

Variables Predicting Video Development Process in Teacher Training

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ABSTRACT

For pre-service teachers, it is very important to use digital technology effectively and productively during their teacher training and in the educational institutions that they will work in the future. In this context, video development process is an effective learning environment in improving digital skills of students and acquisition of new skills by them. The present study aimed to determine the factors that predict the use of video development activity in instruction process. Freshmen pre-service teachers attending different departments participated into the study. During a three-week application period, students developed videos on subjects related to social responsibility. In the study, which was patterned as a single group experimental design, video development score was determined as the predicted variable while emotion, motivation, personal innovativeness, and self-efficacy beliefs on educational internet use were determined as predicting variables. In the present study, multivariate regression analysis findings demonstrated that, among these predicting variables, only the emotion variable was a significant predictor of the video development score.

Keywords: *Multimedia design, video development process, regression analysis, teacher training, emotion.*

INTRODUCTION

In recent years, learning environment has been redesigned and reorganized to train individuals who can adopt innovations, utilize technologies efficiently, take individual responsibilities, research, inquire and produce. Thus, several technological tools such as whiteboards, smart boards, computers, projection devices are included in the instruction process (Yanpar Yelken, 2017). Today, information and communication technologies are utilized by both teachers and students for many purposes such as audio and video recording, sending SMS, internet access, chatting, and watching videos (Kasumuni, 2011; Traxler & Kukulska-Hulme, 2005). According to the theory of multimedia learning, instructional content is communicated to learners through various technological instruments and media types such as manuscripts (texts, words), visuals (pictures, images, and illustrations), audio (narration, sounds, voice, spoken), videos and animations (Mayer, 2009). Being one of these media types, videos allow both visual and verbal presentation of information. There are many studies in the literature indicating that videos are an effective method in increasing student motivation and ensuring permanent learning (Hakkarainen, 2009; Kılıç & Çelik, 2014; Kılınc, Fırat & Yüzer, 2017; Mayer, 2009).

Moreover, students are expected to acquire necessary knowledge and 21st century skills to create multimedia content (Greenberg & Zanetis, 2012). In this context, Web 2.0 technologies provide productive means for students to create their own videos and video content (Kearney & Schuck, 2006; Atici & Yıldırım,

2010; Odabaşı et al., 2012). Owing to the fact that mobile technologies are more commonly used, the need for special tools and studios to develop video is reduced, and individuals are now able to produce and share digital videos in an easier way (Tiernan, 2013). Web applications such as YouTube and DailyMotion make it possible for students to develop videos and publish them on digital media. Thus, students can create new content on an online video development medium using several multimedia elements such as audio and visual animation. Similarly, in Turkey, the curriculum of Information Technology and Software Course taught at the 6th grade includes a unit about producing digital products (MEB, 2017). This unit aims students to recognize video-production tools and create digital videos. The video development activity is considered as an effective method in creating various instructional contents in learning environments where pre-service teachers will work in the future. For, it is considered to be an important way to use an active method including videos in developing an instructional content. Likewise, structuring the information based on personal perspective is regarded to be more useful when compared to instructing literal knowledge. However, according to Hobbs (1998), there are practical barriers to video or multimedia production such as hardware support, limitation of course periods, personal requirements and teacher training. Certain measures can be taken to overcome these difficulties. But, it is important to determine the factors that affect video development process with respect to students in instruction process. Therefore, it is believed that findings of the present study will guide instructors who use video development activities in the instruction process since it aims to investigate the factors affecting development of video products by pre-service teachers.

