Research on the application of animation design based on digital media technology

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Abstract: The continuous development of science and technology is making digital media technology widely used. In the field of animation design, the application of digital media technology shows great advantages; it not only improves the efficiency of animation design, but also promotes the healthy development of China's animation industry. The article firstly draws attention to this industry by the sharp increase of digital media practitioners, analyses the combination of digital media technology into animation design and the advantages of the combination development, and puts forward the view that digital media technology is conducive to improving the efficiency of animation design and the more skilled digital media technology is, the higher the efficiency of animation design is, and puts forward strategies to optimize the application of digital technology in animation design in the case practice. It also proposes strategies to optimise the application of digital technology in animation design in the case practice, hoping to provide reference for improving the technology of animation design.

1. Introduction

Thanks to the advancement and development of our country's technology, digital media technology is known to be gaining more and more attention and it is developing at an unprecedented rate. Digital media technology is entering the daily life and production of the general public, influencing and changing the way people live and produce. By the end of 2018, the number of people working in information technology and software rose at a significant rate over the decade, as shown in Figure 1, from 1.738 million to 4.243 million, an increase of 2.505 million [1]. In the last decade, the information transmission, software and information technology service industry has seen a steady expansion in the number of employees and the widespread use of applications, with digital and multimedia technology combined with applications appearing in all aspects of our lives, and the sharing of resources in digital media arts alongside the ever-expanding information network technology[2]. In the field of animation, the application of digital media technology is the most prominent. It breaks the traditional animation production mode, using digital media technology to produce, to achieve efficient, convenient and shared big data management effect, to better combine science and art together, which will also have a more far-reaching significance for scientific progress.
2. Integration of animation design and digital media

2.1. Traditional animation design

Any artistic creation requires a certain artistic aesthetic and artistic practice base. For animation design, it is closely related to art, and the process of animation design is also the process of art creation, and the specific cultural characteristics and artistic charm of its content are important indicators for its evaluation. The visual effect of traditional animation design is not perfect and cannot attract the audience's recognition, but after the application of digital media technology means, the visual effect of traditional animation design content can be improved to a certain extent[3]. The visual effect of traditional animation design is not perfect, but after the application of digital media technology, the visual effect of traditional animation design can be improved to a certain extent. For example, the success of these traditional animation works such as "Havoc in Heaven" and "Journey to the West" etc are only a small part of the many hand-drawn works. Their success is not unrelated to the high ideological level and artistic quality of the creators, while animation designers and art masters who really have ideological level are after all a minority, so there are not many successful works in traditional animation. But when it comes to digital animation, a batch of Excellent works: "Peach Blossom Story", "Monkey King: Hero is Back", "The Legend of Qin", "The Q Edition of the Three Kingdoms", "Romance of the Three Kingdoms", "Rainbow Sea", "One Hundred Thousand Bad Jokes" and so on are all popular works. These are all great changes produced by the integration of digital media technology into animation design, and innovative animation design has promoted the development of the animation industry.

2.2. Entry point for the combination of digital technology and animation design

The combination of animation design and digital media technology should be applied to find out the breakthrough of the combination, that is, the entry point of the problem, in order to effectively improve the effect of animation design, enhance the visual expression of animation design, so that the digital media technology has a positive impact on animation design.

First of all, the digital technology diagram in Figure 2 is used to recognise and analyse the content of digital technology. Digital media technology mainly contains scene design, character image design, game program design, multimedia post-processing, human-computer interaction technology, is mainly for game development, website artwork and creative design technology. And animation design is mainly the use of animation software tools for the creation of film and television animation artworks, to complete the creative tasks of animation design, animation editing, animation creation and so on. Its core technology of animation motion laws, animation character and scene design, animation storyboard design, 2D animation production, 3D modelling and animation, 3D material and rendering, and animation short film creative production, etc. have directly related to digital media technology. Then the combination point of animation design and digital media technology is cut in the core technology to realize the technology of dual platform together[4]. From the intersection diagram in Figure 3, it can be clearly seen that two-dimensional three-dimensional modelling and animation post-synthesis are the entry point of digital technology and animation design (especially post-synthesis technology), and after
locking the entry point, the work unfolded in the post can be carried out in a purposeful and orderly manner, and form a mutual promotion and common development between the two.

