navigation of the website is perhaps the element that users interact with the most, as it takes them through the different sections, and allows them to interact and explore the content. The navigation systems were changed and revised many times, according to the feedback received from usability testing.

### Main Menu

The main menu required minimal revisions from its earliest design, as users found it easy to use, but suggested adding functionality that indicates which section the user is currently in.

Figure 8.1.1  
The initial and revised menu



### Theories Menu

The controls for navigation in the theories section consist of different elements. First, there are five “tabs” that direct the user to the the five Gestalt principles. When a user clicks on a tab, it extends out to indicate that that they are in that particular section (figure 8.2.3). Once inside that section, the viewer can play and pause the animation, and navigate through the different illustrated examples of each principle. The users who tested the website were concerned with the placement of the play, pause and example buttons, as they were originally placed under the animations and examples (figure 8.2.1), and it proved to be time consuming to click on a theory tab and then move the mouse all the way to the play and pause buttons.

## VIII. Navigation & Menus - *continued*

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### Theories Controls

With the feedback from users taken into consideration, the final version of the controls were aligned with the tabs, to ease the navigation process.

Figure 8.2.1

*Initial navigation for principles*



Figure 8.2.2

*Revised navigation for principles*



## VIII. Navigation & Menus - *continued*

---

Figure 8.2.3  
*Revised navigation  
for principles*

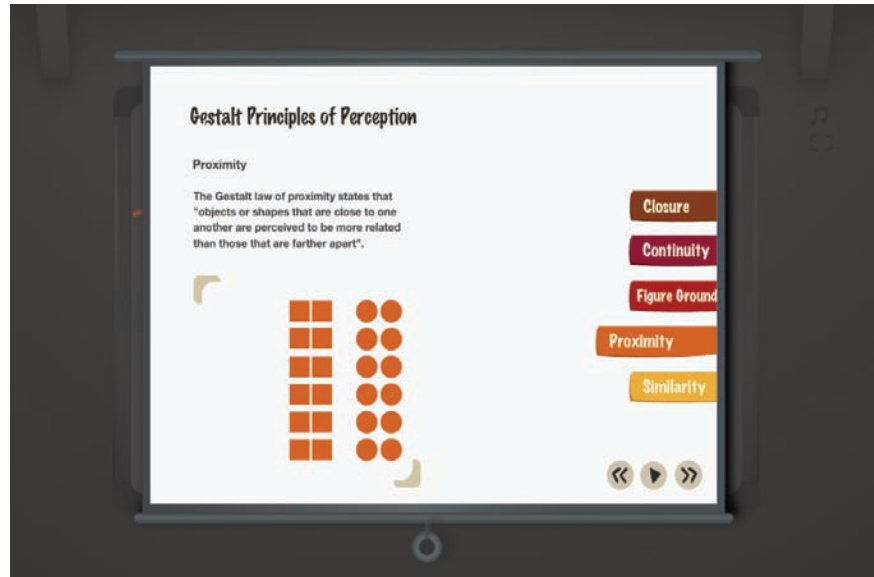
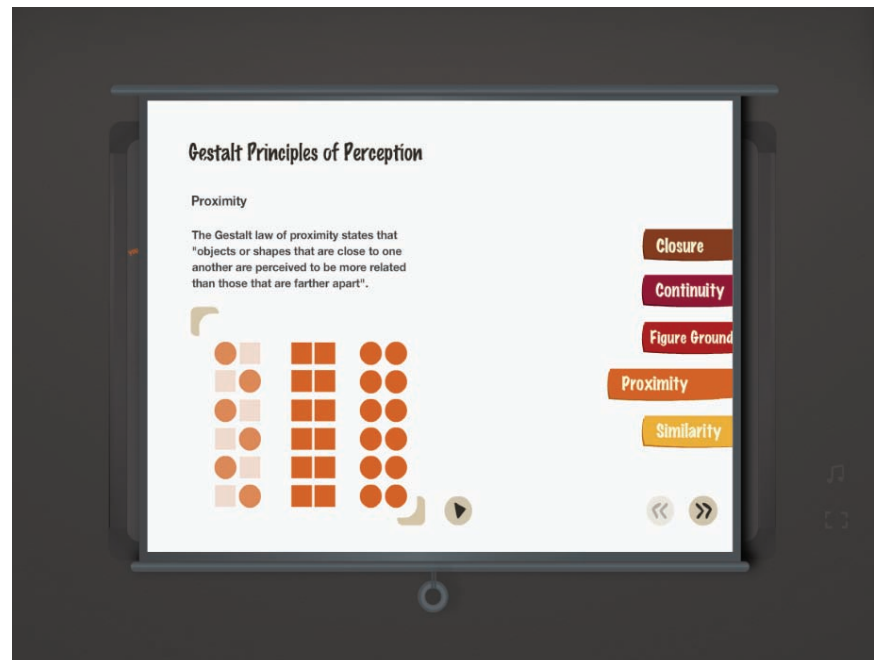


Figure 8.2.4  
*Final navigation  
for principles*





## VIII. Navigation and Menus - *continued*

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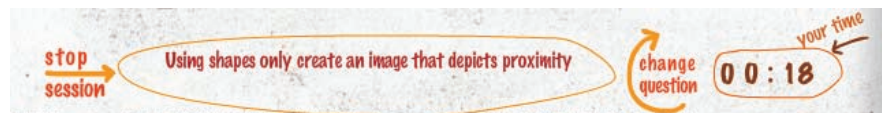
### Workshop Menu

The menu created for the workshop section has two main parts: the tools which the user uses to create a design/artwork/composition (figure 8.3.1), and the “session box” which when clicked displays randomized questions that guides the viewer to create designs based on the principles (figure 8.3.2).

Figure 8.3.1  
Drawing tools



Figure 8.3.2  
Random questions  
session tool



## IX. Technical Approach

---

The implementation of this thesis project was done in a series of steps. The initial designs were imported from Adobe Illustrator into Adobe Flash, in order to create a working website. Two versions of Adobe Flash were used; CS4 and CS5. The programming language used to add the functionality to the different elements was ActionScript 3.0.

The first stage of coding revolved around creating a navigation system that connects the different sections of the website. Several menus were create for each section. This part of the code was working fairly seamlessly when it was first implemented, but had to be revised constantly when further functionality was added.

The second stage of programming was dedicated to the functionality of the Gestalt principles section (viewing animations and examples), the quiz (answering questions, showing feedback for wrong and right questions, creating a timer etc.) and the workshop section (creating the tools for drawing, working canvas, randomizing questions etc). This process took the longest out of all the other components, and was truly a work in progress. The input from advisors, online tutorials, plugins such as GreenSock's TweenMax and Transform Manager and constant revisions were all invaluable parts of the process. It was finalized only a few weeks before the thesis defense.

Figure 9.1

*GreenSock code  
used in project*

```
184 function addSquare(e:MouseEvent):void {
185     newSquare = new Square();
186     newSquare.x = 400;
187     newSquare.y = 400;
188
189     addChildAt(newSquare,10);
190     manager.addItem(newSquare);
191     manager.selectItem(newSquare);
192     newSquare.buttonMode=true;
193
194     newSquare.addEventListener(MouseEvent.MOUSE_DOWN, stopDraw);
195     newSquare.addEventListener(MouseEvent.MOUSE_UP, startDraw);
196     newSquare.addEventListener(MouseEvent.CLICK, stopDraw);
197
198 }
```

## IX. Technical Approach - *continued*

---

The final stage of the coding process was adding functionality, such as a full-screen option, controls for the music, navigational crumbs (that show the user which section they are currently in), and making the final website resize proportionally to the elements visible in the browser (please see Appendix IV for detailed coding used to create the website). The last part involved a fairly recent coding concept called “Liquid Stage” and it is best implemented at the very beginning of the work process, so it took some time to be implemented at this final stage of work, but it worked beautifully in the end.

