

# The Use of Clay Animation to Study “Development of Multimedia Materials” Teaching Procedures

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粘土アニメの利用による「マルチメディア制作」の授業展開

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## 概要

マルチメディア制作は広島女学院大学生生活デザイン・情報学科において高等学校の教員免許「情報」の取得のための科目の一つでもあり、また一般財団法人全国大学実務教育協会（JAUCB）が認定するウェブデザイン実務士の資格に関する科目として位置づけている。2007年より、マルチメディア制作ではクレイ（粘土）を使ってモデルを作り、コマ撮りでの画像をコンピュータ上で編集しアニメーションを制作するという授業形態をとっている。本研究では、上記の教員免許と実務士の資格の観点から効果的な授業構成について述べる。

**Key words:** マルチメディア制作 Development of Multimedia Materials, クレイ（粘土）アニメ Clay Animation, 教科「情報」Subject “Information Study”, ウェブデザイン実務士 Certified Web Designer, プリプロダクション Pre-production, 粘土モデル Clay Model, グループ活動 Group Activities, カット Cut

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## 1. Introduction

“Development of Multimedia Materials” has been provided as an elective subject to the students who want to obtain a teaching certificate in “information studies” since 2001 at Hiroshima Jogakuin University. At Hiroshima Jogakuin University, this subject is also one of the elective subjects in the “Certified Web Designer” course and a degree of “Certified Web Designer” is issued to students by the Japan Association of University and College for Business Education (JAUCB) <sup>1)</sup>. The aim of the course is to provide students with the professional knowledge and skills necessary for today’s business world.

For a few years following the commencement of the teaching certificate course at our university, students strictly used digital information, such as pictures taken using a digital camera, movies captured using a digital video camera and sounds recorded using a digital recorder for the “Development of Multimedia Materials.”

However, two years ago, a clay animation project was adopted in this class as the strict use of digital information tends to be tedious or lead to disinterest, especially for students not seeking a teaching certificate or a degree as a “Certified Web Designer.” To avoid this situation, as well as stimulate interest in the class, clay models, which could be considered analog counterparts to digital information, are thought to be useful<sup>2)</sup>. The procedure can motivate students to design multimedia content comprising both clay models and digital data. We must emphasize that the aim is not simply to entertain students. The present paper reports on the evaluation of the procedure using examples that focus on the students’ ability as a future student teacher or as a co-worker at business scene.

## 2. Teaching procedure

In class, we use Adobe Premiere Pro 1.5 as the video editing software and Adobe Photoshop CS2 as the image processing software. The syllabus for “Development of Multimedia Materials” is presented in Table 1. This class can be taken by third- or fourth-year students.

Table 1 Syllabus for “Development of Multimedia Materials”.

In the course design, students begin pre-production (i.e., developing a plan, concept, story, play) after lesson 4. They discuss the development for 20 or 30 minutes during each lesson until lesson 9.

## 1. Objective

The class aims to provide students with the knowledge and skills necessary to create multimedia content using static images, sounds and movies. We use Adobe Premiere Pro 1.5 as the video editing software.

## 2. Course design

### 1. Guidance

### 2. Selecting a project

Types of video formats

### 3. Capturing static images using Adobe Premiere Pro

Image processing using Adobe Photoshop

### 4. Creating videos with effects and transitions using static images

Capturing sound

### 5. Adding text with motion effects to movies (opening background title and closing credits title)

### 6. Practice using a given theme 1

### 7. Practice using a given theme 2

### 8. Capturing and editing movies

### 9. Practice using a freely chosen theme 1 (Planning)

### 10. Practice using a freely chosen theme 2 (Generating content)

### 11. Practice using a freely chosen theme 3 (Generating content)

### 12. Practice using a freely chosen theme 4 (Capturing stop motion frames and editing pictures)

### 13. Practice using a freely chosen theme 5 (Capturing stop motion frames and editing pictures)

### 14. Practice using a freely chosen theme 6 (Capturing stop motion frames and editing pictures)

### 15. Project summaries and critiques of each group's work

First, students practice how to edit pictures and generate effects, such as transition and motion effects, between frames because a clay animation, a form of stop motion animation, is constructed from many static images. Subsequently, after lesson 4 in the course design, students are divided into several groups (5 or 6 students per group). During the group activities, students are in charge of their own roles that students decide among themselves what role they will assume. In the process of making a movie, these are generally three stages, that is pre-production, production and post-production<sup>3)</sup>. During pre-production, students devise a plan, write a screenplay and continuity. The pre-production process is further discussed in Section 4. During production, according to the continuity, groups create clay models and other contents such as flooring board made of paper and sky made of paper. During post-production, students edit the digital content with a computer until the work is complete. A sample of continuity from one group in the class is shown in Fig. 1. The group's theme in this case is "Music concert by notes".

