AC 2010-1057: FREEHAND DRAWING VS. TRANSFORMED DIGITAL DRAWING: A PRELIMINARY STUDY AND COMPARISON

Suining Ding, Indiana University-Purdue University, Fort Wayne

Freehand Drawing vs. Transformed Digital Drawing: A Preliminary Study and Comparison

Abstract

This paper presents a preliminary study and comparison of digital drawings, which are transformed from freehand sketching by using Photoshop. With the development of new software, digital drawings are used more and more extensively in the design field. However, freehand sketching continues to provide unique and vital capabilities to interior designers and architects in allied fields (Laseau, 2004). In order to balance both freehand sketching and digital drawing to meet the requirements of the current trend, it is necessary to explore a new technique of transformation from freehand sketching to sophisticated digital drawing. The transformed drawings should represent the characters of both freehand sketching and digital drawing; especially it presents certain qualities that hand-drawn drawing can not present. Therefore, a preliminary study on how to transform freehand drawing to digital drawings was undertaken. Most importantly, this preliminary study compares the characteristics of transformed digital drawings with characteristics of freehand sketching in order to make recommendations about conversion from hand-drawn to digital drawings for professional practice and education. This paper presents a procedure of transformation from traditional sketching to digital by Photoshop. It also presents a series of transformed drawings and hand-drawn drawings. A comparison list was created to describe the characteristics of both hand-drawn and digital drawings. This study provides valuable suggestions to the body of knowledge of graphic communications. It will benefit both design education and professional practice.

1. Introduction

The objective of this study is to explore a method that can transform freehand sketching to digital drawing and keeps the characters of freehand sketching. The software used was Photoshop. The first of three steps involved in this preliminary study include freehand sketching or freehand drawing for perspectives or floor plans or isometric drawings with line drawings. The second step is to scan the freehand drawn line drawings and make them PDF files. The third step is using Photoshop to edit the scanned drawing and applying materials and gradient fillies. Finally, a comparison list of both freehand drawing and transformed digital drawing is presented in this paper.

Freehand Sketching is a means of communication for designers. Students and practitioners frequently call upon freehand drawing skills to communicate ideas or support a point of view with clients, colleagues and instructors. At other time, freehand drawings will be utilized to better understand aspects of one's own design or to refine them. It is used extensively in the design process, especially schematic design. Designers need to effectively convey their ideas both visually and verbally. Therefore, the ability to draw and sketch becomes an important skill for designers because it supports a relaxed and fluid conversation among designers and clients. Most designers and architects agree that the freehand sketching process is a creative

process that presents immediate responses to design problems. Freehand drawings embody the designers' personalities and mind set at that time. Therefore, it has become a consensus among design profession that no other method can replace freehand sketching during the schematic design phase yet. However, with the development of new software, digital drawings become more and more popular, such as 3-D modeling and animation. In order to meet the requirement of the trend of digital drawing, a study that can generate hybrid drawings with both characteristics of freehand and digital drawing seems timing. It is also obvious that a research study is needed to investigate the characteristics of hand-drawn and digital drawings in order to teach sketching more effectively in education and apply sketching more effectively in the design practice.

2. Literature Review

2.1. The Characters of Freehand drawings and Digital Drawings

With the revolution of computer technology, more software are developed, which enable designers and architects to create realistic three-dimensional models and virtual environments. Then why do so many design educators and practitioners still make sketchy, freehand drawings when computer software can be accessed, which allows them to create perfectly accurate three-dimensional digital models and then view them from any position. Sorenson (2007) explained that in the creative working process, freehand lines and the shapes designers suggest are infinitely superior to mechanically engineered lines and forms. Especially early on in that partially understood, partially sensed, highly fugitive stage where the nature of a new problem and search for possible, alternative avenues of geometric resolution are explored. This is because the freehand line encodes a uniquely individual human thought and action partnership.