Figure 9.2  
*Liquid Stage code*

```
1 stop();
2
3 import com.greensock.*;
4 import com.greensock.easing.*;
5 import com.greensock.layout.*;
6
7
8 var ls:LiquidStage = new LiquidStage(this.stage,1250,781,1250,781);
9 var area:LiquidArea = new LiquidArea(this,0,0,1250,781);
10 ls.attach(screen_mc, ls.CENTER);
11
12 area.attach(background_mc, ScaleMode.PROPORTIONAL_OUTSIDE, AlignMode.CENTER,
13             AlignMode.CENTER);
14 area.preview = true;
15
16
17 ls.addEventListener(Event.RESIZE, onLiquidStageUpdate);
18
19 function onLiquidStageUpdate(event:Event):void
20 {
21
22     // trace("updated LiquidStage");
23
24 }
```

## X. Limitations

---

Due to the extreme prevalence of the thesis subject matter in the design world, the initial plan was to use imagery from existing real life examples to illustrate the Gestalt Perception Principles, in order to better resonate with the viewer. The imagery was implemented into the design of the website at a very early stage. However, during the final weeks of the working process, RIT Art and Photography librarian Kari Horowicz advised that permission must be obtained from all the companies to use the imagery legally. None of the companies that were contacted for permission responded. Companies included Coca-Cola, World Wildlife Fund and Major League Baseball. This created a major setback, as all the examples had to be taken out and substituted with personal newly made illustrations, which took a lot of time to create.

Another key drawback to the working process was the technical issues faced with Flash CS4, Flash Player 10, and Actionscript 3.0. Halfway through completion of the project, Flash Player 10 started to crash constantly when switching between two sections user interface, for no apparent reason (figure 10.1). Both Adobe technical support and Apple support were consulted, but neither of them were able to help with the crashing issue. Through trial and error, I found that Flash Player 9 would not crash at the same point, and that Flash Player 10 had many known bugs with many of the plug-ins used in the project. Thus the publishing format was reverted to Flash Player 9. This itself caused technical difficulties as well, as the JPEG encoder in Actionscript 3.0, which allows the user to save an image from the application to their personal hard drive, does not work with Flash Player 9 (figure 10.2). The “save image” option had to be removed from the project.

A problem that came to light through user testing, was that no user could enter text in the name entry box for the quiz while the website was on full screen. After much research and revisions to the existing code, I found an article on the Adobe website that simply states that a user cannot input text while in full screen mode (Stampfli).

## X. Limitations - continued

---

The plug-ins mentioned previously, mainly used from GreenSock (a plugin that creates more seamless functionality than stand-alone ActionScript), also added to the technical issues faced. To begin with, the GreenSock code had to be purchased (at a educational price of 99 dollars). Once implemented, the preexisting ActionScript code malfunctioned (figure 10.3 & 10.4). A major part of it had to be rewritten, in order to allow both GreenSock and Actionscript codes to work with no errors. Also, many functions of the Greensock code did not work well with Flash Player 9, as it was designed quite recently, aimed for Flash Player 10. Therefore, a lot of the GreenSock code was not fully utilized.

Perhaps the major limitation to this project that could not be “troubleshooted” was the time constraints. The project was successfully completed in 9 months, but had there been more time to work on it, lengthier animations, more examples, and increased functionality would have been added.

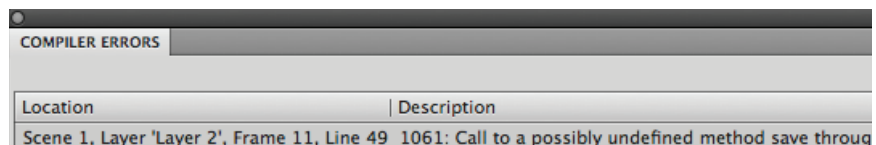
Figure 10.1  
Error report  
from Flash CS4

```
Java Threads: ( => current thread )
 0000000028018000 JavaThread "Low Memory Detector" daemon [_thread_block
(00000000b43dd000,00000000b44dd000)]
 0000000028017000 JavaThread "CompilerThread0" daemon [_thread_blocked,
0000000028016400 JavaThread "Signal Dispatcher" daemon [_thread_blocked
(00000000b135e000,00000000b145e000)]
 0000000028015400 JavaThread "Surrogate Locker Thread (CMS)" daemon [_th
(00000000b125c000,00000000b135c000)]
 000000002889e800 JavaThread "Finalizer" daemon [_thread_blocked, id=-13
000000002889d800 JavaThread "Reference Handler" daemon [_thread_blocked
(00000000b0e4f000,00000000b0f4f000)]
=>0000000028001000 JavaThread "main" [_thread_in_native, id=-1603525408,
Other Threads:
 0000000028007c00 VMThread [stack: 00000000b0d4d000,00000000b0e4d000] [i
0000000028019800 WatcherThread [stack: 00000000b44df000,00000000b45df00

VM state:not at safepoint (normal execution)
VM Mutex/Monitor currently owned by a thread: None

Heap
 par new generation   total 14784K, used 0K [0000000031b40000, 0000000032
 eden space 13184K,   0% used [0000000031b40000, 0000000031b40000, 00000
```

Figure 10.2  
Error report  
regarding saving  
in Flash Player 9



Location	Description
Scene 1, Layer 'Layer 2', Frame 11, Line 49 1061:	Call to a possibly undefined method save through

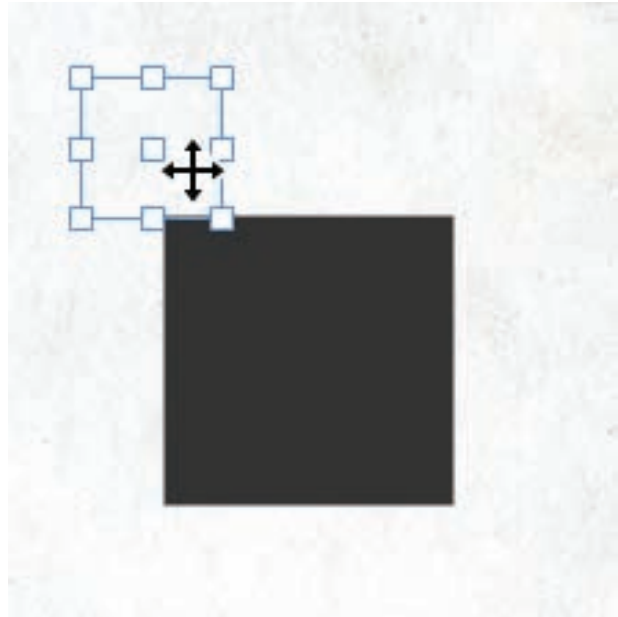
## X. Limitations - continued

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Figure 10.3  
Runtime error  
when GreenSock  
was imported

```
TypeError: Error #2007: Parameter text must be non-null  
at flash.text::TextField/set text()  
at oct13_fla::MainTimeline/change_question()[oct13_fla.M  
at oct13_fla::MainTimeline/countDown()[oct13_fla.M  
at flash.utils::Timer/_timerDispatch()  
at flash.utils::Timer/tick()
```

Figure 10.4  
GreenSock not  
working upon  
first installation



## Final Evaluation

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The final evaluation was conducted using the strongest working prototype of the thesis project as a reference. The survey basically tested how effective the website was, in terms of content, design, navigation and functionality (please see Appendix III for actual survey format). The feedback that was received helped in reaching the website's final form. Eighteen people conducted the survey, following a link that was provided to them to view the website.