Literature Review

Video Development Process

Digital video is generally defined as the video that can be stored, edited and digitally recorded on electronic media (BECTA, 2003). Considering their potential for easy production and use by both students and teachers in instructional process, active use and design of digital videos in learning practices is significant for increasing the effectiveness of instruction process (Kılıç & Çelik, 2014). Digital video can be considered as a metacognitive instrument that helps learners to observe and analyze self-performances and reflect their learning (Schuck & Kearney, 2006), as well as a communication tool that facilitates the interaction between learner and teacher (Moore, 1989). According to the findings of a study conducted by Orús et al. (2016) on the digital videos produced by students, it was found that the use of YouTube as an educational tool and the content created by learners contributed positively to the learning outcomes and satisfaction level of students. In a similar study conducted by Greene & Crespi (2012), students were asked to produce videos as a part of classroom evaluation. According to the findings, the students enjoyed video experience and found it both interesting and entertaining. On the other hand, in recent studies, it has been observed that studies on video development by students focus on English language instruction (Bradley & Cole, 2016; Hafner & Miller, 2011; Ting, 2013). For example, a study by Ting (2013) demonstrated that video production was influential on integration of language learning with computer skills. Likewise, Baran, Canbazoglu-Bilici & Mesutoğlu (2015) stated that video-development activities could be used for purposes such as assignments, project development and product promotion in computer courses. Schuck and Kearney (2006) also concluded that the video development process was an entertaining activity. Similarly, Norton and Hathaway (2010) stated that this activity could be an important method for use at the secondary level education and had positive effects on students' motivation and learning performances.

Innovation

For many people, video development can be perceived as a novelty since it is a different experience. Similarly, although the concept of innovation was defined in various ways, it was described by Rogers (2003) as an idea, practice or object that is perceived as novel by individuals and groups in a society. Moreover, Goldsmith and Foxall (2003) defined this concept as a creative process where new ideas or applications emerge become a part of cognitive and behavioral reactions of those who accept an existing innovation. In accordance with above mentioned definitions, it can be argued that the concept of innovation is the condition of perceiving something as a novelty, or the process of recognizing a new existence. On the other hand, the acceptance or rejection of innovations is based on the theory of innovation diffusion by Rogers

(2003). According to this theory, the innovativeness of individuals changes depending on their acceptance of technologies.

Motivation and Emotion

The concept of motivation, which reflects the performance put forth to achieve a specific purpose or complete a specific task (Keller & Deimann, 2012), is frequently observed in studies on learning and teaching. It has been reported in the literature that motivation is a significant factor in the acquisition of specific skills by students and that the concept of motivation influences academic achievement either directly or indirectly (Balantekin & Bilgin, 2017; Dinçer & Doğanay, 2016). Thus, the introduction of a subject after a certain period of time is considered as an important factor that can be affected by motivation variable. Furthermore, similar to motivation, the concept of emotion has been a significant topic in educational research for a long period of time (Leutner, 2014). The emotional factor can be considered as a variable that facilitates the motivation of individuals (Gendolla, 2017). For example, a study by Staus & Falk (2017) found that the emotion factor was one of the predictors of short-term learning in a video-assisted learning environment. Similarly, in certain studies in the literature, it was reported that academic achievement was correlated with emotion (Pekrun et al., 2011). Considering the fact that the process of learning with multimedia is influenced by emotional and motivational factors (Leutner, 2014), it is important to examine the emotional and motivational status of students in video development process.

Educational Internet Use Self-Efficacy

In addition to the emotional status of individuals, their self-efficacy perceptions are also significant in completing an activity successfully. The concept of self-efficacy is defined by Bandura (1986) as judgments of individuals on their ability to organize and perform the activities, which would facilitate their achievements in a particular objective. In general, self-efficacy can be described as beliefs and judgments that affect the problem-solving ability and performance of an individual in an activity. It is considered that individuals' self-efficacy in internet use of is also effective on video development activities. It was previously mentioned that self-efficacy in using internet had an impact on the effective use of Web 2.0 tools. In fact, a study conducted by Liaw (2002) demonstrated that internet self-efficacy of college students positively affected their learning performances. It is believed that self-efficacy significantly contributes to overcome students' anxiety and stress that they experience during video development activities with Web 2.0 tools (Kaya, 2009; Yeşilyaprak, 2018). Likewise, certain studies demonstrated that students with low Internet self-efficacy had a low level of participation in online systems due to their lack of confidence (Livingstone & Helsper, 2010; Shi, Chen & Tian, 2011). Furthermore, in a different study by Tsai and Tsai (2003), it was found that students with high internet use self-efficacy performed better in web-based learning when compared to those with low self-efficacy. Thus, it is considered that self-efficacy in internet use could be an effective variable on video development process, as well. It is important to create adequate environments where individuals could acquire and use knowledge with a perception of innovation. For, the opportunity provided for students to organize self-knowledge by integrating multimedia elements and exhibiting their knowledge as a product during video development process could facilitate the achievement of meaningful learning. However, since video development process using Web 2.0 technologies is considered as a new concept, it is found that the number of studies on students' video content development are limited (Orús et al., 2016).