During the freehand sketching process, as the mind behind those strokes and marks becomes more confident and engaged, the lines themselves tend to progress from tentative, delicate traces towards decisive and powerful statements of commitment and resolution. (Sorenson, 2007). These imperfect lines and strokes all come directly from designers. People recognize the human attributes and personalities present in freehand lines, marks and strokes.

Although the computer is an increasingly powerful tool for constructing, rendering, and animating three-dimensional models, and it can even generate formal geometries not possible to conceive in the human mind, it cannot reveal, amplify, or clarify that semi-to-subconscious state of mind where much of the uniquely individual and human creative act takes place (Sorenson, 2007). It doesn't really matter if mechanically engineered lines are drafted by triangle and T-square or by computer assisted design software. It does matter that the drawings should present the designers' personality and immediate response of solving the problem. Mechanically created images tend to project a sense of sterility, of surreal environments devoid of the messiness of real-life experience, absent all evidence of human spirit or soul and passion (Sorenson, 2007). Thus, keeping freehand sketching in the schematic design phase and representing the characters of freehand drawing is crucial for designers in the design process.

2.2. The Transition From Freehand Drawings to Digital Drawings

The utility and speed of sketching is particularly advantageous, as many ideas can be tried out and retained or discarded without large time investments or actual constructive expenses (Diekman & Pile, 1985). Leggitt (2002) indicated that with the increased application of digital

techniques, the method by which 3D sketches are produced may be changing. A recent research finding by Pabel (2007) confirmed Leggitt's statement. Pabel's study (2007) revealed that preference for hand verses digital design process and presentation graphics may vary by design specialty. Corporate and facilities planning may embrace digital sketch methods earlier in the design process, as early precision is often preferred by clients. Retail, healthcare, residential, and entertainment practice may place more stock in the human experiential aspect and more frequently employ hand methods though these drawings may be digital assisted. Furthermore, Lu (2005) explored a method that bridges the difference between digital and traditional media in a studio course without the qualitative analysis. Therefore, it is evident that although computer software has been used by designers and architects for digital drawings and modeling, freehand drawings are still used by design practitioners and educators. It confirms again that exploring a new method to represent the characteristics of freehand drawings in digital drawings is necessary.

3. Process

The author conducted of this paper a preliminary study of representative of the characteristics of freehand sketching in digital drawing. Photoshop was used to transform freehand drawings into digital drawings. Based on this preliminary study, a comparison of characteristics of both freehand drawing and transformed digital drawing was conducted as well. During the process, the first step was to create freehand-drawn line drawings, such as perspectives, plans or isometric drawings. These line drawings were scanned into PDF files. Internet searches were conducted to find real materials, such as wood flooring, marble counter tops or glass walls. Real trees or plants were found through internet as well. The next step was to use Photoshop to edit the line drawings that were in PDF format. Finally, a comparison list was generated. As an objective of this study, recommendations were made for future research and provide valuable suggestions to the body of knowledge of graphic communication.