### Background Information

- |                             |  |
|-----------------------------|--|
| 1. <i>Work / study area</i> | 6 respondents answered Computer Graphics Design<br>1 answered Photography<br>1 answered Marketing<br>10 did not leave an answer  |
| 2. <i>Gender</i>            | 10 respondents were male<br>4 were female<br>4 did not leave an answer   |
| 3. <i>Home country</i>      | 8 respondents were from the USA<br>2 respondents were from Kuwait<br>1 respondents was from Mexico<br>1 respondents was from Taiwan<br>1 respondent was from China<br>1 respondent was from Korea<br>1 respondent was from the UK<br>3 respondent did not answer |
| <b>Age Group</b>            | 1 respondent was between ages 10 and 19<br>15 were between ages 20 and 29<br>1 was between ages 30 and 39<br>1 was above 50 years  |

## Final Evaluation - *continued*

---

**Are you a designer  
or design student?**

12 respondents answered yes  
6 answered no

**Is the website visually  
pleasing?**

17 respondents answered yes  
1 answered yes, but needs improvement

**Is the typeface legible?**

18 respondents answered yes

**Is the navigation of  
the website intuitive?**

15 respondents answered yes  
3 answered mildly  
0 answered not at all

**Is it easy to tell which  
section you are in  
within the website?**

17 respondents answered yes  
1 answered no

**Are the navigation  
buttons clear and  
self explanatory?**

17 respondents answered yes  
1 answered I guess

**Would you like to hear  
music in the background,  
or would that distract  
you?**

15 respondents answered yes  
3 answered I don't know

**Would you come to this  
website again?**

18 respondents answered yes



## Final Evaluation - *continued*

---

### Examples of user comments from the evaluation

Great design! Really intuitive and easy to use.

The website was clear and visually pleasing.

I liked how it was in harmony.

I would like to see the section I am in highlighted.

I think the "1" "2" "3" "4" "5" buttons that show the examples are annoying. Maybe consider arrows instead?

I think if the play and stop buttons were placed under the tabs, it would be much easier to navigate in that section.

The music - maybe in the workshop/drawing section.

I don't know about the music, maybe in the game section only?

## XI. Conclusion

---

Prior to starting this thesis project, many new media theories and ideologies were examined and tested on a series of design issues and problems, in order to assess their influence on design solutions, and develop the framework for the thesis. While examining the effect of these theories, the Gestalt Principles of Perception proved to have a tangible and direct effect on the quality of the design solutions. A heightened and improved sense of visual communication was found in the designs of students who applied the Gestalt Principles of Perception into their solutions. (Graham).

These findings were the driving force behind this project, and its ultimate goal was to create an educational reference for students and teachers alike, that explains core design principles and aids in the proper application of these principles into the users work, ultimately resulting in stronger and more effective compositions.

The final thesis project combines short animations – which are more engaging than still imagery - that illustrate the different principles, and examples that reinforce the animations' content. It also allows the user to test their knowledge and apply the principles to examples they create within the project.

Successfully creating this project was a challenging endeavor that raised many theoretical, design, and technical questions. Completing the project from its early start to its final form took dedication, constant work and open mindedness to feedback and suggestions.

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## **Appendix I : Thesis Proposal for Master of Fine Arts Degree**

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### **FORM PERCEPTION: AN INTERACTIVE GUIDE TO THE GESTALT PRINCIPLES**

**Hend Alawadhi**

Computer Graphics Design Program  
School of Design  
College of Imaging Arts and Sciences  
Rochester Institute of Technology

November 2009

## **Appendix I : Thesis Proposal - Abstract**

---

The use of “shape” in design is inevitable; shapes are what make any design. The appearance of visual graphics can be broken down and simplified into abstract shapes.

Over the past three years, I have been researching the variation of levels of cognition and reactions of different pictorial shapes through different level students. My thesis will be an educational tool that will explain the basic theories of form perception through the use of simple short animations based on Gestalt’s theories, which will be presented in a website. It will also be a study to find out how individuals perceive and react to different shapes through the aid of a computer-based design – which I will monitor through the experimentation section of the website, where viewers can draw and experiment with shapes.



## Appendix I : Thesis Proposal - Problem Statement

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My thesis is an educational reference to the concepts of form perception that were developed by the Gestalt school: Law of Similarity, Pragnaz (Figure – Ground), Proximity, Continuity and Closure. It is an interpretation of these theories through the use of animated design, which will be a starting guide and an explanation to the nature and relationship of shapes in design. In addition, I want to create an experimentation section that allows users to think of the nature of shape in design and encourage different problem solving techniques when presented with a visual problem.

I want to create a website that is both instructional and interactive to be used by design instructors and students. My rationale for choosing this medium is that a website can be easily incorporated into a classroom or any study program related to design, and because the web is easily accessed by millions of people everyday, it will thus reach many people. It is also easily changed and updated, providing the option of expansion and renewal. A website is also a medium in which the user can interact, and submit their ideas, sketches, and comments, advantages that cannot be found in books or most other mediums.

I want to create short instructional animations about the relationship of shapes and their symbolism in our modern day thinking, using Gestalt's theories. I think these important principles can be easily grasped and remembered when they are presented in a non-linear and non-textual fashion. My main goal is to make them entertaining as well as educational, possibly incorporating motion graphics and animation while explaining these theories. I also want to create a section that allows the user to “solve” exercises about shapes, pictograms, and symbolism. Enabling the user to experience digital brainstorming through the use of a canvas and default shapes - that will allow for a drag and drop function, amongst other tools - will make for easier understanding of how shapes work and relate together. These short exercises will also work as 'brain stimulus', because they target the right side of the brain – which is the creative side, and will hopefully help the viewer brainstorm fast design solutions.

## Appendix I : Thesis Proposal - Parameters

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### Limitations

My biggest cause of concern is making the website work smoothly. I have designed many things in Flash before, but I have never created a working website. I want to make sure that the section of artwork submission is easy to manage and update therefore serious preplanning is required.

### Methodology

The first plan of my research is going to be looking through books, websites, and journals that have dealt with the subject of shape symbolism. I am aware that there are many books on shape symbolism theories, but I have yet to find a website that effectively explains this information. I will also need to search the different types of instructional websites and which techniques are more successful.

Researching and learning more about Actionscript 3 is also a priority, because the website will be made in Flash using Actionscript 3.

The design component of my thesis will be divided between the instructional part of shape symbolism and the website as a whole. The computer graphics design part will be putting the website together (animation, linking, gallery submissions, interactivity) through code.

### Subjects & Participation

The testing of my thesis will be divided into two parts:

1. I will ask my peers and friends to test the prototype of the website for feedback. I want to know from many different individuals what they think of the website, how easy it is to access, how legible the font is, and how intuitive the website is as a whole. I will be asking for feedback on ways I can improve the website.

2. I will also ask my fellow design students to try out the mini exercises I will have in the website and to answer a short survey telling me what they thought of the exercise and if it helped them brainstorm design solutions in different ways they haven't thought of before. This can be done before the website prototype is due, as some of the exercises can be done using a pen and paper.

## Appendix I : Thesis Proposal - Parameters *(continued)*

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### Persona 1

Jack is an 18 year old boy who just started studying Graphic Design at a big university. He doesn't have a solid background in design principles, unlike many of his peers. Jack is taking many design related courses, such as Basics of Graphic Design, 2D Computer Animation, and Principles of Design Theory. He wants access to a credible source that will provide information about some of the theories in design, such as Gestalt's Theories, in an interesting yet educational manner.

### Persona 2

Jill is a professor at a school of Arts and Design. She teaches Design Principles. Jill knows that most freshmen who take her classes have no idea about some of the basic principles and theories of design. She wants to have a reliable source that she and her students can access from anywhere that will both provide an educational aspect related to their studies, as well as a section that allows the student to test and try out the theories they have learned online and share them with their peers.

