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Research Article

Examination of Technological and Pedagogical Properties in Short Film Designs[1]

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Abstract

Establishment of technology assisted environments suitable for new teaching programs has become more of an issue each passing day. From this aspect, Teaching Technologies and Material Design (TTMD) course comes first as applied courses modeling the knowledge generation in pre-service teacher education. One of the teaching activities within the scope of this course is the activities of pre-service teachers for short film preparation and application. Ministry of National Education (MEB) encourages the short film designs through Education Informatics Network (EBA). Integration of technological and pedagogical knowledge that pre-service teachers have within the frame of content knowledge to be taught has been aimed with this kind of activities. This study includes the examination of technological and pedagogical properties of scripts of early childhood pre-service teachers in short film designs. In this research that has been performed with pre-service teachers in KTÜ (Karadeniz

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Technical University) Fatih Faculty of Education, Early Childhood Education Department, short film production towards the suitable ones for the zones of development and objectives within the MEB Early Childhood Education Program (2013) was asked from groups of four. 5 films selected by criterion sampling method from educational short films prepared, were examined in terms of technical skills, suitability for pedagogical learning objectives and child development, varieties of representation, and knowledge of learner (pre-conceptions and learning disability characteristics). Results refer to that short film contents are suitable for zones of development with pedagogical learning objectives indicators in this type of scripting beside the film preparation skills in terms of technical skills, It has been seen that even if a variety of representation in terms of early childhood education was provided, there are not enough applications characterizing the pre-conceptions in short film contents.

Keywords: *Short film, design, technology, pedagogy*

Introduction

The best way of providing the qualification for the applications of the current technologies in teaching-learning processes to teachers is possible with pre-service education and therefore with the environments provided in Teaching Technologies and Material Development/Design (TTMD) courses that are available in teacher education programs (Gündüz & Odabaşı, 2002). It can be said that the pre-service teachers taking this course go along with the course (Bektaş, Nalçacı & Ercoşkun, 2009). It has been expressed in a research that pre-service teachers care about material preparation and application in teaching in terms of attention getting, permanent learning and learning motivation with the teaching applications performed within the scope of TTMD course, as expressed in their own statements.

When investigations on TTMD courses are examined, it can be seen that they usually cover the in-service and pre-service teachers. It has been seen that science and technology teachers believe the necessity of using materials for effective teaching in courses they teach (Karamustafaoğlu, 2006), go along with textbooks but still need different materials (Kurnaz & Yiğit, 2012), and yet their material using/development levels are not in desired level. Additionally, Şahin (2015) reported that textbooks, written documents and whiteboards have been used most as teaching materials by teachers. In addition, he has determined that teaching materials of teachers have the role of interest and attention getting, knowledge concretization, and student motivation. In a similar way, Metin, Birişçi, and Coşkun (2013) have indicated that teachers exhibit positive attitude towards teaching technologies.

When investigations on pre-service educational institutions are examined on the other hand, it can be seen that they focused on what the most distinct examples in various disciplines are, and how the preparation of these would contribute to pre-service teachers and students. Alım (2012) has reported that visual material preparation for geography education can be taught to teachers and students, and Inan (2006) has introduced sample materials, that can be prepared, emphasizing the significance of material development in mathematics education. Similarly, Hırça and Genç (2012) has reported that a lot of skills can be provided to the students who lack the proficiency regarding the use of technology in science education by preparing a PPT presentation, and he introduced a sample application for it. Karataş and Yapıcı (2006) have

emphasized the necessity of sampling in content by giving examples of 2-3D visuals that were prepared in TTMD course as well as couple of years of experience.

Moreover, there are different evaluations regarding the pre-service teachers who have been taken and completed the TTMD-related courses in the report mentioned above. Güven (2006) has emphasized that pre-service teachers who have taken the course, recently called TTMD, couldn't gain most of the technical skill (psychomotor) content behaviors that were expected to be gained within the scope of this course. However, Alım (2015) emphasized that behaviors in all areas have been gained but skill learning objectives have been learned less compared to others. Kolburan-Geçer (2019) reported that pre-service teachers know how to benefit the equipment to be used in classrooms in learning-teaching processes, and they have realized the importance of developing their own materials in future. In short, applications in TTMD course develop the learning objectives in knowledge and awareness level more compared to those in skill level. In pre-service teacher education programs, the properties of the teaching program of the course to be taught in MEB should be taken into consideration (Güven, 2006). Based upon this point, it arises those pre-service teachers who study in different programs should be present more in the studies that specific for their own fields. One of the studies made in this direction is short film making applications.

