

# Investigating Technical and Pedagogical Considerations in Producing Screen Recorded Videos

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**Abstract**—Due to the COVID-19 pandemic, its impacts on education all over the world, and the problems arising from the use of traditional methods in education during the pandemic, it was necessary to apply alternative solutions to achieve educational goals. In this regard, electronic content production through screen recording became popular among many teachers. However, the production of screen-recorded videos requires special technical and pedagogical considerations. The purpose of this study was to extract and present the technical and pedagogical considerations for producing screen-recorded videos to provide a useful and comprehensive guideline for e-content producers. This study was applied research, the design was descriptive, and data collection has been done using qualitative method. In order to collect the data, 524 previously produced screen-recorded videos were evaluated by using an open-ended questionnaire. After collecting the data, they were categorized, and finally, 83 items as technical and pedagogical considerations in the form of 5 domains were determined. By applying such considerations, it is expected to decrease producing and editing time, increase the technical and pedagogical quality, and finally facilitate and enhance the processes of teaching and learning.

**Keywords**—E-learning, e-content, screen recorded-videos, screen recording software, technical and pedagogical considerations.

## I. INTRODUCTION

TODAY, information and communication technology has affected all aspects of human lives. One of the most important and fundamental aspect is education and learning. This development has increased teaching and learning opportunities, access to educational resources, and accelerating educational processes. Therefore, new methods emerged in the field of teaching, influenced by the growth and development of ICT. One of these methods is e-learning. It is defined as a method for designing, compiling, presenting, and evaluating education that utilizes electronic capabilities to assist in learning and reduce dependency on time and space [1]. In the field of e-learning development, not only educational methods but also curricula have been transformed. As the environment and the context of education have changed, the forms and types of content that can be presented on it have also undergone extensive changes. This has led educators and educational institutions to make efforts to produce electronic content [2]. This e-content includes items such as e-journals, e-books, animations, sounds, movies, pictures, graphics, and virtual labs [3]. During the teaching and learning process, e-content supports teachers by enriching educational contents [2]. These

contents are valuable and useful for both teachers and students. The ultimate purpose of e-content is to bridge the gap between learners through effective education. E-content improves and shortens the teaching and learning process and helps students to understand various topics and subjects [4]. E-content also motivates students to use their maximum potential in learning [5].

Developing e-content is not an easy process [6]. This content should be prepared and produced according to the level of student's readiness and their learning styles [7], [8]. To prepare and develop e-content appropriate to the teaching and learning process, a team of experts including coordinators, team leaders, producers, art directors, designers, environment developers, content experts, training technicians, training psychologists, training sociologists, and assessment experts is required [7], [9], [10]. Therefore, e-content can be developed easily and quickly when these professionals have a good collaboration together [11].

Among all types of e-content, video has a special place. This type of content plays an important role as educational material in both e-learning and traditional courses. In recent years, the use of video for teaching and learning has received much attention. By producing instructional videos or packages containing these videos, teachers can provide effective content for students to improve the quality of the teaching and learning process. Numerous studies have shown the effective role of video as an educational tool [12]-[16]. Other studies also have shown that this type of content is more acceptable than textual content [17].

The effective role of educational videos that deal with the steps of working with a computer or the operation of computer software has been proven on the high level of students' learning [12], [18]. These videos help the teacher to record the whole process of working with software and then prepare and present it in the form of e-content. These types of videos have received a lot of attention in the field of computer skill training. So, this led to the production of many educational materials by companies, institutions, instructors, educators, teachers, etc. Producing screen-recorded videos does not cost too much. To produce this type of video, it is enough for a producer (teacher or educator) to have the required hardware and software, an educational scenario, and a guideline for producing screen-recorded videos.

Screen recording software simply records video from a

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computer screen. By using this software, producers can make educational videos to teach a variety of computer skills. For example, imagine that a user wants to know how to change page layout in MS Word. Instead of presenting educational content in the form of text, the teacher can easily teach the desired skill to the students in a short time by producing this type of video. This has many benefits for the student. The students can playback, pause, or rewind the video many times. This allows students to control their learning conditions and not have to learn only at a specific time and place. Brick and Holmes showed that teachers used screen recording to provide video feedback to learners, and it has a positive effect on students' learning. Some evidence suggested that learners liked this type of feedback and found it clearer than traditional ones [19]. In general, the use of screen recording software can provide many advantages in the teaching and learning process. Fernandez et al. stated some of these advantages as follow [20]:

- Screen recording provides a convenient way to help students to learn and explore in classes or in extra-curricular.
- Capturing screen activities, lectures, interviews, and supplementary support resources can be easily disseminated to students, accessed from a range of electronic devices and viewed at a time and place that suits the student.