### Target Audience

Audience: Students and educators in the field of Design (Graphics – Computer Graphics)  
Age: No limit  
Educational Level: High School and beyond  
Motivational level: A new experience in learning about theory  
Experience with Thesis Subject Matter:  
Educational and Entertainment  
Language: English

### Marketing Plan

I want the website to be introduced to graduate and undergraduate design students to both improve their understanding of shape symbolism and to “awaken the creative senses” of the students. I also want to submit the project to several institutions such as:

National Art Educational Association  
Adobe Interactive Annual Competition  
Communication Arts Interactive Annual Competition  
Siggraph

## Appendix I : Thesis Proposal - Parameters *(continued)*

---

### Software and hardware requirements

MacBook Pro or iMac  
OS: Leopard  
2.5GHz Intel Core 2 Duo Processor  
4GB RAM memory  
2 GB free disk space  
1280 x 1024 Monitor Resolution  
A minimum of 512 Internet connection speed

### Thesis project budget

Adobe CS4 Design Premium \$0 available at RIT  
Computer monitor \$300  
Sound speakers \$40  
Hosting services for a website \$160  
Total \$500

### Exercise ideas

Make a shape of a sound we hear daily: Water, Noise, Music  
Make a shape of a smell we experience: Rain, Grass, Chocolate  
Create an acronym for your full name  
Create different symbols to represent the exclamation mark, one for happiness, anger, and surprise  
Draw an abstract pictogram for each word: Happy, sad, frightened, joyful, mean, pressure etc  
Using only squares and lines, describe your personality  
Redesign your country's flag, changing only the colours  
Design a soda can for different periods: Ancient, Medieval, Future etc

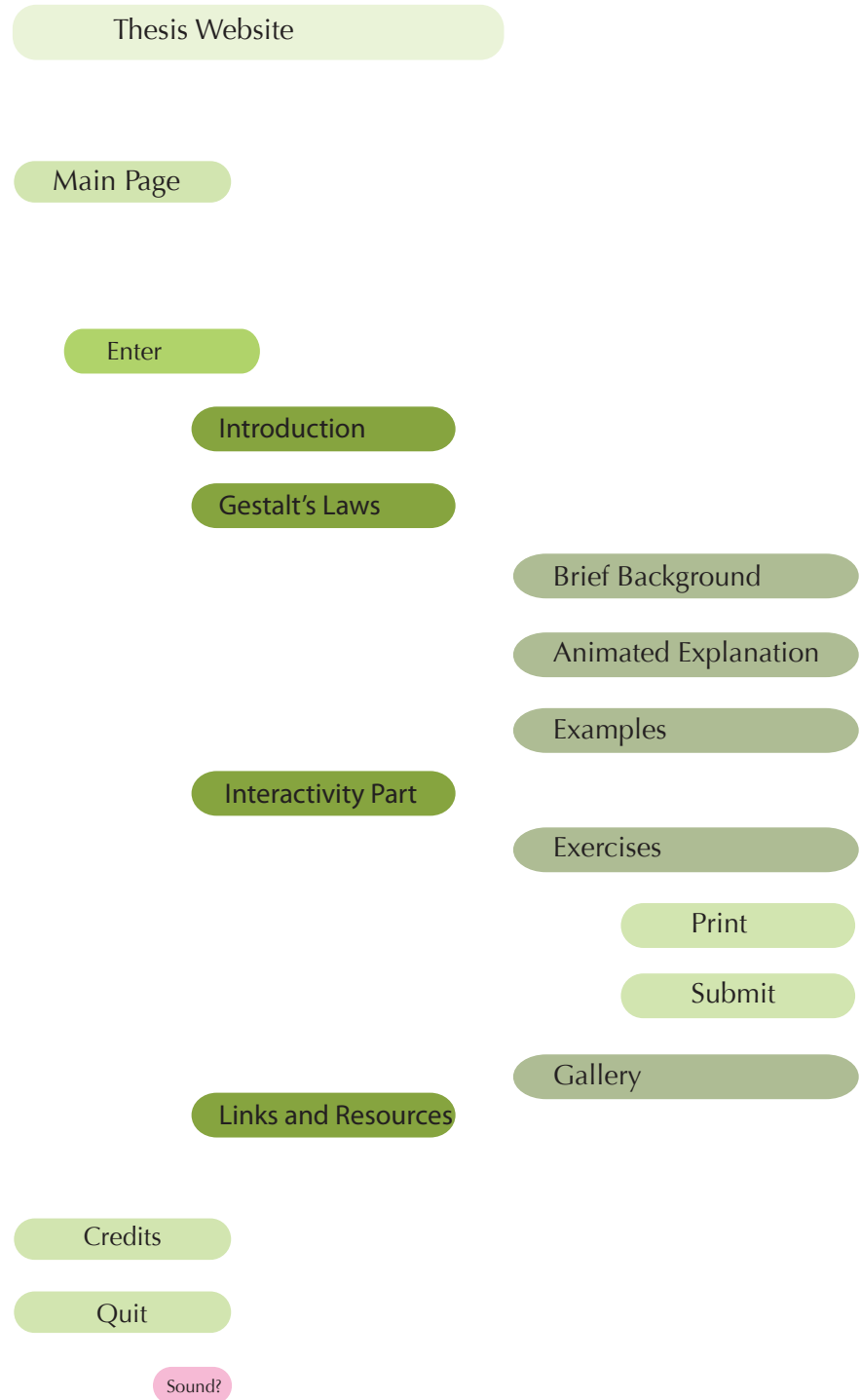
## Appendix I : Thesis Proposal - Timeline

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	Milestone	Due Date
	Thesis Proposal Draft	14.10.2009
	Committee Approval	20.10.2009
	Thesis Proposal Defense	04.11.2009
	Thesis Website and Documentation	11.11.2009
Fall Break	Finalize Literature Review	11.11.2009
	Research Content	11.12.2009
	Develop Content Outline	11.12.2009
Christmas Break	Comittee Meeting	14.12.2009
	Website Design Layout	14.01.2010
	Website Prototype	22.01.2010
	Comittee Feedback	22.01.2010
Spring Break	Website Intructional Part (Animation)	18.02.2009
	Coding Website (Part I)	15.03.2010
	Comittee Meeting	17.03.2010
	Coding Website (Part II)	21.04.2010
Summer Break	Website Testing and Feedback	05.05.2010
	Thesis Documentation	15.09.2010
	Finish Website	15.10.2010
	Comittee Meeting	18.10.2010
	Thesis Defense	08.11.2010

## Appendix I : Thesis Proposal - Website Flowchart

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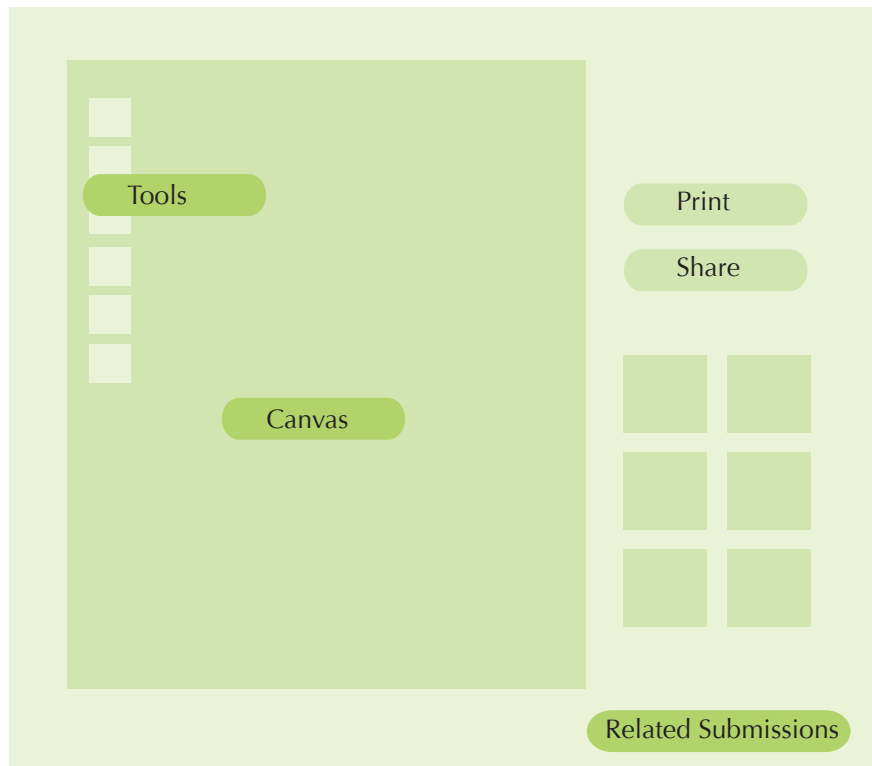


