Digital Textbooks of S3D Japanese Animation Making

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Abstract
The use of Stereoscopic 3D (S3D) is increasing in movies and game content. The use of S3D has spread also into animation. However, in the animation industry, human resources with applicable knowledge and competence in S3D production skills are insufficient. In an effort to amend this we have set out to develop a new education system that provides basic knowledge and training in production skills. The aim of this education system is to make S3D computer graphics animation that can be used in universities, vocational schools and companies. The education system consists of curricula and corresponding syllabus, digital textbooks, digital workbooks, animations, S3D computer graphics production work material, exercises and tests. This paper introduces the education system generally and four chapters containing digital textbooks and digital workbooks specifically.

1. Introduction
In the development of competencies towards the advancement of the animation industry, emphasis has been put on the job training (OJT) in Japan. Despite these efforts increasing segments of the production process is being outsourced overseas.

This renders OJT no longer viable as a method for the transfer and development of knowledge and expertise within the expressive techniques of digital media. In order to solve this issue, the Ministry of Economy, Trade and Industry (METI) has made efforts to strengthen education in universities, vocational schools, and publicly sought research projects aimed towards curriculum development.

This paper will introduce our new education system consisting of digital textbooks and corresponding production work material covering S3D computer graphics animation. This was developed by the Computer Graphic Arts Society, Curriculum Development Committee (Chair, Masayuki Nakajima) which is entrusted by the METI.

2. Features of the S3D Computer Graphics Animation Education System
The education system consists of curricula and corresponding syllabus, digital textbooks, digital workbooks, animations, production work material, exercises and corresponding tests. These are specifically designed to facilitate and enhance the unique expressive style of Japanese animation in S3D.

Particular focus has been placed on developing teaching materials containing production exercises towards animation classes offered at universities and vocational schools. This is due to the shortage of freely available high-quality S3D exercise materials in this area.

The development began with the production of a 55 second S3D computer graphic animation in collaboration with industry experts from the computer graphics animation industry. We then proceeded to create the production work material based on the documentation of the production process and interviews conducted with production staff. The production work material include asset package consisting of character models, and animation data, environment models and completed scenes.

In addition to this the educational material contains digital textbooks and corresponding digital workbooks production training exercises which cover the production process of S3D computer graphics animation in detail. By exploiting these educational materials, students can replicate professional animation production methods and take steps towards applying theory and enhancing practical skill-sets.
3. Digital Textbooks
3.1 Foundation knowledge of 3D Computer Graphics Animation Production

Many works of Japanese animation have a uniquely expressive style acknowledged and appreciated worldwide. The style is distinctively different from that from the Western tradition as typified by Disney's 2D and 3D animation. This digital textbook enables students to also learn about the cultural and social backgrounds that gave rise to Japanese animation and the history of the development of the animation industry. In addition, students will gain basic knowledge of Japanese animation and its evolution from limited expression of the stylized hand-drawn materials into digital ones. It is composed of three chapters; Background of anime production, Development of anime production, The knowledge base of anime (Figure 1).

3.2 Basic knowledge of S3D

The digital textbook covers fundamentals of stereoscopy, its history and principles and technology. Other areas covered are the include image to screen technologies and techniques required of animators. We expect that students will be able to implement the technical knowledge obtained from the material into their own animation productions. [1]. It is composed of five chapters; Basis for stereoscopic 3D, Displaying S3D, Production precautions, Production work, Convert 2D/3D (Figure 2).

4. Digital Workbooks
4.1 S3D Computer Graphics Animation Production: Making of Jubei

The digital workbook produced in the production work material is based on the documentation of the production process of S3D computer graphics animation and interviews conducted with production staff. It contains materials and images covering each process. [2]. It is composed of six chapters; Pre-production, Modeling and rigging, Animation, Building a scene, Post-production, Evaluation of the parallax (Figure 3).

4.2 Example of Making Basic Motion for 3D Computer Graphics Characters

This digital workbook was made as an educational material for students lacking basic skills in character animation. The material covers set-up and character-modeling of male and female characters, both adult and as children as well as basic motions such as walking, running, sitting, jumping and waving hands. It is composed of six chapters; Previous work of modeling, Modeling of a character head, Modeling of a character body, Creating character details, Character setup, Character Animation (Figure 4).

5. Conclusion

We have developed two digital textbooks and two digital workbooks as educational materials for S3D computer graphics animation production. These educational materials were made with the cooperation of practitioners in the animation field, university teachers and researchers. These digital textbook are available for the iPad and Web browser. The anaglyph method is used for S3D images, which students can use to view the stereoscopic images without other special instruments other than anaglyph glasses. The aim is to boost motivation, understanding and skill-sets of S3D computer graphics animation. The educational materials are now being used by the Computer Graphic Arts Society which holds seminars for educators to promote the use of these educational materials in universities, vocational schools and companies training.

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References