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## Prospective Science Teachers' Self-Assessments about the Use of Slowmation Approach in Teaching

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### Abstract

In the concept of this study, science teacher candidates prepared some animations regarding biology topics by using slow-motion technique. Following this process of animation making, how teacher candidates see extend of contribution of the process on education is examined. This study is carried out with 49 teacher candidates, who were taking general biology course in the spring semester of 2013-2014 academic years. The data of the research is collected by 8-item five-point Likert-type slow-motion survey forms and semi-structured interview questions, developed by the researchers. As a result of the study, the teacher candidates reported that the slow-motion technique is an informative technique, which is instructive, useful, developing their creativity, enjoyable and stimulating to the course. As a result of the interviews made with teacher candidates, it is revealed that they are quite willing to use this technique in their professional lives as a teaching approach, which contribute to their learning skills, thus they want to implement this technique to their students as well.

**Keywords:** slow-motion, teacher candidate, teaching technique, self-assessment

### Introduction

Using technology that is readily accessible can sometimes be a catalyst for such engagement, especially if the tools help pre-service teachers to represent their knowledge in innovative ways (Kim & Reeves, 2007; Lee, Linn, Varma, & Liu, 2010). With the rapid advancement in personal digital technologies, it is becoming easier for

students such as pre-service teachers to design media products such as animations and videos, which may be a way to support their conceptual understanding of science concepts that are typical in the primary school curriculum (Hoban & Nielsen, 2012). In several studies involving animations made by experts to assist students in learning science concepts have produced mixed results. Some studies have shown that watching animations to explain science concepts has improved the knowledge of high school and college students (Marbach-Ad, Rotbain, & Stavy, 2008; Williamson & Abraham, 1995). But in some studies, contrarily, it has been found that there has been little improvement in learning when students watch animations explaining science concepts (Sanger & Greenbowe, 2000; Yang, Andre, Greenbowe, & Tibell, 2003). According to Chan and Black (2005), animations could provide a motivation for engaging with content if learners become the designers and creators rather than consumers of information as in expert generated animations. Although this possibility of motivation for engaging with the content, designing and creating students' own animations have been limited because, this process requires time and sophisticated software and the process is too complex (Hoban & Nielsen, 2012).

### **Slowmations**

Slow Motion Animation (abbreviated to "Slowmation") is a new teaching approach that has been developed over the last decade in science education classes at the University of Wollongong. This approach simplifies the complex process of making animations to enable learners to create their own comprehensive animations about science concepts (Hoban, 2005, 2007, 2009; Hoban & Ferry, 2006). Slowmation technic is similar to clay animation and in this approach, students make research, storyboard, design models, capture digital still images of small manual movements of the models. After these, they use a computer software to play the images in a sequence to simulate movement.

Making a movie using a traditional stop-motion animation technique is feasible, because the creator who manually moves the objects while taking each digital still photograph, thus eliminates the need for complex mechanisms to provide movement. Having pre-service teachers take digital still photos one by one, instead of a continuous 25–30 frames per second as in video, also allows them to check, manipulate, think about, discuss and reconfigure the models with each movement and photograph (Hoban & Nielsen, 2011).

Pre-service teachers can learn the process at the beginning of a course period and can prepare their models made out of daily routine materials such as plasticine, paper, and existing plastic models. If the materials are ready and available, in the course period, they can continue and take digital photos as the models are moved manually. The creation process integrates features of clay animation, object animation and digital storytelling and involves the pre-service teachers in designing and a sequence of representations (Hoban and Nielsen, 2010); (a) research notes, (b) storyboard, (c) models, (d) digital photographs and (e) narrated animation.

In summary, slowmation greatly simplifies the process of creating a stop-motion animation by enabling pre-service teachers to (i) make or use existing 2-D or 3-D models that may lie flat on a table or the floor; (ii) play the animation slowly at 2 frames per second requiring 10 times fewer photos than required in normal animation and (iii) use widely available technology such as a digital still camera, a tripod and free movie-making computer software (Hoban & Nielsen, 2012). McKnight, Hoban and Nielsen (2011), have explained that a slowmation displays the following features:

- Purpose - the goal of a slowmation is for pre-service teachers to make use of 1-2 minute animated mini-movie to tell a story, and through the creation process, learn about the story's meaning. The design of the slowmation can include a range of technological enhancements such as narration, music, other photos, diagrams, models, labels, questions, static images, repetitions and characters.
- Timing - slowmations are usually played slowly at 2 frames/second, not the usual animation speed of 20-24 frames/second, and thus need ten times fewer photos than in clay or computer animation, hence the name "Slow Animation" or "Slowmation";
- Orientation - models are made in 3D and/or 2D and usually manipulated in the horizontal plane (on the floor or on a table) and photographed by a digital still camera mounted on a tripod looking down or across at the model. This makes the models easier to make, move and photograph;
- Materials - because models do not have to stand up, many different materials can be used such as soft play dough, plasticine, 2D pictures, drawings, written text, existing 3D models, felt, cardboard cut-outs and natural materials such as leaves, rocks or fruit; and,
- Technology - pre-service teachers use their own digital still cameras (with photo quality set on low resolution so as to avoid overloading the editing software) or cameras in mobile phones and free movie-making software available on their computers (e.g. iMovie or SAM Animation on a Mac or Windows Movie Maker on a PC)

### **Purpose of the Study**

The purpose of this study is to put forward the self-assessments of prospective science teachers about slowmation approach when it is used in science teaching (or learning).

### **Method**

#### **Participants**

The sample included 49 prospective science teacher in Turkey between the ages of 20-27 of which %79,6 were women (n = 39), and 20,4% were men (n = 10). The mean age was 21,55.

## Materials

In this study, a semi-structured interview form was developed and used to investigate pre-service teachers' views about using slowmations in teaching science. They have already prepared animations related to some biology topics before interviews. The purpose and content of the interview was to put forward their point of view.

**Animation Evaluation Form:** Pre-service teachers were asked an evaluation to use slowmation preparation approach in teaching science by animation evaluation form developed by researchers. The form contained 8 items required five ratings.

## Results

The main aim of this study was to evaluate the views of pre-service science teachers about slowmation approach as a teaching method. According to results derived from animation evaluation form, 72% of pre-service teachers think that this approach helpful in understanding the content. 77% of them think that slowmation preparation process was enjoyable and 89% of them think that this process was encouraging. 75% of pre-service teachers found this process as informative and 83,4% of them found as helpful in learning. 79,2% of pre-service teachers think that this process was instructive and 87,4% of them stated that slowmation preparation process increases the creativity. Nearly all of the participants think that the courses with slowmations will be better than the courses with traditional methods.

In the interviews, participants were asked advantages and disadvantages of using slowmations in teaching science. The responses were summarised in the table below (Table 1). According to results summarized in table 1, participants chiefly emphasized that slowmations provided better and amused learning as advantages. Furthermore, they stated that the approaches facilitated learning and increased creativity. According to them, slowmation preparation process provides permanent learning, increases cooperation awareness and technological ability. Furthermore, they stated that slowmation increases self-confidence and attendance to lesson.

When disadvantages were asked to the participants, they stated that slowmation requires more time and the process is troublesome. Considering slowmation as waste of time and requiring technological ability are other disadvantages according to pre-service science teachers. Participants stated that slowmation preparation process may be distractive. Some of participants stated that there is not any disadvantages of slowmation preparation process or approaches in teaching science.

Table 1. Advantages and disadvantages of slowmation approaches in teaching science

Advantages	f	Disadvantages	f
Provides better learning	42	Requiring more time	22
Provides amused learning	33	The process is troublesome	19
Facilitates learning	29	Considered as waste of time	16
Increases creativity	15	Requires technological ability	11
Provides permanent learning	12	Causes conflict within the group	7
Increases cooperation	10	Distraction	5
Increases technological ability	9	Technological requirements	4
Increases self-confidence	6	Being not easy	2
Increase attendance to lesson	4	Occurs misconception	2
Motivates to learning	3	There is no any disadvantage	6
Improves observation skill	3		
Provides contact between science and daily life	3		
Students learn to make a research	2		
Improves motor skills	2		
Provides visuality	2		

## Discussion

According to results, participants considers slowmation approach helpful in understanding science, enjoyable, encouraging, informative, helpful in learning, instructive. According them the process increases creativity. They stated that slowmations provide better and amused or enjoable learning experience and facilitate learning. Furthermore, participants state that the slowmation increase creativity, cooperation, technological ability, self-confidence, attendance to lesson of/for learners. They are advantages of slowmation approach as a teaching learning strategy.

Accorting the pre-service teachers there are also disadvantages of use slowmations. Disadvantages of using slowmation in teaching science are requiring more time, being troublesome, considering as waste of time, tequiring technological ability and other technological requirements such as computers, camera, software.

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