If short films are towards the learning objectives in teaching programs, they are called 'educational films' (Akbaş, 2011). Many positive behaviors such as learning activities planning, application, reflecting thinking on own experiences, and interpretation of learning process are expected to be gained by pre-service teachers through educational films to be prepared (Akbaş, Canoğlu & Ceylan, 2015). In addition to this, it has been determined in a study in which advantages and deficiencies of the educational films made by pre-service teachers are evaluated also by middle school students that the short films are useful in issues such as 'applied discourse' , 'giving a concise knowledge in a short time' , 'creating awareness' (Akbaş, 2011).

Nowadays, internet has made it possible reaching to short films with adaptation of advanced cameras into cell phones and computers. Moreover, editing software programs such as Windows Movie Maker have provided a significant contribution for production and becoming widespread of the educational short films (Yiğit, Alev, Özmen & Akyıldız, 2012). Short films production has become viable for students in all age groups. Even if the use of

technology in early years has been causing arguments in terms of its developmental suitability for children, researches has emphasized the positive influences of the technology on cognitive, social and emotional development of the children (Chen & Chang, 2006). Similar researches emphasize that computers support the development of communication, problem solving, memory skills (Haugland, 1992), mathematics skills (Clements, 1999; Clements & Samara, 2003; Kaçar & Doğan, 2007), and reading and writing skills (Clements, 1994; Ihmedieh, 2010; Judge, 2005) of the children. When the importance of the films in developments of children, especially in certain age groups (Şahin, 2015; Yağlı, 2013) are taken into consideration, both the significance of the educational short films will be noticed and their skills related to current technologies will be developed by education faculty pre-service teachers to perform this kind of applications in TTMD course (Akbaş, 2011). It has been emphasized on MEB (2009) pre-school teachers special content adequacies that it would be possible to be a model for students by developing preparation skills for the materials which are clear, understandable, and suitable for children's developmental levels. Supporting of the information and communication technologies for development and learning of the children is directly related with effective and proper integration of teachers into pre-school education program (Bayhan, Olgun & Yelland, 2002; Haugland, 2000). For this reason, teacher education is quite important for computers to be used effectively and as an effective learning tool. It's quite important to support teacher both in pre-service and in-service for them to use the computers in the early childhood years that covers the critical period of development and learning.

In recent years, a conceptual model called Technological Pedagogical Content Knowledge (originally TPCK, now known as TPACK) (Koehler & Mishra, 2005) based on Shulman's (1986/1987) Pedagogical Content Knowledge (PCK) model has been commonly used in education researches for the examination of knowledge basis of teachers. PCK was first introduced by Shulman, and includes both Content Knowledge (CK) and Pedagogical Knowledge (PK) components but it has been considered as a new type of knowledge that is completely different from these two knowledge types. Usually, PCK has been described as the transformation of CK into a form that is more understandable for students (Geddis, 1993; Grossman, 1990; Shulman, 1986, 1987). According to Shulman's (1986/1987) PCK model, PCK components are knowledge of learner (pre-conceptions and student difficulties), and knowledge of varieties of representation. Varieties of representation knowledge used in transformation of CK into a more understandable form by students are critical. This type of