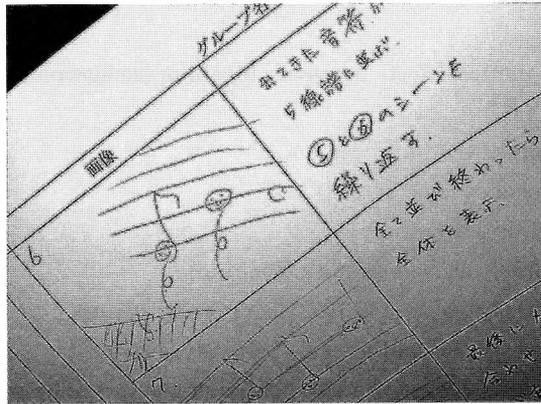
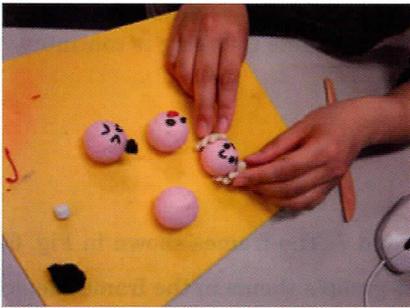


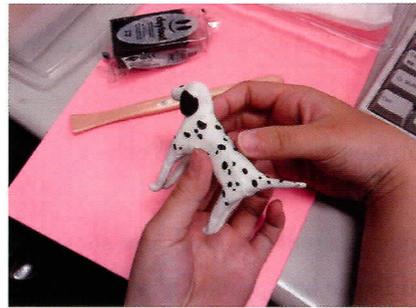
Fig. 1 A sample of continuity from the group whose theme is "Music concert by notes".

The following series of figures show the production (Figs. 2, 3, and 4) and the post-production (Fig. 5) process. According to their plan, students create clay models as shown in Fig. 2. Students use "Plastalina" to make the clay models, a modeling clay that is provided by Van Aken International<sup>4)</sup> through CEC Co. Ltd<sup>5)</sup>. This modeling clay is non-hardening and can be reformed at any time. After creating

the clay models students proceed to capture images. As shown in Fig. 3, a student is using a digital camera to take a picture of a clay sun flower that has been placed in a box lined with a blue cloth. Next, a student processes the captured image using the chroma key technique in Photoshop (Fig. 4). Students then edit frames using Premiere Pro while referring to continuity (Fig. 5).



(a) Bowling balls



(b) Dalmatian

Fig. 2 Students creating clay models.

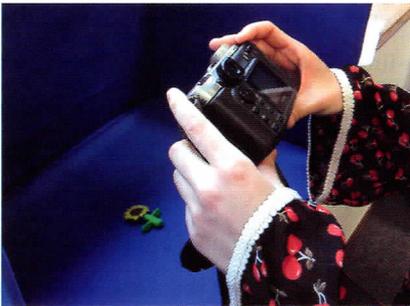


Fig. 3 A student uses a digital camera to take a picture of a clay sun flower that has been placed in a box covered with a blue cloth.

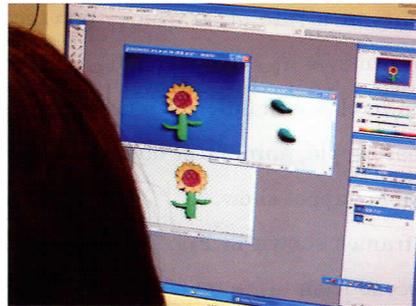


Fig. 4 A student processes the captured sun flower image using Photoshop.

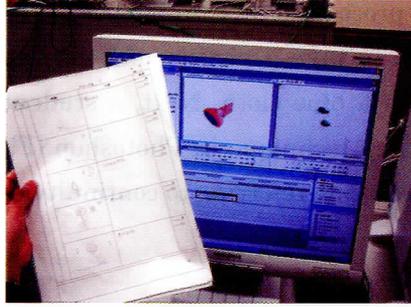


Fig. 5 A student uses Premiere Pro to edit frames while referring to continuity.

### 3. Samples of Students' Work

Samples of students' work are shown in Figs. 6 and 7. The frames shown in Fig. 6(a)–(c) appear in the background of the opening title. The group's theme in the frames depicted in Fig. 6 is colors, and Japanese letters are shown gathering in the sky and gradually assembling into a sentence which means "A World in Seven Colors" in English. This opening sequence uses deformation of the clay models to create a sense of motion from one frame to the next. In general, a person perceives a more natural movement of animated elements at a rate of 30 frames per second; however, it is very difficult for students to create a movie at such a fast frame rate in the limited amount of class time. Awkward motion in clay animation is more easily accepted by audiences because the characters are not real people, animals or objects. The movies tend to have a similar feeling to that of an enjoyable puppet show.

