Graphic Art Design Based on Computer Graphics Software

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Abstract. Currently, graphic design has been shifted from traditional hand-drawing to computer-aided design comprehensively, which allows the design concept to be effectively transformed into gorgeous realistic graphics. Through the functional analysis and hands-on application of three professional design software (CorelDRAW, Photoshop, and Flash), their characteristics and application directions are analyzed and compared in this paper. In addition, the necessity and development trend of computer graphics software in graphic art design are pointed out.

Keywords: Computer, Graphics Software, Graphic Design, Hands-on

1. Introduction
In the new era, digital design has been extensively used in all fields of design in China. With the rapid development of design software, designers have evolved from the original manual sketch, planting words, monochrome ink manuscript to computer operation and scanning input, which makes the design work more convenient and realizes the qualitative leap of the design industry. China's graphic design keeps up with the development trend of the times[1-2]. It changes from a single way of expression to a multi-product, high-grade and international type. The cycle of updating graphic art design works is becoming shorter and shorter, and the expressive force is becoming more and more outstanding. In recent years, the computer is extensively used, which also has a significant effect on the field of graphic design[3]. In daily life, the application of computer art design in trademark, poster, web page, automobile, house, fashion design and other fields is becoming more and more common. The demand for talents with graphic design ability in society, enterprises and companies is increasing[4-5]. As a major with massive applications, graphic design offers more extensive and diversified development and job opportunities than in the past, and the related talents are in short supply. The use of computer software for creative design is gradually replacing the traditional way of hand drawing, which has become an inevitable trend[6].

Currently, secondary vocational school students' creative design ability is mainly trained through calculation assistance in graphic design majors at colleges and secondary vocational schools.
However, most of the secondary vocational school students are junior high school graduates, and only a few students have art skills, weak cultural foundation, no painting foundation. It is challenging to study graphic design. Hence, graduates can not meet the needs of enterprises for talents in design and production. On the one hand, interior design companies, advertising companies, multimedia design and production application companies, graphic processing and image creation and media development, image design, graphic design and other companies need many graphic design talents, especially those with excellent comprehensive quality and outstanding professional technology; on the other hand, many “Designers” trained by secondary vocational schools have relatively low level of creative design, who cannot meet the requirements of various enterprises or be recognized by consumers. The reason is that it is difficult to improve the students' art foundation and aesthetic level through about two years of secondary vocational education, which has limited their design capabilities to a large extent.

Computer software course is a main course of graphic design major in secondary vocational school. Adobe Photoshop, Corel painter and CorelDRAW play an vital role in the three-year curriculum of students. It is also the essential software needed for bookbinding, interior design, graphic advertising and other courses in the last academic year. These courses are related to the necessary skills of painting, the cultivation of aesthetic ability and computer operation skills and other comprehensive knowledge. Currently, the most popular software of graphic design is Corel Draw (vector drawing, graphic layout), Photoshop (image processing), Flash (Web Design), illustrator (vector drawing layout), and industrial design (book layout), etc. In this paper, three most commonly used software (CorelDRAW, Photoshop, and Flash) in graphic design work are analyzed and described, including their relevant characteristics and application direction in graphic art design.

2. Reliability analysis of computer graphics software

In this paper, the evolutionary computation method is used to calculate the reliability of each component under the condition of minimizing the system cost and taking the system reliability as the constraint, to help the system decision-makers to allocate resources to each component reasonably. On this basis, the software reliability modeling and simulation problem is simplified to the optimization objective model based on the cost function, and the objective function can be expressed as the function of each component reliability:

$$\text{Min cost} = \sum_{i=1}^{n} \text{cost}(r_i)$$

$$\text{s.t. } RE \geq RE_0, \quad 0.5 < r_i < 1, \quad RE_0 = 0.9.$$

(1)

Where cost represents the total cost of the software system, $r_i$ represents the reliability of each component represents the reliability of the software system and the predetermined reliability value to be achieved by the system. Equation (2) makes the expected reliability of the system reach 0.9, and the reliability of each component satisfies the minimum cost on the premise of 0.5 to 1. The constraint equation is added to the objective function as a state transition matrix term, which becomes an unconstrained optimization problem, namely:
Min cost + penalty = \sum_{i=1}^{n} \cos t(r_i) + k \cdot \min \{0, RE - RE_0\} \tag{2}

Where \( k \) is sufficient large negative number. If the lowest reliability value of the system is not met, the state transition matrix is inversely proportional to \( RE - RE_0 \).