knowledge includes the knowledge for different representation varieties of the content to be taught, and it has many kinds such as simulation, visualization, exampling, illustration, and demonstration (Shulman, 1986). Since most of the studies regarding the determination of varieties of representation in literature are on science (Friedrichsen, 2008; Geddis, Onslow, Beynon & Oesch, 1993; Henze, Van Driel & Verlop, 2008) and due to the lack of studies regarding the early childhood teachers or pre-service teachers, technical and pedagogical characteristics of the scripts for short film designs of early childhood pre-service teachers were examined in this research. What seen in TPACK, based on Shulman's (1986/1987) PCK model is the presence of technology in learning and teaching environments, which indeed are different, and the necessity of teachers to have the knowledge for this technology. Moreover, the most important issue for pre-service teachers' education in accordance with TPACK model is the necessity of presenting of the courses covering this different knowledge basis cooperatively (Koehler & Mishra, 2005) instead of arranging separate courses for each knowledge content in traditional teacher education programs. Koehler and Mishra (2005) have stated that a contribution was provided to develop a new approach regarding the relationship among content, pedagogy, and technology by teachers with "learning by design approach" that has been proposed and used by teachers for the development of TPACK. In this direction, it has been aimed to analyze the scripts in short film designs of pre-service teachers regarding the teaching of the contents determined from teaching programs, and examine the development of TPACK components with this study.

Method

Multiple case study to examine technological and pedagogical characteristics of short films prepared by early childhood pre-service teacher was used in this study. As Merriam pointed out (1998), a case study provides an opportunity to deeply analyze and describe a single unit such as individuals, programs, and groups or systems of which limits are certain.

Data Collection Process and Data Collection Tools

This study was performed with students who took Teaching Technologies and Material Design (TTMD) course in KTÜ Fatih Education Faculty, Early Childhood Education Program in 2015/2015 academic year. Preparation methods for visual content designs and software

programs related with short film making (such as Movie Maker) and properties were introduced to pre-service teachers in detail within the scope of this study. With regard this application, short film making towards the suitable ones for the zones of development and objectives within the MEB Early Childhood Education Program (2013) was asked from groups of four. It has been mainly expected from the pre-service teachers to create scripts which involve the characters of a group of 5-6 years of age including themselves in films prepared The first draft applications of the films have been watched with all pre-service teachers, who have joined the course, together, and the precautions to be taken for the films focusing more on designated learning objectives were discussed. Two weeks after first feedbacks, 14 films on which necessary arrangements were made, were put on a display in class environment. 5 out of short film design of 14 groups that were put in the final form by this were selected by criterion sampling method. In researches in which criterion sampling was used, observation units can be formed out of individuals who have certain characteristics, events, objects or situations, and units, fulfilling the criterion designated for sampling, are taken in the research (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz & Demirel, 2009). In this regard, at least two development fields/skills, and the selection of learning objective indicator regarding this zones were designated as criterion for selecting the films, and film selection was made in this direction. (All the related development fields/learning objectives indicators can be reached from MEB Early Childhood Education Program (2013)).

Analysis of Data

Films selected were analyzed in terms of technical skills, suitability for pedagogical learning objective and child development, varieties of representation, and student knowledge. Analysis of the suitability for learning objective and child development were performed by a specialist from early childhood education, and analysis for variety of representation and student knowledge by a specialist who has made investigations in pedagogical content knowledge from science education due to the fact that the topic given to the teachers was related with the environment. While doing this analysis, explanations on related-development field and learning objective indicators present in MEB Early Childhood Education Program (2013) were primarily examined. At the same time, an evaluation was made considering the properties of suitability for a child, proximodistal, from the known to the unknown, clarity, from concrete to abstract, economy, vitalness, learning by practicing and experience. A

consensus was reached on the suitability of short film script contents for child development by the field specialists that performed the evaluation.

Table 1
Varieties of Representation, and Teaching Activities Referring the Varieties of Representation

Variety of Representation	Teaching Activity
Explanation	Illustration, Verbal expressions.
Demonstration	Making an explanation regarding the tool, being a model, illustrating and asking them to make
Exampling	Relating with daily life
Teaching by play	Playing a game
Teaching by music	Giving the content by music

Content analysis was utilized in determining student knowledge and varieties of representation from the pedagogical properties in short films within the scope of this study. Short films have been watched by field specialist independently, and varieties of representation that pre-service teacher used in scripts were determined. Data regarding the varieties of representation were analyzed by deductive analysis based on the categories of presentation, simulation, visualization, exampling and explanation described by Shulman (1986), as the varieties of representation are determined by different categories in a way of learning by play and music coming out of the data, inductive and deductive analysis was used together. The varieties of representation and teaching activities referring these varieties in short films were listed in Table 1. An absolute consensus was reached between the specialists for the varieties of representation determined in short films. Since inductive analysis gives an opportunity to explain the cases that are not previously known through content analysis, inductive analysis was also used in analyzing the student knowledge of the pre-service teachers in short films Short films were represented as F1, F2, F3, F4, and F5. F1 is 3 minutes and 17 seconds, F2 is 3 minutes and 14 seconds, F3 is 5 minutes and 1 second, F4 is 3 minutes and 2 seconds, and F5 is 4 minutes and 7 seconds.