The frames shown in Fig. 7(a)–(f) depict a bowling scene in which a jump cut links the first scene from (a) to (c) of a bowling ball rotating in a hand and the next scene, from (d) to (f), of the ball traveling down a bowling lane. In these frames, the clay model itself is not deformed, but to an individual the scenes seem to change almost seamlessly, creating a perception of motion. Using a jump cut, the clay animation can be perceived as being faster and more dynamic during the transition from one scene to the next.

In order to clearly express the idea of rotation, the group created a bowling ball with a grimacing face. Frames of this successful attempt at depicting rotation are shown in Fig. 8.



(a)



(b)



(c)



(d)

Fig. 6 A sample showing the deformation of clay models over a number of frames to create a sense of motion without using transition effects between frames. For brevity, some frames have been omitted from the opening sequence depicted here.

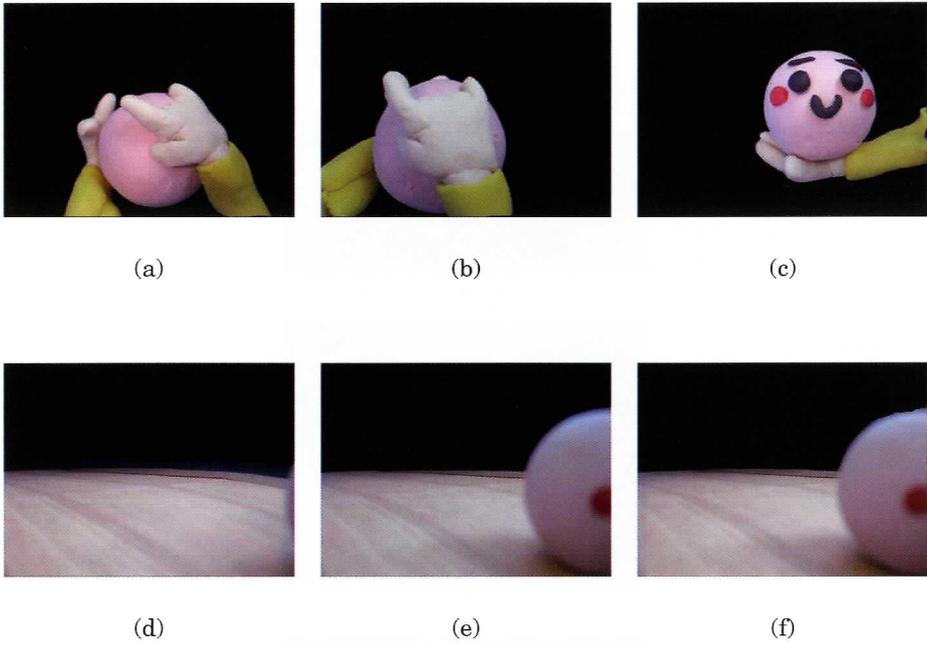


Fig. 7 A sample of a jump cut that links the first scene from (a) to (c) of a bowling ball rotating in a hand and the next scene, from (d) to (f), of the ball traveling down a bowling lane.

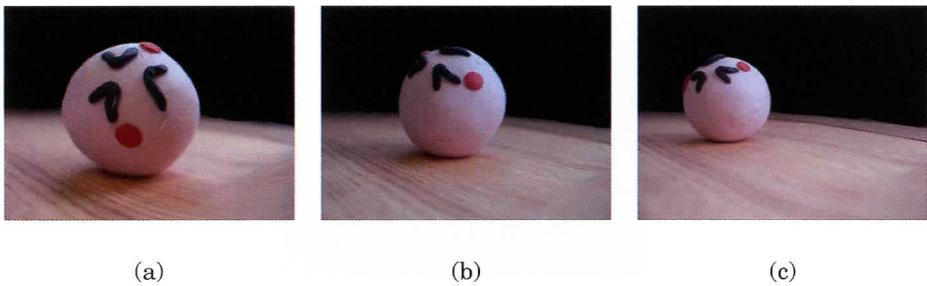


Fig. 8 Rotation of the bowling ball clearly depicted in the grimacing face.

#### 4. Discussion

“Development of Multimedia Materials” is a multidisciplinary course that requires extensive knowledge and skills in a variety of subjects, as shown in Fig. 9. Courses at our university that students are expected to take for “Development of Multimedia Materials” are listed in order in Table 2. Generally speaking, students do not fully grasp the interrelatedness of the required subjects. However, through this course they begin to realize the necessity of acquiring the multidisciplinary knowledge and skills; much like integrating the pieces of a jigsaw puzzle.