## Appendix I : Thesis Proposal - Website Flowchart *(continued)*

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Exercise Section

Exercise "x"

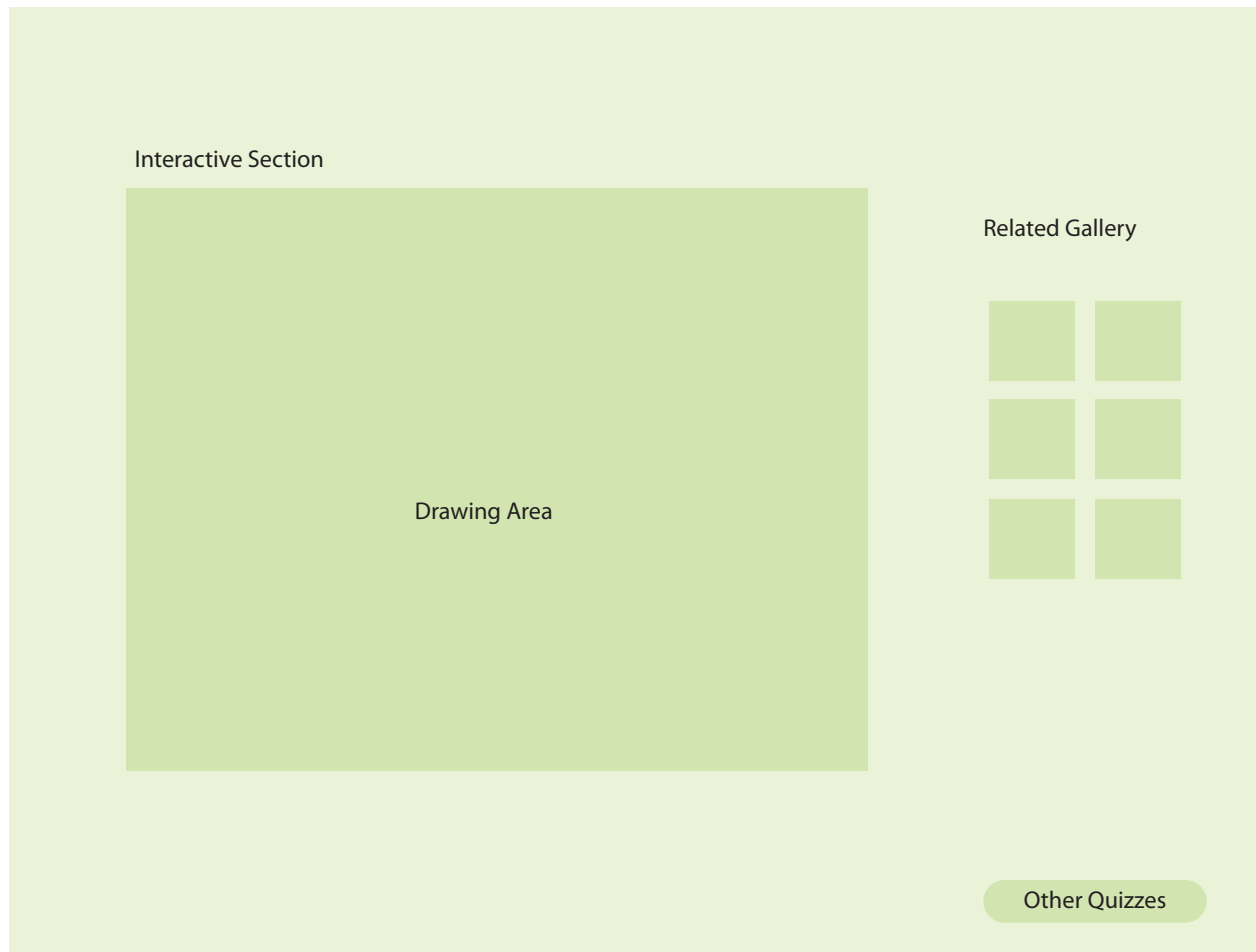


Randomize

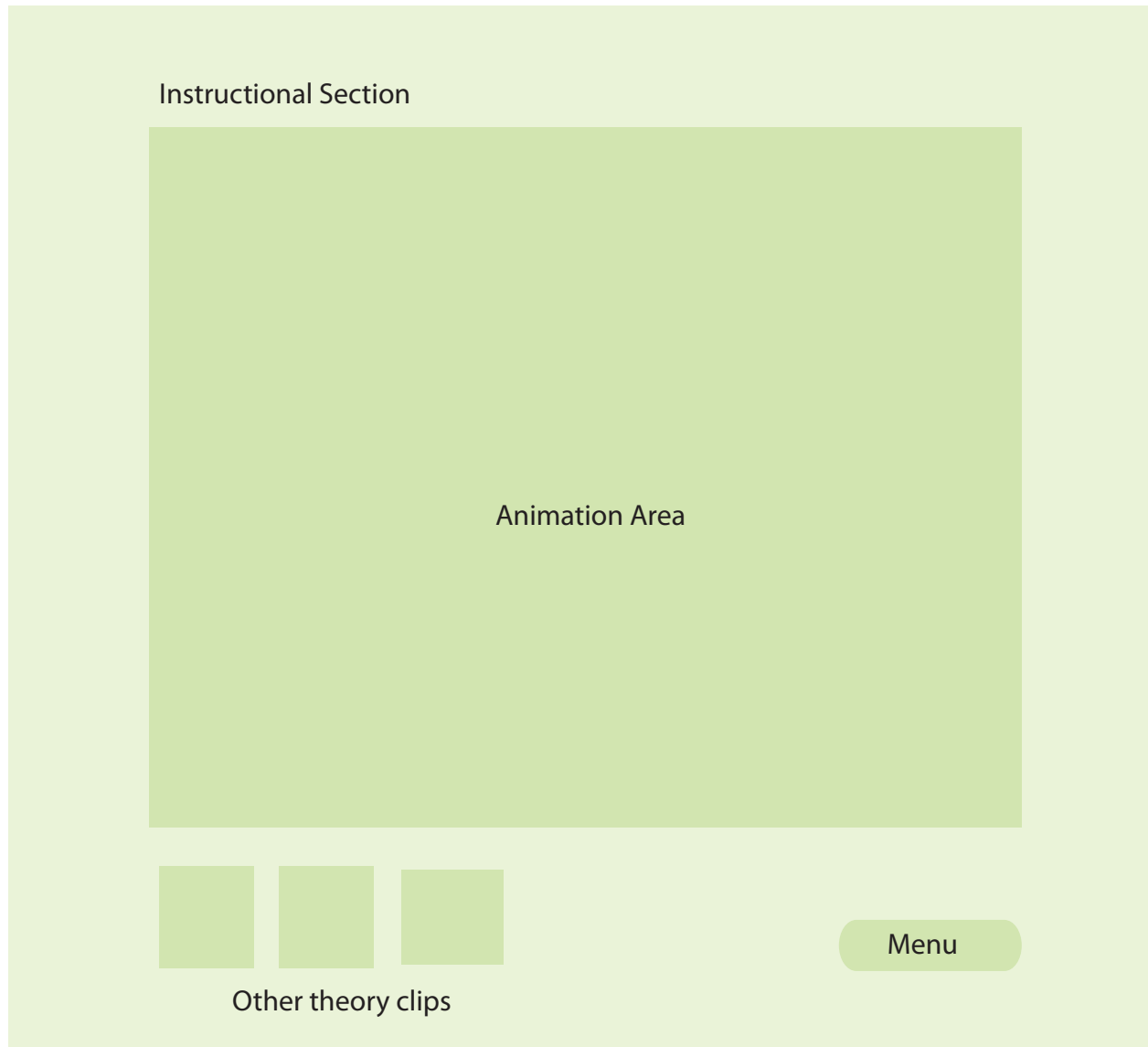
Home

## Appendix I : Thesis Proposal - Website Layout

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## Appendix I : Thesis Proposal - Survey of Literature

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### Flash and AS 3.0 references

Learning ActionScript 3.0 – A Beginner’s Guide  
Rich Shupe with Zevan Rosser  
O’Reilly Media Publishing 2007

Learning ActionScript 3.0 teaches ActionScript 3.0 for the non traditional programmer, such as web designers, GUI based developers, and anyone who is new to ActionScript. This book covers the basics of using ActionScript in Flash, with an in depth look at topics like variables, arrays, loops, and conditionals. There are “hands-on” exercises, short quizzes and an accompanying website which all complement the contents of the book.

Flash + After Effects  
Chris Jackson  
Focal Press 2008

This book is geared towards Flash animators and designers who want take their projects to the next level by adding motion graphics and visual effects through After Effects. The book assumes that the reader has prior Flash experience – a knowledge of the workspace and an understanding of animation concepts - and basic ActionScript. However, the book provides an introduction to After Effects and how to fuse its potential with Flash. It is also accompanied with a DVD that is essential for completing the exercises in the book.

Animation: From Pencils to Pixels  
Classical Techniques for Digital Animators  
Tony White  
Focal Press 2006

Tony White’s Animation From Pencils to Pixels is essential for contemporary digital animators who are interested in learning about the different aspects of traditional animators. The book is a comprehensive overview of animation production, funding, traditional aspects, new tools and methods, and the copyrights and legal aspects of animation. It does not go in depth regarding the specifics of animation tools and programs but provides an overall insight on the art and industry of animation.

## **Appendix I : Thesis Proposal - Survey of Literature** *(continued)*

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### **Flash and AS 3.0 references**

The Animators Survival Kit  
Richard Williams  
Faber and Faber 2002

Richard Williams covers every aspect of animating frame by frame for beginners. The book takes the reader from basic hand drawn walk cycles to breaking joints and to computer animated dialogue and acting. It also has a brief section on the history of animation.

Flash 3D: Animation, Interactivity and Games  
Jim Ver Hague and Chris Jackson  
Focal Press 2006

This comprehensive book is aimed towards Flash developers, animators, multimedia designers and students who want to push their 2D Flash projects into a 3D environment. The book thoroughly explains – using a step by step process – how to use real and simulated 3D space for animations, games, instructional, and interactive systems.

### **Graphic design & web principles**

Universal Principles of Design  
William Lidwell, Kritina Holden, Jill Butler  
Rockport Publishers 2003

Universal Principles of Design is an encyclopedia that includes textual and visual examples of a wide range of concepts and design solutions. This book is designed to bring together an enormous number of disciplines under the belief that no designer knows everything and every designer needs know-how information to complete a design work. This book is a source of fresh and great ideas that would improve the designer's skill and expertise.

## **Appendix I : Thesis Proposal - Survey of Literature** *(continued)*

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### **Graphic design & web principles**

Visual Identities  
Jean-Marie Floch  
Continuum 2001

This book of six essays is a guide to contemporary interpretation of signs and symbols and their effect on the industry. This book differentiates between semiotics in marketing practices, which concentrate on the emotional appeal and semiotics as other means such as politics and criticism. Industrial practitioners in advertising, marketing, and design, as well as students and academics in semiotics will take interest in this book.