Films were arranged by Window Movie Maker. As each group produces their own film, technical properties that they have used in the software program were also examined in these arrangements. As all videos of the groups selected for technical analysis were displayed in

classes, properties were determined as well. These properties are shown in Table 1. By using the properties in Table 1, the videos of the faculties teaching the course were marked in different time intervals twice and last versions (100% compatibility) were shown in results. In order to have a precision in the research, the process is explicitly expressed and research results were supported by raw data.

Results and Discussion

In this section, the results regarding the technical skills, the suitability for pedagogical learning objectives and child development, the varieties of representation together with pre-conceptions components have been presented. Short films were represented as "F1.....F5"

Technical Skills

As can be seen from Table 2, addition of descriptive information on film, video recording, arrangements of the recordings were performed by all groups. No group has benefited from previously prepared videos for their own film designs. Moreover, while only one group has used acceleration property, three groups have favored to add a film to films depending on the characteristics of the topic.

Table 2
Technical Skills that Pre-Service Teachers Used in Software Programs in Film Designs

	F1	F2	F3	F4	F5
1) Addition of descriptive information (description/ name of the film)	X	X	X	X	X
2) Video recording	X	X	X	X	X
3) Addition from own recording/cut	X	X	X	X	X
4) Video acceleration/deceleration	X				
5) Addition of a suitable music (background music) if applies	X	X		X	
6) Adjustment of the volume o the music (turning on/turning down)	X				
7) Cutting parts from previously recorded films					

Suitability for Learner Objectives and Child Development

As can be seen from Table 3 that pre-service teachers have primarily preferred learning objectives and indicators towards self-care skills. In addition to this, it has been detected that they had determined the learning objectives and indicators from social and emotional development, linguistic development, and motor development.

Table 3
Development Fields/ Learning Objectives Fields selected for the Varieties of Representation

	Development Field/Learning Objectives Indicators	The Varieties of Representation
F1	*Social and Emotional Development* Learning Objective 10. He fulfills the requirements *Indicators*: He shows that he is willing to take responsibility. He fulfills the responsibility that he has taken When the responsibilities are not fulfilled, He tells the possible outcomes. *Self-Care Skills* Learning Objectives /: He protects himself from dangers and accidents. *Indicators*: He calls for help in case of any danger or accident.	Explanation Demonstration Exampling
F2	*Linguistic Development* Learning Objective 1. He distinguishes the sounds. *Indicators***:** He tells the direction where the sound comes from. He tells the source of sound *Social and Emotional Development* Learning Objective 1. *Indicators:* He tells his name, and surname Learning Objective 2. He recognizes the properties regarding his family. *Indicators:* He tells the name, and surnames of his parents and home address.	-
F3	*Motor Development* Learning Objective 3. He does the movements requiring object controlling. *Indicators:* He catches the ball thrown. He hits the ball standing idle by his foot. *Self-Care Skills* Learning Objective 8. He takes precautions regarding his health. *Indicators:* He tells what to do for protecting her health. He explains the results that can happen if he doesn't take care of his health.	Explanation Play

F4	*Social and Emotional Development* Learning Objective 12. He follows the rules in different environment. *Indicators:* He acts according to the rules in case of a conflict between them. He follows the rules for politeness. *Self-Care Skills* Learning Objective 1. Applies the cleaning rules regarding his body. *Indicators:* He brushes his teeth; he washes his hands and face. Learning Objective 2. He does works regarding to get dressed. *Indicators:* He takes off his clothes, shoes, he puts on, He buttons/unbuttons, and he ties/unties laces of his shoes.	Explanation Music
F5	*Motor Development* Learning Objective 2. He performs Balance movements. *Indicators:* he stands on one foot. He jumps on one foot. *Self-Care Skills* Learning Objective 6. He uses the necessary equipments for daily living skills. *Indicators:* He uses the right equipment during nutrition. He uses the materials regarding the body cleaning.	Demonstration