In this context, the present study aims to determine the effects of students' motivation levels, personal innovativeness perceptions, self-efficacies in educational internet use, and other emotional variables on their performance of developing a video product. Thus, the research question mainly focuses on "What are the variables that predict video development scores of students?"

RESEARCH METHODS

Research Model

Since participants were not aimed to share different experiences in the application, and the study did not seek to compare these experiences, all participants experienced the same experimental process. Thus, a group that experienced a video development process was established and the study aimed to determine the variables that affect the video development products produced by this group. As a result, the study was designed with a single group experimental design (Fraenkel, Wallen & Hyun, 2012). The study was conducted with first-year undergraduates in Computer II course during spring semester. Two educators participated into the application phase.

Participants

Freshmen pre-service teachers from different departments in the faculty of education at a Turkish public university participated in the study. Demographic information about the participants is presented in Table 1. As seen in Table 1, the participants were students at the departments of Preschool, Elementary Mathematics Education, Guidance and Psychological Counseling, Primary, and Social Sciences Education. Participants' gender was distributed as 21.3% male and 78.8% female in the study.

Table 1. Participants' Demographics

Department / Gender	Female	Male	Total	Percent
Elementary Mathematics Education	38	8	46	28.75
Preschool Education	27	4	31	19.37
Guidance and Psychological Counseling	22	12	34	21.25
Primary Education	23	3	26	16.25
Social Sciences Education	16	7	23	14.37
Total	126	34	160	100

Data Collection Tool

Four different data collection instruments were used in the study. These are personal innovativeness scale, educational internet use self-efficacy beliefs scale, motivation survey and educational video production assessment rubric.

Personal Innovativeness Scale

The Personal Innovativeness Scale was originally developed by Hurt, Joseph & Cook (1977) and adapted to Turkish by Kılıçer & Odabaşı (2010). The five-point Likert-type scale includes four factors and 20 items. Eigen value of the scale is 3.334, 2.72, 2.59, and 1.85 and explained variation is 16.68, 13.66, 12.97, and 9.27 for sub-factors respectively. The total explained variance variation of the scale is 52.51. The reliability coefficient for the scale is 0.82 and the reliability coefficient for the scale factors was calculated to be 0.62 for "Risk taking" dimension, 0.73 for "Opinion Leadership" dimension, 0.77 for "Openness to experience" dimension, and 0.81 for "Resistance to change" dimension. This scale was administered to the participants before the application process.

Educational Internet Use Self-Efficacy Beliefs Scale

The Educational Internet Use Self-Efficacy Scale was developed by Şahin (2009). This 5-point Likert-type scale consists of 28 items with a one-dimensional structure. In the scale, the lowest possible score is 28 and the highest score is 140. For the assessment of self-efficacy perceptions, it is determined that 28-65 points correspond to low, 65- 102 points correspond to moderate, and 102-140 points correspond to high level self-efficacy. The total item correlations of the scale differ between 0.544 and 0.806. The Cronbach alpha internal consistency coefficient for the scale was determined as 0.96. This scale was administered to the participants before the application process.