In the model with the minimum cost as the optimization objective, the functional relationship between the cost and the reliability of each component is generally crucial. The reliability cost relationship function based on experience and/or data is shown in Equation (3) as follows:

\[ c_i(R_i, f_j, R_{j,\text{max}}) = e^{(1-f_j) \frac{R_i - R_{i,\text{min}}}{R_{i,\text{max}} - R_i}} \tag{3} \]

3. Application of coreldraw in graphic design

CorelDRAW software provides designers with a design tool different from traditional typesetting painting. CorelDRAW is a graphic and image software developed by Corel company in Canada. It is extensively used in many fields such as trademark design, logo making, model drawing, illustration drawing, typesetting, and color separation output. It can easily typeset and insert graphics, can switch freely among various kinds of software, realize software interaction and resource sharing, make graphic design and modeling design in a computer synchronously, synchronously design and display, and fully support the preparation before printing and color fidelity for the computer color separation plate-making. CorelDRAW software has the typesetting function of word office software to a large extent, making professional typesetting and graphic collocation natural and comfortable. CorelDRAW is a drawing tool software based on vector. Each object in the vector file is relatively independent. It’s the attributes can be moved and changed many times without affecting other objects in the drawing, making the designer more relaxed and comfortable when drawing, i.e., immediate implementation. For example, if you plan to design a plane advertisement, after importing the main image, you need to add some decorative graphics, text description and graphic arrangement. The Bezier curve tool in CorelDRAW can be used to create images of any shape. Each graphic is an integrated entity, with lines following the shape, or with words changing, presenting vibrant artistic effects. Various design techniques and effects create different feelings. In 2017, the latest version is CorelDRAW X8, which can be used to open large capacity files very quickly. It has reduced the opening time by half compared with the lower version, significantly improving the work efficiency. In terms of the display effect, it is very similar to Photoshop, especially the display layer is smooth and delicate, with a natural feeling. But there are also some small problems, such as: when exporting JPG files or PDF files, the last operation is not recorded automatically; the function of selecting Chinese font is more convenient than that of no lower version CorelDRAW, while English font is preferred. Generally, CorelDRAW is graphic design software that can perfectly represent the three elements of graphic design: graphics, copywriting and color.

4. Application of photoshop in graphic design

Adobe Photoshop is the most powerful visual communication software in graphic design applications. It has expanded the visual language of designers and illustrators, and also allowed photographers to
present magical effects like natural light without darkroom treatment. Industry abbreviation: “PS”, also has a nickname: “P chart”. Adobe company provides a perfect toolbox, shortcut key and path function for photo decoration and image design, which allows the images to change endlessly, adjust the color strength at will, and overlay different mask to produce different image effects. Photoshop has powerful image processing functions. The processing object is pixel. In nature, all the tiny changes of color and image can be realized by pixel. But no matter how good the software is, Photoshop is not as convenient as CorelDRAW in drawing graphics. Currently, there are mainly three ways to create illustrations and Anime: the first is to prepare black and white manuscripts by hand and input them by scanner, and then edit, modify, screen and color them by Photoshop layer style command, but the methods are complicated and require skilled hand-drawing skills; the second is to use digital electronic input pen to directly work on paper or tablet Painting, generating PDF file, and then Photoshop for follow-up work. These two methods have their advantages and disadvantages in terms of time, effect and quality. For example, the digital input pen can't show the white flying effect of Chinese brush. The strokes generated by the software are very stiff, and the transition is not natural, but they are more convenient to carry and can be immediately recorded as they are inspired. The third method is the hybrid method, where the advantages of both methods are leveraged, with the robust functions of Photoshop external filter and Photo image library. Their skillful combination can often create unexpected artistic effects.

5. Application of flash in graphic design

In the information age, graphic design also includes web design and multimedia design. With Flash, graphic designers can easily design these contents. Flash (interactive vector diagram and web animation standard) is a commonly used design software in web page design, and it is also one of Adobe's knock-out products. The operation between Flash and Photoshop is very universal. Users proficient in photoshop will feel that Flash is highly user-friendly and easy to use. Flash can easily integrate pictures, music and animation. The key is that the software allows graphic art designers to free their imagination, break through the still image in their mind, and activate their minds. For example, in Flash, you can edit the sound effect, which most people don't know. They think it's to synthesize on a professional mixing platform. Drag the small box in the sound option of the Frame Properties dialog box to adjust the volume and fade in and out. The advantage of Flash is that it can express the animation action freely, the frame and frame can be seamlessly connected, the transition and connection picture can be automatically generated, and the magic action effect that is impossible for other web design software can be easily accomplished. But the inconvenience of Flash software is that every action should be supported by every keyframe. If a point needs to be changed, it will be a significant change and the design time can be long. The solution is as follows: move Flash files between applications or decorate them in Photoshop without saving them in advance. The files are compressed and saved only when the design is completed for faster playback speed and smaller file size.
Understanding of Flash software

Do not understand  Know a little bit  More proficient

Figure 1. Survey and analysis of Flash painting understanding

Flash software interested

Very interested  Some interest  General  Uninterested

Figure 2. Survey and analysis of interest in learning

6. Conclusions
In conclusion, it is not hard to see that in graphic art design, whether it is graphic, 3D, or color composition, the powerful design function of computer-aided graphics software can perfectly present the design idea attributing to its combined characteristics of creativity, design and production. Usually, design works are not isolated and independent, which cannot be presented by using only one type of software. Designers can use the compatibility of multiple software for complementary advantages and cooperative utilization. Modern graphic design has shifted from traditional design mainly based on
manual work to a brand new era when high-speed computing and big data network are used. The fierce competition in modern society requires that new products should be completed with high efficiency. Hence, it can be predicted that with the further development of China's economy, personal design studios, freelance designers and modern advertising companies will significantly drive the development of computer graphics software in graphic art design, which is also an inevitable trend in the development of the modern graphic design.

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