Analog In, Digital Out  
Brendan Dawes  
New Riders Press 2006

This book unfolds creative ways of acquiring great design solutions through exposure to the experience and the constant work that a successful designer went through. It is a tool for mental refreshment that gives the contemporary designer invisible energy to come up with new ideas and creative design solutions for an ongoing industry.

Color Index I & II: Over 1500 Color Combinations, CMYK and RGB Formulas, for Print and Web Media  
Jim Krause  
How 2007

These two books offer hundreds of color combinations and formulas for designers to use in both web and print mediums. The colors are divided into categories, such as natural tones, progressive, modern, quiet, and web safe, making it easier to search for the perfect color combination.

## **Appendix I : Thesis Proposal - Survey of Literature** *(continued)*

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### **Graphic design & web principles**

Designing Usable Electronic Text: Ergonomic Aspects Of Human Information Usage  
Andrew Dillon  
CRC 2004

Designing Usable Electronic Text talks mainly about online communication with consideration of the users. This book talks about web and hypertext design and their impacts, especially with some new issues on the rise like e-commerce and telemedicine. This book talks about critical issues but also about the mere importance of the usability of electronic text.

Embracing Complexity in Design  
Alexiou, Katerina (ed.); Johnson, Jeffrey (ed.); Zamenopoulos, Theodore (ed.)  
T & F Books UK 2009

Embracing Complexity in Design is a book that speaks to designers with appreciation to complexity and also to those who have an interest in understanding it. It touches on different themes and domains related to design, which would be a new kind of driving force to creative design solutions. One of the interesting subjects that this book discusses is Metamorphosis of the Artificial.

Thinking with Type: A Critical Guide for Designers, Writers, Editors, & Students  
Ellen Lupton  
Princeton Architectural Press 2004

Thinking with Type is a book that uncovers the why behind the how; it investigates the importance for designers to understand how to deliver clear messages by looking at the core of the issue before concentrating on how the end result will look. This book illustrates typographic solutions and how they are critical to create a successful design solution all with easy referencing.

## **Appendix I : Thesis Proposal - Survey of Literature** *(continued)*

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### **Graphic design & web principles**

Colour Forecasting  
Tracy Diane, Tom Cassidy  
Wiley-Blackwell 2005

Fashion is not only related to fashion designers or textile designers but also to designers in all design fields. This book investigates how colour was employed historically and how effective it is today. This book shows how colour is scientifically forecasted and how colour can successfully be developed into 'colour stories' due to its acknowledgment of the psychological importance of colour.

### **Art & visual theories**

Visual Thinking  
Rudolf Arnheim  
University of California Press 2004

Rudolf Arnheim, author of *The Dynamics of Architectural Form*, *Film as Art*, *Toward a Psychology of Art*, and *Art and Visual Perception*, claims in this books that thinking (all kinds of thinking, included that related to art) is perceptual in nature, and that there is no divide between seeing and thinking, or perceiving and reasoning is false and misleading. His book examines the nature of interpretation between multi-disciplinary areas such as psychology and art.

*Art and Visual Perception: A Psychology of the Creative Eye*  
Rudolf Arnheim  
University of California Press 2004

First published over 50 years ago, this book is still considered a classic authority on the art and psychology. It is a seminal book on the different aspects of visual communication, and why we see the way we do. Arnheim bases a lot of his approach on Gestalt's theories, in terms of psychologically breaking down and perceiving a visual image.