Instructional Materials Motivation Survey

The measurement tool "Instructional Materials Motivation Survey (IMMS)" was developed by Keller (1987) and adapted to Turkish language by Kutu & Sözbilir (2011). The original survey included 36 items in four factors (attention, compliance, trust, satisfaction). However the Turkish adaptation includes 24 items in two factors (attention-compliance, trust-satisfaction). Eigen value is 9.38 and 1.96 for sub-factors, respectively. It had a 45.36% of total explained variance. The Cronbach Alpha internal consistency coefficient of the survey was 0.83 for the whole survey and 0.79 and 0.69 for sub-factors, respectively. This scale was administered to the participants after the application process.

Educational Video Production Assessment Rubric

The videos developed by the participants were evaluated with the rubric. Rubrics are considered to be more reliable sources than rating scales because the criteria for marking are clearly stated (Bredenkamp, 2015). Analytical rubric was chosen from rubric types for the evaluation of educational videos. An analytical rubric is divided into pieces and evaluated according to work stages or the response, process-oriented guidelines (Jackson & Larkin, 2002). The rubric was developed based on six main categories (message, originality, use of multimedia elements, consistency of multimedia elements, video flow, scene transition) that could have an impact on the video product such as message design, video product development techniques, multimedia principles.

While developing the rubric, certain steps that have been existent in the literature were taken. These are choosing the desired performance, determining the performance dimensions, and writing the performance definitions (Quinlan, 2006; Moskal, 2003; Saddler & Andrade, 2004; Jackson & Larkin, 2002). The rubric was developed with a 3-point evaluation method which is presented in Appendix 1. Thus, video products were examined based on six main categories and scored with at least one and at most three points in each category. In addition, the rubrics, developed to increase the reliability and validity, were evaluated by a specialist who had studies in the field of multimedia. Moreover, two researchers independently evaluated the videos produced by the students in accordance with rubrics.

As a result of the evaluation, the percentage of fit between the researchers was calculated using the fit percentage formula of Miles & Huberman (1994) ($\text{Compliance\%} = [\text{Consensus} / \text{Agreement} + \text{Consensus}] * 100$) as .85. As a result of the evaluation conducted by researchers and specialist, it is determined that the rubric works in accordance with the purpose of development.

Research Process

It was observed in the literature that video development process is conducted in three stages: pre-production, production and post-production (Callele, Neufeld & Schneider, 2005; Cartwright, 1996; Corbally, 2005; Hobbs et al., 2013). Thus, a three-week research process was planned based on these three stages. These steps are presented in Figure 1 and described in detail below:

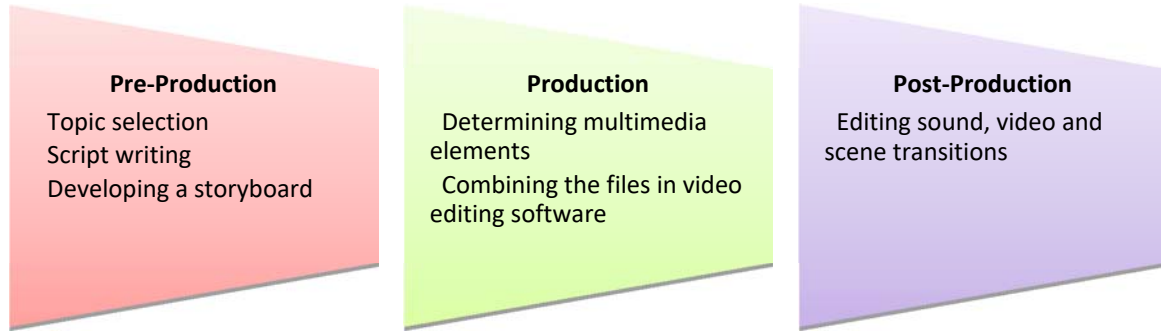


Figure 1. Application process

Pre-production

The first phase of the study involved a pre-production work conducted by participants. Each task, required to be performed in this stage, was presented to the participants in an info graphic. After this process, participants were asked to form groups of 2, 3 or 4 individuals. A learning management system (LMS) was established via Moodle to ensure communications among group members and to present the products. Participants had to enroll at this system. In next stage, the groups were asked to select one of social responsibility topics (health hazards of smoking, animal rights, respect in traffic, global warming, etc.) to produce a video. The groups were not forced to use one of these topics. On the contrary, they were able to choose any social responsibility issue based on their interests. The group members discussed about the issues on LMS and wrote a script for their video. Then, the group members created storyboards based on the scripts. For example, a storyboard, created on the topic of creating awareness for visually impaired people, is presented below in Figure 2.

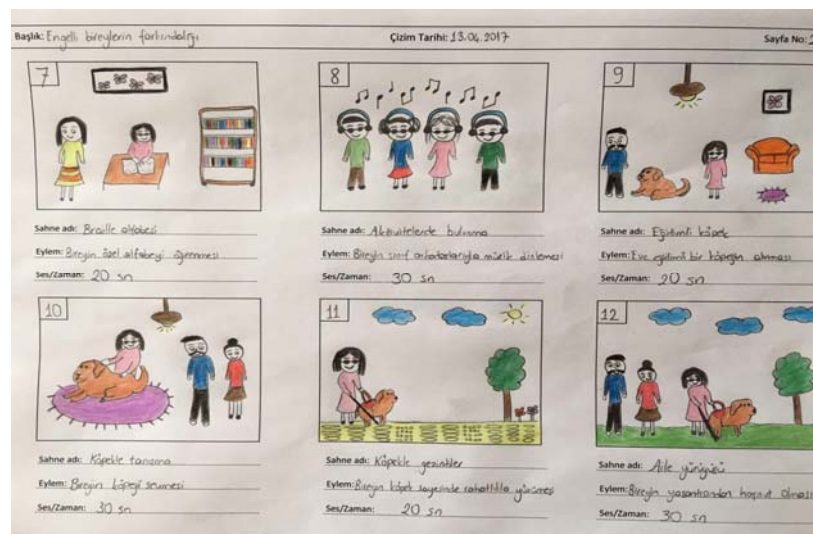


Figure 2. The storyboard created on the topic of creating awareness for visually impaired people

Production

At this stage, the participants developed video products based on the storyboard they created. At the beginning of this process, the participants were informed about access to non-copyrighted audio and visual materials on the Internet. Thus, the participants in groups searched for relevant multimedia elements on the Internet and downloaded the materials they liked onto the LMS. Participants were then informed about the WeVideo video editing application, downloadable at <https://www.wevideo.com/>. Then, the groups produced videos using the WeVideo application. WeVideo application was preferred because it had an easy-to-use interface, offered Turkish language support and was a web-based application. Furthermore, it offered 7.5 minutes free video development per month.

Post-production

In this stage, the videos developed by the groups were edited. In other words, they edited sound and scene transitions of the video they produced. Also, the groups solved transition problems between the scenes at this stage. The videos of the groups that successfully completed the video development process were presented in the classroom in the presence of all participants.

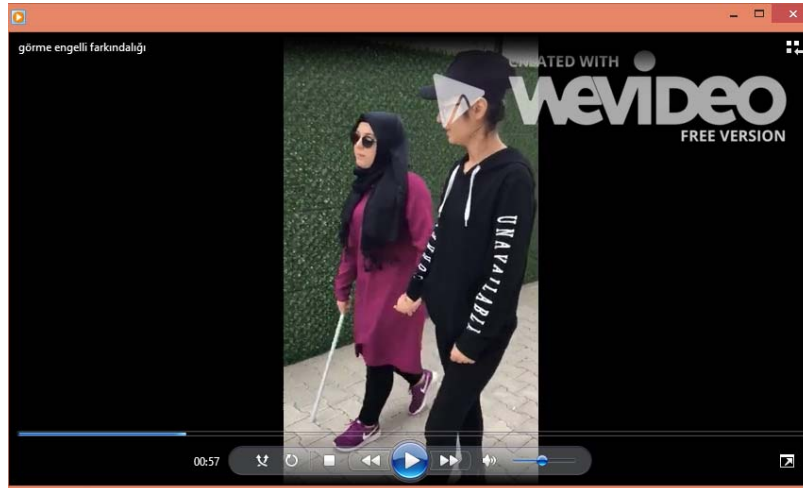


Figure 3. A screenshot of the video produced on creating awareness for visually impaired people