4. Results

Two interior perspectives, one floor plan and one isometric drawing are presented as shown in the following figures (Figure 1 through Figure 8). In the following freehand drawings, keeping the characteristics of freehand sketching is critical. The drawings look free and loose. In the transformed digital drawings, real material, such as carpet, wood floor, marble and trees are presented in drawings. The transformed drawings look polished and sophisticated while embody the characteristics of freehand drawing. A comparison of characters of freehand drawing and transformed digital drawing is presented in the summary.
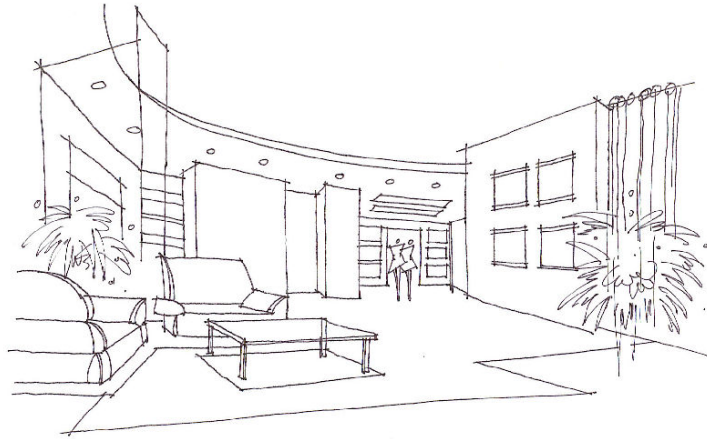
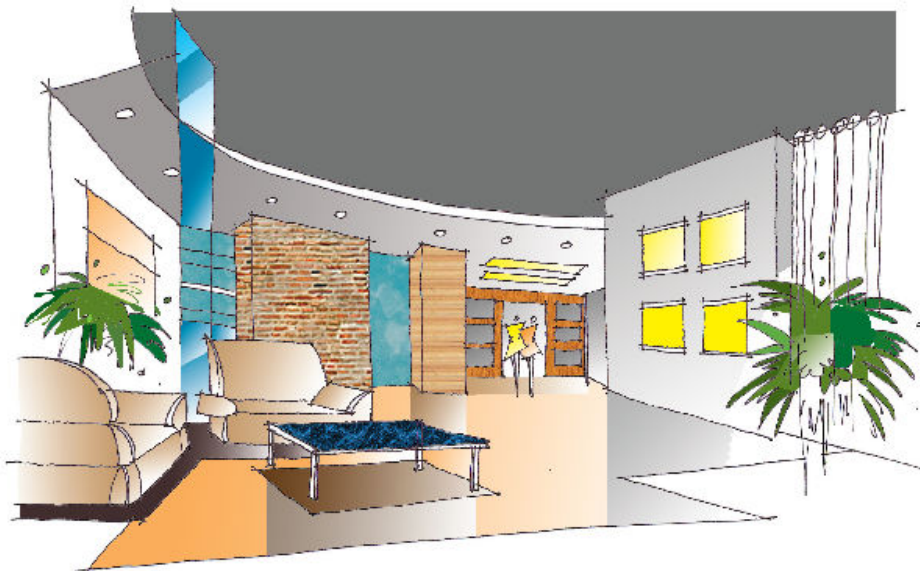**Figure 1: Freehand-drawn Interior Perspective (Ding, 2011)**

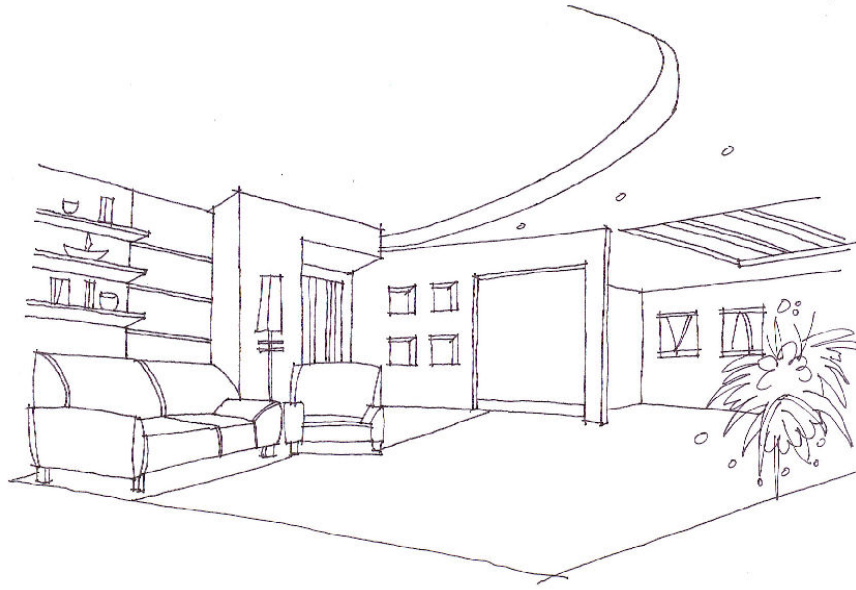**Figure 2: Transformed Digital Interior Perspective (Ding, 2011)**