![Digital technology diagram](image1)

**Figure 2** Digital technology diagram

![Digital technology and animation](image2)

**Figure 3** Digital technology and animation

### 2.3. The development of digital technology combined with animation design

Because of the technology of computer-generated images used in film and animation, the main reliance is on digital technology and multimedia technology. 3D animation uses computer graphics imaging and graphics processing technology to generate digital images for animation. Digital animation is different from traditional two-dimensional animation, and can reflect the realism of objects more vividly. The use of digital media art in film and animation allows a new world of animation to be vividly displayed in our lives. Animation works are also artistic creations and need to be promoted by online media to gain greater recognition. In this regard, digital media can play a more powerful role in achieving accurate publicity and improving media efficiency, thus improving the advertising effectiveness of animation works and accelerating the development of the digital media industry.

### 3. Advantages in digital animation design

#### 3.1. Greatly improve the efficiency of animation creation

As we all know, the traditional animation design mainly relies on manual operation, based on manual drawing, which often results in the phenomenon of "a simple action costing dozens of sheets of drawing paper". As a result, whether it is decomposition of the action or drawing, or specific assembly at a later stage, it will consume a lot of financial and human resources, which is not only costly, but also inefficient and with unsatisfactory creation quality. Digital animation design, on the other hand, has changed the traditional manual drawing mode, eliminating the traditional complex manual procedures and greatly improving work efficiency. In addition, the degree of sophistication and proficiency in digital technology has an impact on the efficiency of animation design, and the more proficient one is in digital technology, the easier and more efficient the workflow will be.
3.2. Greatly improve the visual effect of animation
In the traditional animation design, due to the absence of advanced technical conditions, the setting of scenes often requires more manpower and material resources, which largely limits the overall effect of the animation works. With the application of digital media art in animation design, this situation has been greatly improved, as animation designers can simply use computer-related technology and programming software to perfectly present the scenes they want to express, which greatly enhances the ornamental visual effects of animation products\(^5\). For example, when making ancient scenes in films, traditional operations require more human and material resources, while the application of digital virtual technology can solve this problem very well, as designers can incorporate their own creative ideas to create ancient models according to the needs of the plot, in order to complete the content expressed in ancient scenes.

3.3. Expanding the space of expression of works
Expand the creative space of animation design. With the help of various animation design software, the artistic expression in the virtual environment is enriched, rising from a visual experience to a multi-dimensional one. Among them, virtual technology and human-computer interaction technology can meet the multi-dimensional experience requirements of animation design works. In addition, digital media art can be used to add relevant special effects, and the introduction of 3D image effects and digital sound further enhances the three-dimensional effect of animation products, realizing the multi-dimensional experience of vision, hearing and touch, thus expanding and enriching the expressive space of animation works.

4. Tao Zhi Bookshop MG animation production

4.1. Purpose of Production
To demonstrate the production of a MG animation of a digital bookstore, with the aim of understanding the basic animation design and production process in digital media technology, thus deepening the understanding of the significance of combining digital technology with animation design.

4.2. Objectives of production
Objective 1: Background animation, the car head appears after the background elements appear for 5 seconds.
Objective 2: Car animation: the car drives into the drawing (3 seconds) and stays there for 2 seconds.
Objective 3: Bookshop image: as the car drives in, the image of bookshop called "Tao Zhi" slowly appears for 3 seconds.

4.3. Production process

4.3.1. Create the background animation, the production process is as follows.
- Start After Effects CC 2018 software → Execute the "Composite" → "New Composite".
- In the "Composite Settings" dialog box, set the name, size, frame rate and duration of the composite and other detailed parameters, click the "OK" button.

4.3.2. Import the material into the software and the production process is as follows.
- Import Adobe Illustrator "bookstore front" material file, select the material "bookstore front" → click the "import" button .
- Import the type of setting to "Composite" and confirm it, generate a composite file .
- Drag the "Bookstore Front" to the "Tao Zhi Bookstore MG Animation" composite timeline panel (Figure 4 Composite Timeline).
4.3.3. **Add a solid colour background, the production process is as follows.**

After the background animation has been completed, you should first add a solid colour layer for the rest of the animation.