Data Analysis

Data analysis was conducted in two stages in the study. In the first stage, student demographics were presented. Furthermore, descriptive statistics on video assessment, educational Internet use self-efficacy, personal innovativeness, motivation and emotion scores obtained in the study, were presented. In the second stage, a multivariate linear regression analysis was conducted to determine the variables that affected academic achievement (video development score). The standard (Enter) model was used in this analysis.

FINDINGS

Variables of the study were determined as educational internet use self-efficacy, personal innovativeness, motivation, and emotion. In addition, academic achievement was identified as the predicted variable of the video product development score model. The purpose of constructing this model was to investigate the factors that influenced the participants while producing a video with desired qualities.

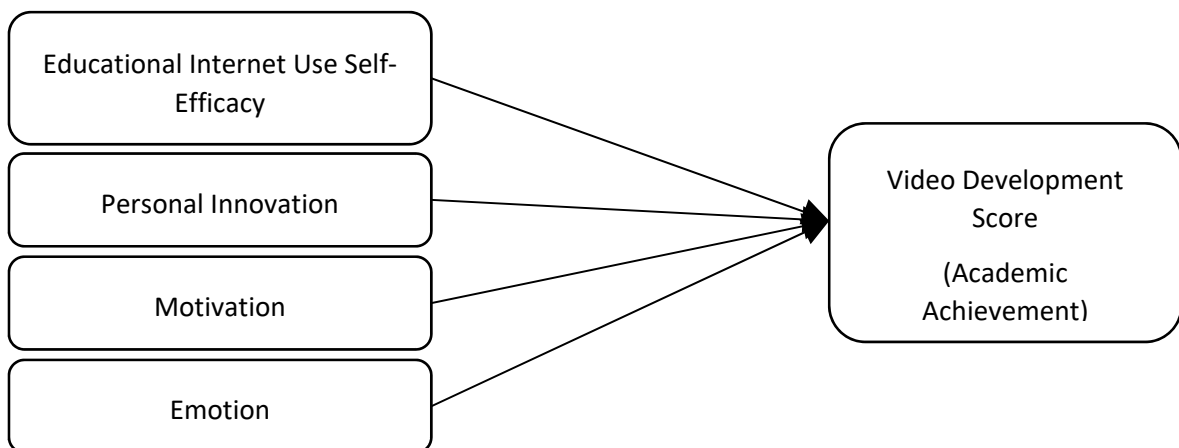


Figure 4. Graphical presentation of regression model

Table 2. Descriptive statistics on continuous variables in data collection instruments

	n	Min	Max	\bar{x}	SD
Video development score	160	8	18	13.76	2.220
Educational Internet Use Self-Efficacy	160	43	140	94.98	21.10
Personal Innovativeness	160	42	89	68.29	7.361
Motivation	160	45	111	84.88	12.51
Emotion score	160	1.00	5.00	3.66	1.06

The data obtained with the educational internet use self-efficacy, personal innovativeness and motivation scales were evaluated according to total scores. The linearity assumptions for all variables used in the study were verified. Furthermore, Skewness and Kurtosis tests demonstrated that the data exhibited normal distribution. The linear multivariate regression findings determined the degree that educational Internet use self-efficacy, personal innovativeness, motivation and emotion variables predicted the video development score. Table 3 below presents the ANOVA table for the model.