Figure 3: Freehand-drawn Interior Perspective (Ding, 2011)
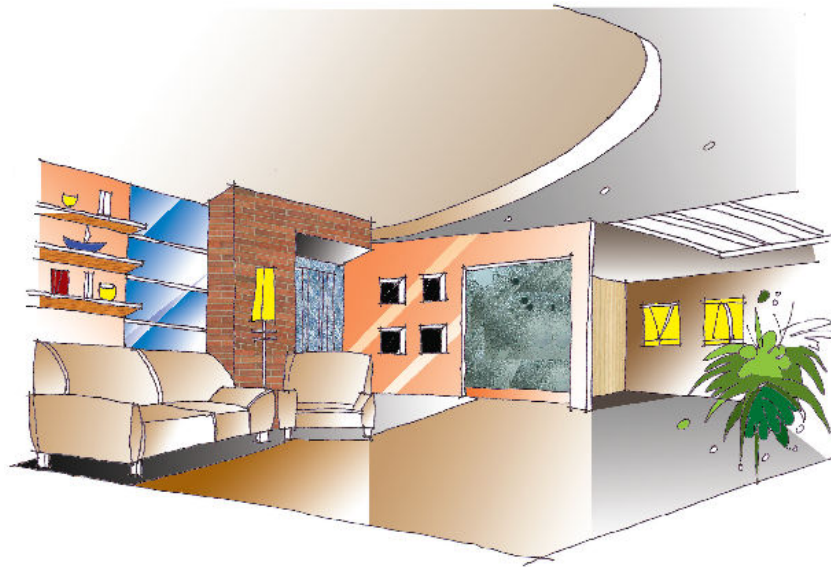

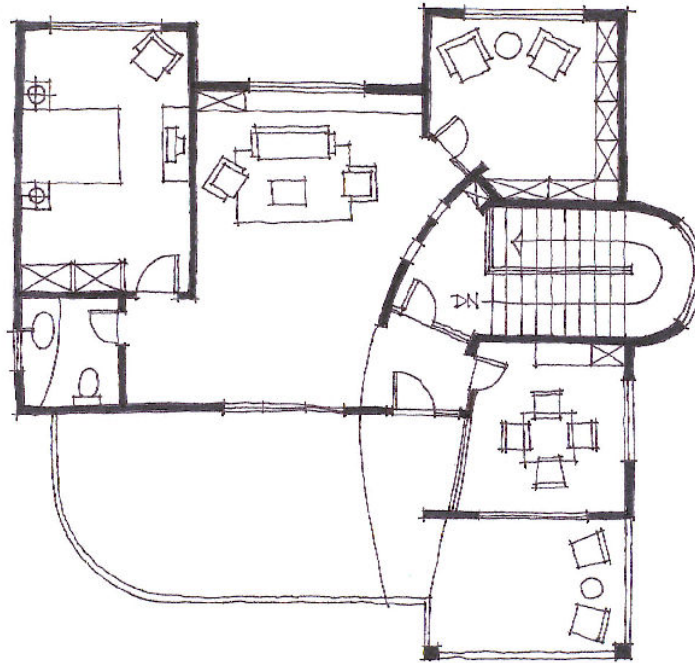**Figure 4: Transformed Digital Interior Perspective (Ding, 2011)**