When F1 is analyzed, for "He fulfills his responsibilities" learning objective and the indicator of "He shows that he is willing to take the responsibility. He fulfills the responsibility that he has taken. When the responsibilities are not fulfilled, He tells the possible outcomes" it can be seen that a content related with garbage topic has been prepared. In the same film, for "He protects himself from danger and accidents" learning objectives and indicator of "He calls for help in case of any danger or accident"; pre-service teachers have written a script on falling of a child from a slide. However, when film was examined, as soon as the child fell, his mother went for help even if the child had not asked any help. Therefore, it was determined that, the script was not suitable for this aimed objective. When F2 was analyzed, for "He distinguishes sound" learning objective, and indicator of "He tells where the sound comes from. He tells the source of sound", pre-service teachers prepared a script they had used "dog sound", in it, and after the dog was lost, a dog sound was heard and *as saying "O, the sound comes from this way, let's go..."*(F2) , it can be concluded that the objective of "He tells where the sound comes from" was reached. In another film, the learning objective of "He takes precautions regarding for his health", and the indicator of He tells what to do for protecting her health. He explains the results that can happen if he doesn't take care of his health", the pre-service teachers scripted a child's who does not have breakfast getting sick. In film, *he warns his friends saying "if you go out without having breakfast you get sick"* (F3) so it can be concluded that they try to reach to the learning objectives. When F5 was examined, for the

objective of "He uses the necessary equipments for daily living skills" and for the indicator of "He uses the right equipment during nutrition. He uses the materials regarding the body cleaning", the pre-service teachers scripting a child combing his hair with a comb in his hand.

It was observed that the pre-service teachers benefits from different topic, concept and contents to reach to the learning objectives regarding the development fields. Since the topic of garbage that the pre-service teachers has preferred as being associated with the concept of environment in which that children are closely involved, them using of the creatures (dog) that children closely know for the topic of sound, and them using tools that are commonly used in daily life such as brushing teeth and combing hair regarding self-care skills, it can be concluded that the pre-service teachers has preferred the suitable content to reach to the learning objectives. In studies performed, it was determined that the teachers use the computers most to support the activities that present in their daily plans, and most of the teachers did reach the goals that they have set for earlier in the activities in which the computers are being used (Yurt & Cevher-Kalburan, 2011). In this direction, the use of computer during the activities is very significant since it gets children's attention and gives them opportunity for active learning, supports their personal learning, and provides them to make a progress according to their personal knowledge level (Haugland & Shade, 1994).

The Varieties of Representation

When the short films in Table 3 were examined, it was determined that the pre-service teachers have preferred to use the varieties of representation such as explanation, demonstration, exampling, play, and music. When F1 out of short films was examined, it can be seen that the pre-service teacher have used the concept of garbage, based on the topic of environment, and have scripted this concept by using the teaching activities such as illustration, verbal expressions, and associating with daily life. There is a quotation from a talk between a child that has gone to a playground with his mother, and his friends in F1 script below.

> *"Child: Look Mom, they threw their garbage out.*
> *Mother: Yes my girl, let's go and tell them that they have made a mistake.*
> *Child: Hello! Guys. Hello. But why do you throw your garbage out?*
> *Friends: Because the garbage bin is too far from here. It's none of your business, I throw out.*

> *Child: but the garbage bin is there, not too far away. If you keep doing this, our world gets dirtier so we cannot live there anymore.*
>
> *Friends: You are right. Let's put our garbage into the garbage bin"* (F1)

In addition, from the talk in which the pre-service teachers have made explanations regarding the tools as they use a slide in the film *"Let's slide down the slide, OK? OK. Just sit now. Hold from the sides well. If we slide this way, you wouldn't fell down, OK?* It was seen from the (F1) expression.

When F3 was examined, it was determined that the pre-service teachers have preferred illustration, verbal expressions and playing game activities to support these expressions by using the ball.

When F4 was examined, it was determined that the pre-service teachers have scripted in short film that a child brushes his teeth in accompany of verbal music, and used the teaching by music activity in this direction. There are lyrics of the song used in the film below.