## **Appendix I : Thesis Proposal - Survey of Literature** *(continued)*

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### **Art & visual theories**

Art & Illusion: A study in the psychology of pictorial representation  
E.H Gombrich  
Phaidon Press 2002

This book is a study of “image-making”. Gombrich begins with a 12-page preface that explains the distinction between an image and a sign, in order to clarify his intentions behind writing the book. The book basically seeks to answer a simple question: Why is there such a thing as style? Throughout the book, Gombrich explores the history and psychology of pictorial representation, which leads him into many important areas. He examines, questions and re-evaluates old and new ideas on the imitation of nature, the function of tradition, the problem of abstraction, the validity of perspective and the understanding of expression, all of which reveal that pictorial representation is far from being a straightforward matter.

Art Terms: The Thames and Hudson Dictionary  
Edward Lucie-Smith  
Thames and Hudson 2004

This dictionary offers more than 2,000 entries of art terms that embrace the visual world of today. It is supplemented with illustrations and diagrams that enhance the terms and make it easier for the student, designer, or artist to find what they are looking for.

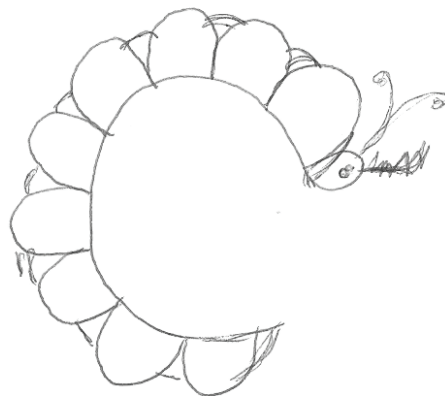
Thinkertoys: A Handbook of Creative Thinking Techniques  
Michael Michalko  
Ten Speed Press 2006

Thinkertoys is practically a cookbook for creative thinking. It provides a step by step guide to near, lateral, and more intuitive thinking techniques. The book provides creative thinking techniques for approaching problems in unconventional ways through fun and thought provoking exercises.

## Appendix II : Handrawn Exercises

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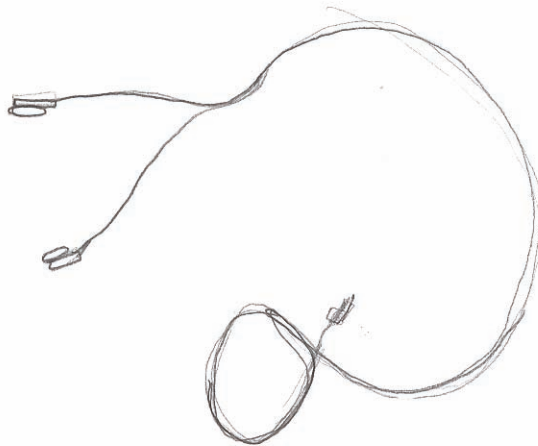
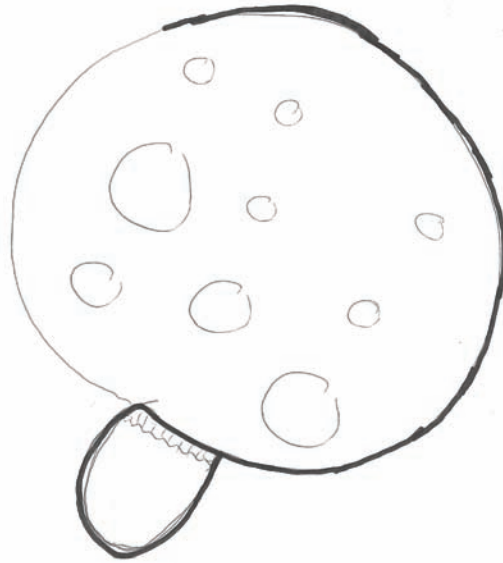
The images below display a sample of the exercises that were conducted on students in a timed environment, using Gestalt Principles as a guide. These exercises are what inspired this thesis project.





**Appendix II : Handrawn Exercises** *(continued)*

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## Appendix III : Survey - Preliminary Evaluation

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### Response Summary

Total Started Survey: 27  
Total Completed Survey: 27 (100%)

PAGE: THESIS SURVEY

1. Background Information. Please provide your email if you are willing to participate in further research for my thesis. <span style="float: right;"><a href="#">Download</a></span>			
		Response Percent	Response Count
<a href="#">Show replies</a>	Work/study field	100.0%	26
<a href="#">Show replies</a>	Gender	100.0%	26
<a href="#">Show replies</a>	Country	100.0%	26
<a href="#">Show replies</a>	Email address	96.2%	25
2. What is your age group? <span style="float: right;"><a href="#">Create Chart</a> <a href="#">Download</a></span>			
		Response Percent	Response Count
	10-19	0.0%	0
	20-29	70.4%	19
	30-39	22.2%	6
	40-49	3.7%	1
	50+	3.7%	1
answered question			27
skipped question			0
3. Are you a designer / design student? <span style="float: right;"><a href="#">Create Chart</a> <a href="#">Download</a></span>			
		Response Percent	Response Count
	Yes	92.6%	25
	No	7.4%	2
answered question			27
skipped question			0
4. Do you research online? <span style="float: right;"><a href="#">Create Chart</a> <a href="#">Download</a></span>			
		Response Percent	Response Count
	Yes	100.0%	27
	No	0.0%	0
answered question			27
skipped question			0

## Appendix III : Survey - Preliminary Evaluation *(continued)*

5. Have you heard about the Gestalt theories of perception (similarity, good continuation, proximity..) ?			<a href="#">Create Chart</a>	<a href="#">Download</a>
		Response Percent	Response Count	
Yes		74.1%	20	
No		7.4%	2	
I think so		18.5%	5	
			answered question	27
			skipped question	0
6. If you answered yes to question 5, have the theories helped you make better design solutions?			<a href="#">Create Chart</a>	<a href="#">Download</a>
		Response Percent	Response Count	
Yes		91.7%	22	
No		8.3%	2	
			answered question	24
			skipped question	3
7. If you answered no to question 5, would you like to learn more about these theories if you knew they would help you make better design solutions?			<a href="#">Create Chart</a>	<a href="#">Download</a>
		Response Percent	Response Count	
Yes		80.0%	8	
No		20.0%	2	
			answered question	10
			skipped question	17
8. Would you like to see an interactive website that explains Gestalt's theories in motion and allows you to apply what you've learnt on the spot?			<a href="#">Create Chart</a>	<a href="#">Download</a>
		Response Percent	Response Count	
Yes		100.0%	27	
No		0.0%	0	
			answered question	27
			skipped question	0

## Appendix III : Survey - Final Evaluation

### Response Summary

Total Started Survey: 18  
Total Completed Survey: 18 (100%)

PAGE: THESIS UI

#### 1. Background Information. Please provide your email if you are willing to participate in further research for my thesis [Download](#)

		Response Percent	Response Count
<a href="#">Show replies</a>	Work/study field	57.1%	8
<a href="#">Show replies</a>	Gender	100.0%	14
<a href="#">Show replies</a>	Country	100.0%	14
<a href="#">Show replies</a>	Email	28.6%	4
		answered question	14
		skipped question	4

#### 2. What is your age group? [Create Chart](#) [Download](#)



		Response Percent	Response Count
	10-19	5.6%	1
	20-29	83.3%	15
	30-39	5.6%	1
	40-49	0.0%	0
	50+	5.6%	1
		answered question	18