Figure 5: Freehand-drawn Floor Plan (Ding, 2011)
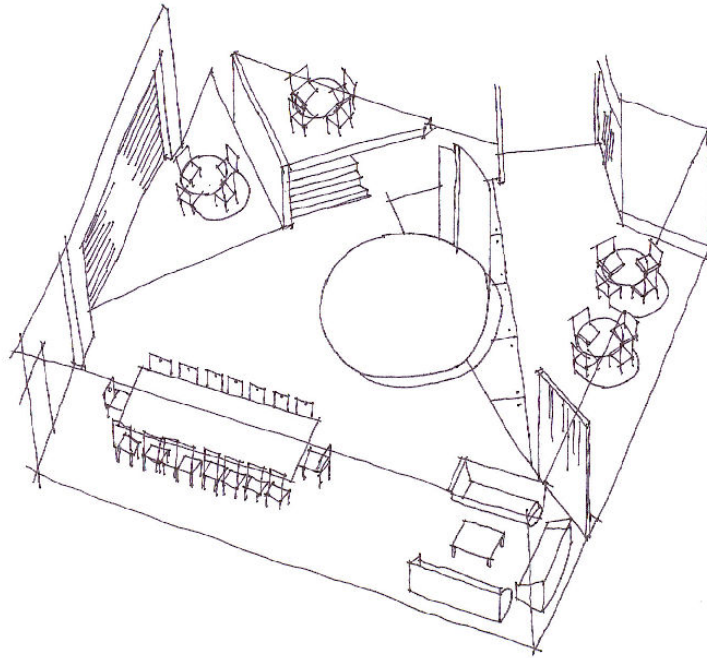

Figure 6: Transformed Digital Floor Plan (Ding, 2011)

Figure 7: Freehand-drawn Isometric Drawing (Ding, 2011)
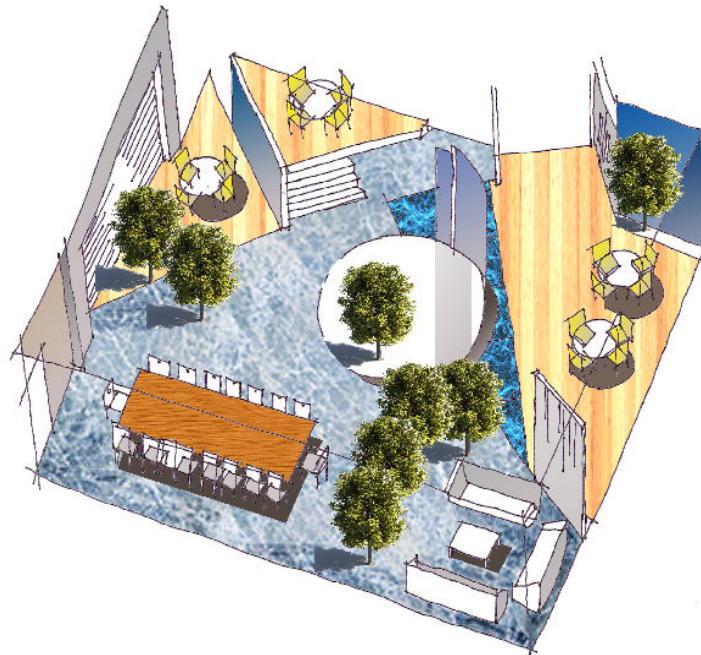

Figure 8: Transformed Digital Isometric Drawing (Ding, 2011)

Step One: Freehand Sketching – This is the first step for transformation from freehand sketching to digital drawing. Sketch the perspectives, floor plans, elevations, isometric views or even sections as you desire. It is very important to be loose when you sketch. Do not be afraid of mistakes. This is a very critical step for keeping the characters of freehand sketching in digital drawing. It's a phenomenon often referred to as the eye-mind-hand coordination during freehand sketching process. Lines made in this way are not "perfect." They naturally embody tendencies, aberrations that stray from absolute perfection and reveal the origin of the strokes and marks made by a human being. Designers and artists are all aware of these particular imperfections, the way such marks subtly document a level of craft and a state of mind as "human." These lines may wobble, wander aimlessly, fade in and out, whiplash, or end in distinctive figure eights or curly-cues (Sorenson, 2007). As the mind behind these strokes becomes more confident and engaged, the marks themselves tend to progress from tentative traces towards powerful statements of design solution. Such lines and shapes record designers' immediate creative thinking and the problem solving. They come directly through and from the designers. Experienced designers and architects all recognize and appreciate the human attributes present in freehand marks. Therefore, keeping these characters is extremely critical.