> *"Brush your teeth, I brush my teeth after I finish my meals, I brush my teeth before getting to bed, all my teeth are as white as snow, I take good care of them, I certainly brush them at least twice a day, to the right, and to the left, shake it, up and down gargle ... You do brush them (Child brushes his teeth in a way that was in the song).* (F4)

When F5 was examined, it was determined that the pre-service teachers have scripted in a film that two families are having dinner in a kitchen, and used the activities of being a model, and illustrating-asking them to make. There are sample expressions for the activities of being a model and illustration-asking them to make, given below.

> *"Mother: Gülsüm, let's show you friend how to hold a spoon and a fork.*
>
> *Child: Look, like this (Child shows his friend how to hold a spoon and a fork as being a model). Friend: I will show you how to hold a glass, then. Look, like this".* (F5)
>
> *"Look, you can stand on your one foot like this, let's try it.* (F5)

In the study, it's seen that the pre-service teachers have preferred to use the activities of teaching by music and play in short films beside the categories of explanation, demonstration and exampling that determined by Shulman (1986). Musical activities such as joining the musical games, performing imitations compatible with the lyrics of the songs within the scope of teaching by music, which is one of the method that can be used in early childhood period,

has a significant place in education program. And computer also presents interesting sources for children in their music experiences. Visual and audio symbols that will be present in short films, high-quality music, sounds of music and communication provides opportunities for learning by music for the children. In the light of this knowledge, Yurt and Cevher-Kalburan (2011) determined in their study that teachers use the computer most in musical activities. Similarly, play method that influences the mental, physical, emotional and social development of a child in a great extent is one of the methods that are commonly used in early childhood period.

Knowledge of Learner

When the short films that pre-service teachers have prepared were examined in terms of pre conceptions of children and learning disabilities, it was determined that pre-service teachers have not used any emphasis or expressions regarding the detection for pre-conceptions and learning disabilities of the children for the learning objectives and indicators.

However, as a result of the studies performed, it was determined that even if the pre-service teachers have preferred the different learning objectives and indicators from different development fields, they generally use the playground and people from child's close vicinity (family and friends of a child) as a character. It can be said that, based on a thought that the most important need for early childhood period children is playing game, and the main characteristics of early childhood education program is play-basis, relativity principle; When the necessity of the providing the teaching to child first from his close vicinity are taken into consideration, proximodastal principle; since the fact that the selection of playgrounds as a places in which the event took place in short films results in minimum cost and affordable, economy principle was taken into consideration.

Conclusion and Suggestions

In this study, it has been aimed that the examination of technical and pedagogical properties of scripts of the early childhood pre-service teachers in short film designs. In this direction, it was seen that the pre-service teacher have used the knowledge and stimulant content

techniques in pedagogical gamification applications as well as technical skills such as effects, music, sound addition, acceleration.

It was determined in short film that the pre-service teachers have usually used the suitable contents for reaching the learning objectives indicators and development fields. The selection of playgrounds and people from child's close vicinity (family and friends of a child) as characters in scripts by pre-service teachers showed that they are aware of the influence of the close vicinity in learning of early childhood period children. While this is an indicator that the pre-service teachers would have the knowledge of the student which is one of the components of PCK, it doesn't directly give the information. In prospective studies, besides the pre-service teachers' scripts for determining the knowledge of the student, lesson plans, and the curriculum would be used and included into the research.

It was seen that the pre-service teachers have often included illustration and verbal expressions in short films. In addition to this, arising of the categories such as teaching by play and music beside the categories theoretically available in terms of the varieties of representation, remarks for music and play methods that would be used effectively in learning of the children in early childhood period. Simulation, visualization, exampling, explanation, and demonstration categories determined by Shulman (1986) were usually seen in studies of science education. Different varieties of representation categories in addition to teaching by music and play may arise with prospective studies regarding the early childhood education.

In this study, technological pedagogical properties were tried to be determined through short films. In other studies to be made, these properties would also be determined through different techniques used within the scope of TTMD course. In the light of results, the contents of the criteria in technological pedagogical study would be examined in detail for the utilizing the short film designs scripted, or new criteria team would be developed in addition to current studies taking into account the different knowledge components of the technological and pedagogical contents.

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