#### 3. Are you a designer/design student? [Create Chart](#) [Download](#)


		Response Percent	Response Count
	Yes	66.7%	12
	No	33.3%	6
		answered question	18

## Appendix III : Survey - Final Evaluation (continued)

### 4. Is the website visually pleasing? [Create Chart](#) [Download](#)

		Response Percent	Response Count
Yes		94.4%	17
No		0.0%	0
Yes, but needs improvement		5.6%	1
answered question			18

### 5. Is the typeface legible? [Create Chart](#) [Download](#)

		Response Percent	Response Count
Yes		100.0%	18
No		0.0%	0



[Hide replies](#) Other (please specify) 1

1. I liked how it was in harmony.

Wed, Nov 3, 2010 5:14 PM [Find...](#)

answered question 18

### 6. Is the navigation of the website intuitive? [Create Chart](#) [Download](#)

		Response Percent	Response Count
Absolutely		83.3%	15
Mildly		16.7%	3
Not at all		0.0%	0

[Hide replies](#) Other (please specify) 3

1. It was also clear and visually pleasing.

Wed, Nov 3, 2010 5:11 PM [Find...](#)

2. I think the "1" "2" "3" "4" "5" buttons that show the examples are annoying. Maybe consider a back and forth button

Wed, Nov 3, 2010 3:26 PM [Find...](#)

3. I think if the play and stop buttons were placed under the tabs, it would be much easier instead of going back and forth

Tue, Oct 26, 2010 10:36 PM [Find...](#)



answered question 18

## Appendix III : Survey - Final Evaluation *(continued)*

7. Is it easy to tell which section you are in within the website?		<a href="#">Create Chart</a>	<a href="#">Download</a>
		Response Percent	Response Count
Yes		94.4%	17
No		5.6%	1
At times		0.0%	0
		<a href="#">Hide replies</a> Other (please specify)	1

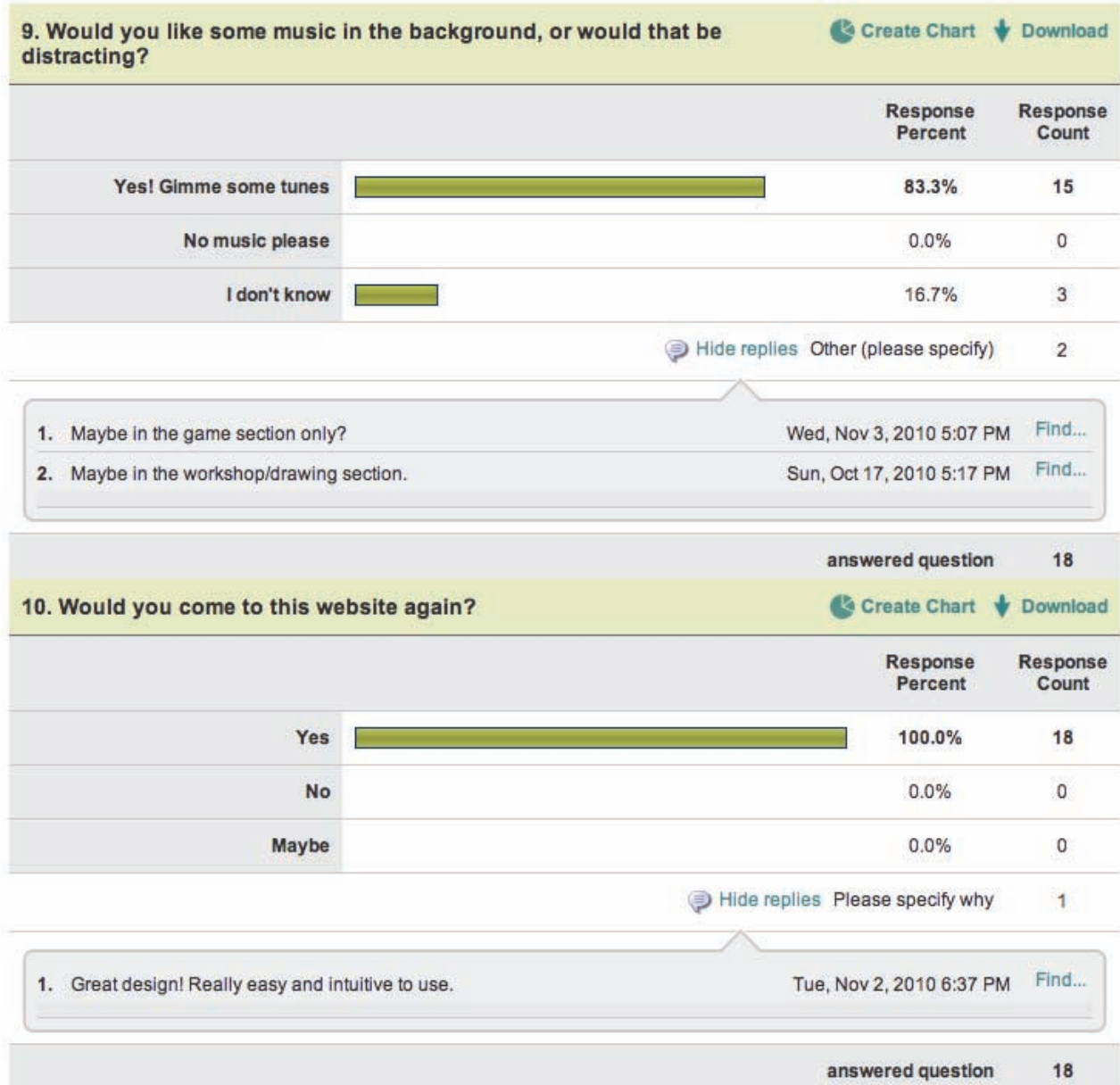
1. I would like to see the section I am in highlighted.

Wed, Nov 3, 2010 4:26 PM [Find...](#)

8. Are the navigation buttons clear and self explanatory?		<a href="#">Create Chart</a>	<a href="#">Download</a>
		Response Percent	Response Count
Yes		94.4%	17
No		0.0%	0
I guess		5.6%	1
		answered question	18

## Appendix III : Survey - Final Evaluation *(continued)*

---



## Appendix IV : Sample of Code

---

The images below display excerpts of the ActionSript 3.0 code used to build this thesis project.

*Code created to  
navigate between  
different sections  
of the website*

```
function goQuiz(e:MouseEvent):void {  
  
    if(newCircle != null)  
        {  
            manager.selectItems(manager.items);  
            manager.deleteSelection();  
            manager.removeAllItems();  
  
        }  
    else if (newSquare != null)  
        {  
            manager.selectItems(manager.items);  
            manager.deleteSelection();  
            manager.removeAllItems();  
  
        }  
    else if(newTriangle != null)  
        {  
            manager.selectItems(manager.items);  
            manager.deleteSelection();  
            manager.removeAllItems();  
  
        }  
  
    else if(newStar != null)  
        {  
            manager.selectItems(manager.items);  
            manager.deleteSelection();  
            manager.removeAllItems();  
  
        }  
}
```



## Appendix IV : Sample of Code

---

*Code used to track  
quiz answers*

```
cross_mc.visible = false;
check_mc.visible = false;

function showcross(e:MouseEvent){

    if(e.target.name == "A1_btn"){
        cross_mc.visible = true;
        cross_mc.y = A1_btn.y;
    }

    else if (e.target.name == "B1_btn"){
        check_mc.visible = true;
        cross_mc.visible = false;
        check_mc.y = B1_btn.y;
    }
    else if (e.target.name == "C1_btn"){
        cross_mc.visible = true;
        cross_mc.y = C1_btn.y;

    }
    else if (e.target.name == "D1_btn"){
        cross_mc.visible = true;
        cross_mc.y = D1_btn.y;
    }
}
}
```