Step Two: Transformation from Freehand to Digital with Scanning and Internet Search – After your freehand line drawings are created, it was the time to transform them into digital format. Drawings were placed on a scanner and scanned to PDF files, such as Figure 2, Figure 4, Figure 6 and Figure 8. You would use these PDF files for Photoshop editing in the next step. At this time, you also needed find real materials that you were going to use in your drawings on the internet. You could use Google to search images. The following figures present samples of image that used in Photoshop editing.
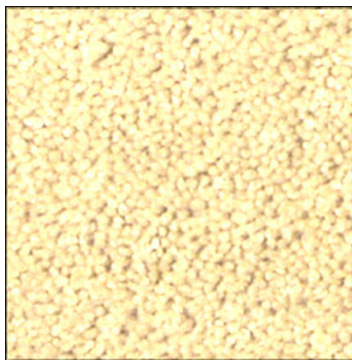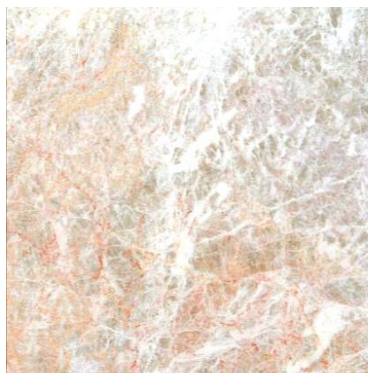

Figure 9: Carpet

Figure 10: Marble

Figure 11: Grass

Figure 12: Tree

Figure 9 presents carpet, Figure 10 presents marble and Figure 11 presents grass. These three images were used in the floor plan as shown in Figure 6. Figure 12 presents a tree that was used in isometric view shown as Figure 8. It is advised that you edit the images as needed in order to present clear texture of materials. You can edit these images in Photoshop, such as scale and rotate image. It will be explained in the next step.

Step Three: Photoshop Editing for Digital Drawings – After freehand sketching has been scanned into PDF format and real material images are found on the internet, it is the time to start editing your drawing with Photoshop. The editing process is not hard as soon as you are familiar with Photoshop. The edited drawing looks very sophisticated compare to freehand drawing. The following describes the procedure to create the digital drawing in Photoshop.

1. Open up Photoshop and always open a "New" file.
2. Set Resolution to 300; CMYK color; choose "Letter" and "White page". (See Figure 13)
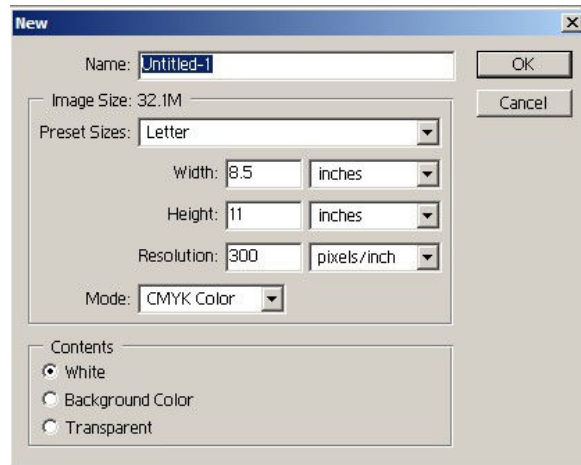
Figure 13: Photoshop Page set up