Table 3. ANOVA for the regression model

	Sum of Squares	sd	F	p
Regression	54.227	4	2.881	.025*
Residual	729.267	155		
Total	783.494	159		

* $p < 0.05$; $R^2 = .069$

It was determined that the model investigated in the study was significant at $p < .05$. In the current model, the R-squared value indicated that determined variables explained 6.9% of the variance in the video scores. In order to identify significant variables in regression model, it was important to investigate variable coefficients. In Table 4, standard coefficients and significance values of the variables included in the regression model are presented.

Table 4. Independent variables' standard coefficients

	β	t	p
Constant		7.103	.000*
Educational Internet Use Self-Efficacy	.000	.002	.998*
Personal Innovativeness	.039	.460	.646*
Motivation	-.159	-1.717	0.88*
Emotion score	.307	3.393	.001*

As seen in Table 4, it was determined that educational Internet use self-efficacy, personal innovativeness and motivation variables were not significant predictors of video achievement score. It was found that only the emotion factor explained the video development score as a significant predictor. The standard coefficient of the emotion variable also indicated that this variable was a robust indicator in the model. The vast majority of study participants stated that the video development activity was quite an entertaining process. Educational Internet use self-efficacy did not have an effect on video development. This might be due to certain reasons. For example, the vast majority of participants portrayed their scripts and did not attempt to search for audiovisual elements such as audio, video, or visuals on the Internet. On the other hand, the Pearson's Product-Moment Correlation Coefficient was calculated to examine the

correlations between the variables that affect the video development scores of pre-service teachers. Results of the analysis are presented in Table 5.

Table 5. Pearson’s Product-Moment Correlation Coefficient Distributions among the variables that affect video development score

		Educational Internet Use Self-Efficacy	Personal Innovativeness	Motivation
Personal Innovativeness	r	.373**		
	p	.000		
	n	160		
Motivation	r	.128	.211**	
	p	.105	.007	
	n	160	160	
Emotion	r	.025	.009	.507**
	p	.751	.914	.000
	n	160	160	160

**p<.05

As seen in Table 5, there were significant and positive correlations between total personal innovativeness and educational Internet use self-efficacy scale scores ($r = .373$; $p < .01$); motivation and personal innovativeness scale scores ($r = .211$; $p < .05$); and motivation and emotion scale scores ($r = .507$; $p < .05$). In order to describe the correlation level, Evans (1996) proposed that the level of correlation should be defined as very weak between .00-.19, weak between .20-.39, moderate between .40-.59, strong between .60-.79, and very strong between .80-1.00. Accordingly, it can be stated that there was a weak correlation between personal innovativeness, educational Internet self-efficacy and motivation, and personal innovativeness in accordance with above mentioned intervals. However, there was a moderate correlation between motivation and emotion.

DISCUSSION AND CONCLUSION

There is no doubt that Web 2.0 technologies have a huge impact on learning environments. These technologies allow students to produce digital content such as videos and podcasts without having technical knowledge or skills. In this context, the video development process is considered as an interesting and entertaining method for students to learn the course content (Green & Crespi, 2012). Furthermore, Schuck & Kearney (2006) noted that video production activity increased students' motivation levels. Additionally, this type of activities has a positive effect on students' learning experiences as well as increasing interest in the content (Gaston & Havard, 2019). Video production has the potential to increase student empowerment for social issues. By supporting their production skills. These activities provide students a means to reflect their emotions and thoughts. However, literature review demonstrated that this activity was mostly limited to language instruction, and previous studies often focused on instruction outputs (Hafner & Miller, 2011; Brandley & Cole, 2016). Although it is a known fact that videos have positive effects on learning outcomes, the factors that influence video development process remain unclear. Therefore, in the current study, educational Internet usage self-efficacy, personal innovativeness, motivation and emotion factors, which are considered to affect the video development process, were investigated. The students were allowed to

complete a video development process in 3 weeks (2 hours a week), however they stated that they spent a great deal of time on the project on their own, as well.