- First click to add a layer, then click the "Color" button and set to light blue, reference values for (R = 193, G = 210, B = 240).
- Click the "OK" button. Click on the OK button in the Solid Colour Settings dialog box to implement the solid colour settings.
- Place this layer at the bottom of the layer and use it as a background layer.
- The car animation is made with a link to the car layer. The car material is made with Adobe Photoshop, first import the material, set the import type to "Composite-keep layer size". The process is as follows.
- Pre-compose all the parts of the front end of the car with a new layer called "Total front end".
- Create a parent-child link to the layers → make a parent-child link between the "Total front end" and "Carriage" layers and the "Bars" layer → set the "Bars" layer to be the parent layer → add a keyframe for the bars.
- At frame 175, and set the "position" value → set the "Wobbler" to create a vibration animation for the bar.
- Set the "frequency" and "order of magnitude" of the wobbler → execute the application. This completes the car layer link.

4.3.4. **Create a car displacement animation, using the following procedure.**

- In the "car transport" composite, drag the "car" into the frame 14 → adjust the position of the "background", so that the background moves up.
- Expand the layer → add a keyframe at frame 14 and adjust the value so that the front of the car appears on the screen.
- Select "Ease in" → "Keyframe assist" to give the car the effect of easing in → Add a keyframe and a easing effect at frame 72, then adjust the value to make the car stay in the frame for a few frames.
- At frame 112, add a keyframe and add a easing effect → add a easing out effect at frame 154, adjust the "position" value to make the car exit the frame → show the effect.

By adding the easing-in and easing-out effects, the car will drive slowly and then stop slowly, more in line with the animation pattern. The car animation is now complete (Figure 5 Effect of car easing in).
4.3.5. The bookshop animation was created in three steps. Firstly, set the anchor points for the layers.

- Double-click on the "Background" to enter its interior → view the layer display inside the composite → select "Window" → click the "Motion 2.jsxbin" → adjust the the position of the anchor points of the layers.
- Select the "Tao Zhi Bookstore", "Potted Plant", "Street Lamp", "Fire Hydrant" and "tree" layer → click the down button to move the anchor points of all layers to the bottom of the layer.
- Then create a scaling animation. Select the "pointed tree" layer → click on the "scale" → add a key frame at frame 15 → move the time bar to the start frame, the "scale" value is set to "0.0, 0.0%". This way, a scaling animation is created, and so on for other layers that need to be scaled.
- To add the final elasticity effect.
- Select two keyframes → click the "EXCITE" button → select the "Effect Controls" panel and set the last scaling value (the larger the value, the more elastic the animation will be).
- Select the "Scaling" keyframe combination <Ctrl+C> to copy → adjust the scale layer on the horizon → select the "scale" keyframe combination <Ctrl+V> to paste the elasticity effect and set the value.
- The final bookshop animation is shown in Figure 4 below, with the background image appearing first, followed by the tree, bookshop and bookshop name slowly appearing from top to bottom; thus, the bookshop animation is finished(Figure 6 Presentation of the bookshop animation).

5. Summary

From the above application examples, it was found that an animation with more than 200 frames could be completed in just half an hour, with fast efficiency and good visual effects, thanks to the support of digital technology and the sharing of network resources. In addition, the use of shortcut keys is emphasised many times in practice, which means that the more skilled you are in digital media technology the faster your animation design efficiency is, which is one of the strategies to improve design efficiency. And the import of multiple files in different software and the technical operations before and after import are also two of the strategies to improve design efficiency. In conclusion, with the development of digital media technology, its role in animation design is growing. Whether it is 2D animation or 3D animation, its production process is inseparable from digital media technology[6]. Only by laying the foundation of artistic aesthetics and digital media technology, by repeatedly using different digital technologies for many practical applications, and by fully grasping and giving full play to the advantages of digital media art, can we inject new development vitality into the animation industry, create animation works with Chinese characteristics, and promote the healthy and stable development of China's animation industry.

Acknowledgments

The limitation of "household contract responsibility system" lies in the division of business and the lack of innovation of employees due to the division of business and the lack of innovation. The future business development and innovation of independent colleges and universities need to break the limitations of the original business unit, which will inevitably deconstruct and restructure the development mode of "household contract responsibility system".
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