3. Go to "File" pull-down menu to find "Place" and click on it.
4. You will be prompted by a dialogue box that allows you to brows your PDF file that you have made from your freehand sketching. Choose the PDF file, such as Figure 1, Figure 3, Figure 5 and Figure 7.
5. After you choose your PDF file, you will see a big "X" on top of your PDF file. To remove the "X", just hit return key.
6. You need to rename the layer for background. You can rename it as "line drawing"
7. At the little drop down menu for layers, change "Normal" to "Multiply" and lock it.
8. To attach real material, such as marble floor to your PDF file, go to File – then open – marble. JEPG in Photoshop.
9. Select "Marble" image with selection tool (dashed square looking).
10. Click "Ctrl" "D" to deactivate the selection command.
11. Go to "Edit" pull down menu and click on "Copy".
12. Switch to your line drawing PDF file. Use "Magic Ward" to select the area that you want to fill in real material.
13. Then use "Past Into" command (not Past) to attach real material to the area that you just specified.
14. It is important that you create new layer for each different material attachment.
15. You also can change texture size for the material. Use selection tool first. Then go to "Edit" pull down menu and use "Transform". You can scale, rotate or making perspective for the material.
16. For solid area, you can use "Gradient Tool" or "Paint Bucket Tool" to add desired color.
17. To create shadow or to make certain area darker, you can use "Burn Tool", which is located below "Paint Bucket Tool". To make the area lighter, you can use "Doge Tool".
18. To place a tree or bushes to your PDF file, you can use "Copy" and "Past". One important step that you need to do is to remove the background behind the tree. In order to do that, you can use "Magic Ward" to select the tree. Then the boundary will be highlighted. Use "Crop" that is under the "Image" pull down menu to remove the background.

19. One special note that is important during the process. If the boundary is not closed, it will not allow you to use "Magic Ward" to select desired area. Therefore, you will have to draw lines to close the boundary in order to use Magic ward.

In general, editing PDF file of line drawing in Photoshop is not hard. The transformed digital drawing presents both characters of freehand sketching and digital drawing. The following is a summary of the comparison of these two types of drawings.

5. Comparison of Freehand-drawn and Transformed Digital Drawings

The outcome of this study provides a systematic procedure of representing the characteristics of freehand sketching in digital drawing with Photoshop. In order to exam how much characters of freehand sketching are presented in digital drawing and what kind new characteristics are generated in digital drawing, a comparison was conducted. Several freehand drawings were selected, for example, Figure 14 and Figure 15 as interior perspectives.

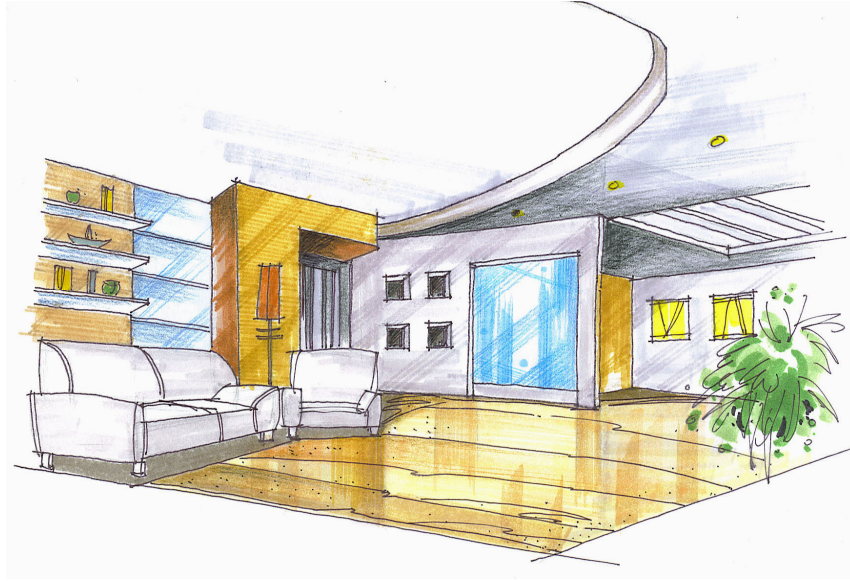**Figure 14: Freehand Drawn Interior Perspective (Ding, 2010)**

Figure 15: Freehand Drawn Interior Perspective (Ding, 2010)

Characters of Freehand Drawing:
1) *Presents the sense of "human" touch with "imperfection" marks and wobble lines.* Freehand sketching process is an eye-mind-hand coordination process. Lines made in this way are not "perfect." They naturally embody tendencies and aberrations. It is this imperfection reveals the sense of human touch.
2) *Presents the process of creative thinking. The ideas come directly from the designers through pencil strokes or marker strokes.* As the mind behind these strokes becomes more confident and engaged, the lines, marks and strokes tend to progress from tentative, delicate lines towards determined and firm graphic design solution. Such lines and shapes record the designers' instant mental and physical state at the moment that ideas come up.
3) *Presents unique individual manner and sketching style.* Experts can identify the author's handwriting by different writing characters and style. Since the eye-mind-hand coordination and different personalities set the drawings apart, freehand drawings can be identified by individual sketching style from the way of lines, marks and strokes were made.