Factors related to video development were analyzed with the regression enter model. Although there are some factors that were determined as statistically insignificant in the model, this study still constitutes a guide for educators. On the other hand, the emotion score associated with the process was a significant factor that affected video development achievement. In the study, students freely selected the topic and group members. Furthermore, students were not guided in expressing their emotions and thoughts. Thus, emotional changes that the students experienced in the process directly affected video achievement scores. At the end of the application process, a large majority of the students stated that they were satisfied with the video development process. Emotion scores obtained in the study also bore witness for this finding. In addition, this finding is consistent with the study of Pirhonen & Rasi (2017). The researchers found out that producing instructional videos about the subject matter provided a student-centered learning environment in which students could motivate, engage, and had productive roles. They also suggested that video development activity enhanced students' motivation and positive emotions. Similarly, Koc (2011) claimed that video development process could develop pre-service teachers' motivation, and the construction of professional identity. Moreover, according to Girod (2007), video development activity offered a valuable opportunity to help students pay attention to the issues on the role of group process, audience, and educational outcome.

In the present study, it was determined that educational Internet self-efficacy, personal innovativeness and motivation factors were not statistically significant predictors of video development achievement. However, this finding was inconsistent with the studies in the literature. For example, technical skill is an important variable that affects academic achievement or student participation in computer-aided learning environments according to Dennis et al. (2010) cited in Çakir (2013). Similarly, Reeves, Caglayan, & Torr (2017) state that students need to have at least a basic technical skill in terms of maximizing the benefits of video development process. Therefore, it can be thought that internet use self-efficacy does not affect the video production process as the students produce videos without the need of technical skills thanks to the web 2.0 tools. Likewise, in the current study, it was determined that the educational Internet use self-efficacy did not directly affect the video development scores. Secondly, it was concluded in the current study that students' motivation levels were not a factor that affected the video development scores. However, it was reported in the literature that the motivation level was a significant factor that affected student achievements (Gbollie & Keamu, 2017; Amrai et al., 2011; Tella, 2007; Vansteenkiste et al., 2005). There might be a few reasons for the insignificance of this variable in the current study. The first reason could be the fact that students developed videos in groups in the current study, thus every student did not contribute equally to the produced video which resulted in disagreements within the groups. Moreover, the fact that the application was completed in a short period of only 3 weeks could have also led to the above-mentioned result.

The fact that two different educators were included in the application process was a limitation of the current study. This may have led to certain differences in the activities. Future studies can be conducted to investigate the effects of different variables such as critical thinking and creative thinking skills. In addition, studies including video development activities conducted over a longer time span, and carried out by individual students, not groups will also be more effective.

Appendix 1: Educational Video Assessment Rubric

Items	1	2	3	Score
Message	The information provided was insufficient to describe the subject.	The information provided was sufficient to describe the subject.	The provided information reflected the objective of the subject to the audience in an interesting manner.	
Originality	The message of the subject was presented with a common construct.	The presentation of the message included unaccustomed emotions, thoughts and perspectives	The message was presented with an original construct	
Use of multimedia elements	Textual, visual and audio elements were included in the same scene or one element was dominant in one scene.	Use of textual and verbal elements together was avoided.	Only visual and verbal multimedia elements related to the topic were used economically.	
Consistency of multimedia elements	Multimedia elements that were inconsistent with the subject were used.	Multimedia elements that were consistent with the subject were used.	Multimedia elements were both consistent with the subject and in harmony with one another.	
Video Stream	There were problems that disrupt the video stream (resolution, dimension, rotation, cropping, etc.).	There were audio problems that disrupt the video stream (volume, external sounds, unrelated voices, etc.).	There were not audiovisual elements that disrupted the video stream.	
Scene transitions	No scene transitions were utilized, or unrelated transitions were used.	Appropriate effects and transitions were included in the video.	Transitions that did not disrupt the concentration of the audience and did not disrupt the video stream were used.	
Total Score:				

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