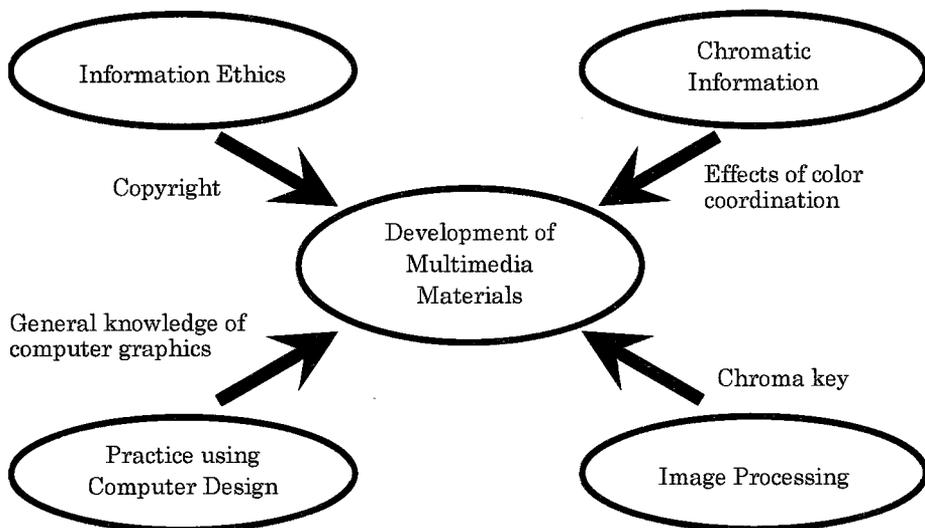


Fig. 9 Relationship between “Development of Multimedia Materials” and other subjects. Arrows indicate how the subjects relate to one another.

Table 2 The order of subjects leading to “Development of Multimedia Materials” at our university.

These are elective subjects.

	Subject	Year	Semester
1	Chromatic Information	1	Second
2	Information Ethics	2	First
3	Practice using Computer Design	2	First
4	Image Processing	2	Second
5	Development of Multimedia Materials	3	First

Although students are informed of the necessary courses for certification, some students do not want to earn the credits in the typical order shown in Table 2, and a few students are not interested in obtaining a teaching certificate or a degree as a “Certified Web Designer”. Therefore, key points need to be explained as concisely as possible to prevent other good students from losing their interest during review lessons. Therefore, we think that it is effective to teach a student on the spot when a student asks us about skills of software. Moreover, students with software skills are eager to teach other students within their group how to use the software. This can lead to more cooperative efforts within groups.

As described in Section 2, students need to communicate with other students in their group during pre-production. The revised course of study was made public by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in 2009. MEXT stresses activities that allow high school pupils to formulate their own opinions, discuss problems or issues and present their ideas in a manner that benefits society<sup>6</sup>. Therefore, a student teacher must develop these skills. In the “Development of Multimedia Materials” class, we foster the development of these skills not only using the latest technology, but also requiring the students to work together as members of a group. These skills are essential in today’s business world as well.

Indeed, some students are too shy to voice their opinions. To avoid such a situation, we adopted the following procedure. First, a group chooses a chair person and students introduce themselves to each other and talk about things such as their hobbies or favorite sports. Of course, while talking, one of them must actually take notes. Subsequently, each group uses the notes to begin discussing what might be suitable for a clay animation. Finally, each group writes the continuity and decides on effective cuts. In the next stage of production, students create their clay models; tangible, three-dimensional representations of their ideas that can be molded and reshaped. The students can actively participate in the model creation process. Three-dimensional computer modeling requires technical skills and as one of the aims of this class, we strive to get away from the need to obtain computer skills. Moreover, the class does not simply involve the crafting of clay models. In the pre-production stage, we advise students to create simple and clearly understandable clay models and to discuss how to transition from one scene to the next dramatically or smoothly. Therefore, students can easily finish their clay models in the production and post-production stages because they adhere to their concept of the animation and their well-thought-out continuity. It is important to clearly express a concept, especially in business presentations, and success depends on your concepts.

During the final class, students watch the animations from each group and then critique each project. This activity stimulates students' interest and desire to improve their communication skills.

## 5. Summary

The present study focuses on the following three points.

1. Significance of group study and integrated education in the creation of simple clay model animation
2. Importance of animation concepts and the pre-production stage
3. Evaluation of each other, as well as self-assessment

Nearly all of students indicated that they made an effort to utilize their own concepts, but that it was very difficult to express their concept on the continuity. On the other hand,

they felt a sense of accomplishment, when the work was done successfully. From this perspective, students had the opportunity to practice their problem-solving skills.

In future projects, we plan to have students record their activities using a digital video camera, edit the video, and then show the final version to other students. To increase the students' skill level in Computer Graphics, we hope to have students act in an animation along with clay models in digitally composed projects; although we currently lack the necessary photography and movie studio. However, we believe that students can rise to the challenges working in such a limited environment.

### Acknowledgement

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