Characters of transformed digital drawing:
1) *Maintains the sense of human touch by keeping freehand drawn lines and marks.* Since original sketching was scanned, the characters of freehand sketching were kept. All the "imperfections" are shown in the digital drawings. In addition to scanning line drawings, marker strokes or color pencil strokes can be scanned into PDF file as well in order to represent more sense of human touch.
2) *Presents the sense of realism by using the real materials and landscaping.* Real materials and landscaping were down loaded from internet. These JEPG files can be modified in Photoshop. Attaching these real materials to drawing makes the drawing more realistic. In this way, the features of realism in digital modeling are presented in transformed digital drawings.
3) *Presents the sense of sophisticate by using functions of computer software.* Many functions of Photoshop, such as paint bucket tool, gradient tool, doge tool and burn tool can fill in different

color on the digital drawing and change the darkness and brightness on the drawing. The changes made by these functions in Photoshop make the drawing look more sophisticate.

In summary, transformed digital drawing is a hybrid of freehand-drawn and digital drawing. It not only maintains the characters of freehand sketching, but also presents all the characters of digital drawing. Based on this preliminary study and summary of the characters of freehand drawing and transformed digital drawing, the recommendations were made for future studies.

6. Conclusions and Recommendations

The outcome of this study provides a procedure of transformation from freehand sketching to digital drawing with Photoshop. The characters of both freehand sketching and transformed digital drawings are summarized through a comparison. It provides valuable recommendations to the body of knowledge of graphic communication for design practice and education. This preliminary study will stimulate dialogues among educators and practitioners. Future research could be an in-depth investigation, which uses a qualitative-style questionnaire. As Pable (2007) indicated that specific character of sketching as it is currently used in interior design practice has not been thoroughly investigated yet. Consequently, it is difficult for design programs to know how to teach sketching or to lead design practice to better sketch application (Pable, 2007). Therefore, a qualitative analysis of transformed digital drawings should be undertaken. Most importantly, future research study will have to compare characters of transformed digital drawings with characters of freehand drawings in order to generate a qualitative comparison list. The research method could be a qualitative-style questionnaire with visual images of both hand-drawn and digital drawings that will be distributed to both educators and practitioners. The data will be analyzed by descriptive statistical analysis methods. In order to conduct this qualitative analysis, a series of transformed drawings are needed. Therefore, this preliminary study was the first step for further investigations. It provided a demonstration for generating transformed digital drawings with Photoshop and a preliminary summary of the characteristic comparison of both type of drawings.

Reference

Diekman, N. & Pile, J. (1990) *Sketching Interior Architecture*, NY: Book Sales

Ding, S. (2011) *Sketching Interiors: From Traditional to Digital*, Fairchild Publications, New York (to be published in 2011)

Laseau, P. (2004) *Freehand Sketching: An Introduction,* Second Edition, Norton & Company, New York

Legitt, J. (2002) *Design Shortcuts*, NY: Wiley

Lu, J. (2005). *Bridge the Difference Between the Digital and the Traditional Media.* Proceedings. *pp. 76-78.* 2005 Interior Design Educators Council International Conference, Savannah, GA.

Pabel, J. (2007). *Quick Three-Dimensional Sketches: Educator and Practitioners' Use, Personal Competency, and Perceptions of interior Design Student Preparedness.* Proceedings. *pp. 271-278.* 2007 Interior Design Educators Council International Conference, Austin, TX.

Sorenson, H. (2007). *Freehand Drawing on Computer.* Design Communication Association 2007 Bi-annual Conference.http://www.designcomm.org/index1.php?content=newsletter