They also stated that screen recording can support the teachers and students in a variety of ways. It can support students by [20]:

- Providing diverse teaching techniques for learning
- Increasing student motivation and enhancing learning experience
- Simplifying and explaining complex problems
- Allowing students to access the learning materials as often as required
- Allowing students to learn at their own pace, with instant playback, rewind and pause

And it can support teachers by:

- Reducing the feeling of isolation for cloud-based students, but also helps located students feel connected
- Enabling teachers to insert short snippets of interesting and relevant news that engage students in current, real-world examples
- Providing more time for teachers to manage and guide students in subjects or units like computer course learning
- Reusing the captured video

Nowadays, various types of screen recording software have been designed and produced by large companies. Each software provides users with special features and facilities. Bogdanov examined and compared several screen recording software. In the article, screen capture and screen recording software such as Hero Screen record, BB Flashback, Camtasia Studio & River Past Screen Recorder have been reviewed and compared. In this comparison, every software was discussed based on some parameters such as price, hardware requirement, output file size, disk space requirement, capture options from audio source & limitations [21].

During the time of the Coronavirus pandemic, teachers tried

to provide educational content and distribute them among their students. On one hand, the production of educational videos through screen recording has received a lot of attention from teachers and helps a lot during the teaching and learning processes, but on the other hand, the production of these videos requires many technical and pedagogical considerations. Therefore, this study was conducted with the aim of providing the necessary technical and pedagogical considerations to produce videos based on screen recording. It is expected that, by using these considerations, producers produce screen-recorded video with higher quality to facilitate and make the teaching and learning processes much more effective.

## II. METHOD

The present study is descriptive research in terms of purpose and uses a qualitative method to collect data. In this research, an attempt has been made to collect and analyze data, categorize them, and finally provide considerations and indicators for producing educational videos.

### A. Sample and Sampling Method

In this research, 524 educational videos were examined. These videos were randomly chosen from some of the most common and popular educational websites or video on demand services (VOD) in Iran.

### B. Instrument

In order to collect the data, a qualitative questionnaire was used. This questionnaire contained items about the strengths and weaknesses of videos in areas such as teacher's voice and speech quality, content presentation, video quality, and video production principles.

### C. Procedures

In the present study, after studying the available resources and literature, several technical and pedagogical criteria and considerations in the field of technology and pedagogy of educational video production were extracted. Then, by using a qualitative questionnaire, 524 educational screen-recorded videos were examined and evaluated. At this stage, the strengths and weaknesses of the evaluated videos were extracted. All the obtained items, including those that were extracted from the literature and resources, as well as the items from evaluated videos, were reviewed, and resulted in determining some technical and pedagogical considerations. Finally, these items were reviewed, analyzed, and categorized.

## III. RESULTS

By reviewing and categorizing the data collected from available resources and literature and evaluated videos, the following considerations were drawn. They were categorized into 5 main domains and 15 sub-domains that should be considered in the production of any educational screen recorded videos. Table I shows these domains. Tables II-VI show the items for different domains and sub-domains.

TABLE I

THE EXTRACTED DOMAIN FOR PRODUCING SCREEN RECORDED VIDEOS		
Domains	Number of sub-domains	Number of items in each domain
Pedagogy	3	41
Recording	3	12
Video file	3	12
Editing	4	14
Publishing	2	4

TABLE II

THE EXTRACTED CONSIDERATION UNDER PEDAGOGY DOMAIN		
Sub-Domains	Items	
Lesson Plan	Determining the subject and purpose of training	
	Designing and using suitable teaching project as sample	
	Project-based training	
	Using practical educational materials	
	Avoiding any discrimination; gender, language, race etc.	
	Congruence of the volume of educational materials with the duration of the film	
	Conformity of teaching with the subject and purpose of teaching	
	Using the latest and diverse approaches, strategies, and teaching-learning methods	
	Creativity and innovation in teaching	
	Concordance of the content level with the characteristics of the learners	
	Anticipating potential learners' questions and provide appropriate answers	
	Using appropriate and practical examples to explain the subject	
	Systematic scientific and educational harmony and coherence	
	Following the right order in presenting the content	
	Observing the principle of simplicity in educational design	
	Providing practice for learners during the training	
	Observing the principles of timing in teaching	
	Presentation	Realistic expression and attention to practical concepts and learners' previous experiences
		Expressing the necessity and importance of the subject
Paying special attention to the first and last sections of education		
Motivating the learners		
Observing the principle of continuity and focus on the main subject of education		
Developing the learner's interaction with the educational content		
Scientific mastery of the subject		
Teaching at the right pace		
Avoiding reading of pre-prepared content		
Having a fluent, consistent, and understandable language for learners		
Observing politeness and respect in education		
Avoiding grammatical and linguistic errors (correct literature)		
Keeping silence during playing inserted video and audio		
Avoiding unnecessary and long pauses and silences while teaching		
Observing the principle of brevity		
Paying attention to breathing during teaching		
Moving mouse cursor at right speed		
Typing with proper speed		
Content	Using standard language and calligraphy in spoken and written content	
	Validity of the content	
	Providing up-to-date information	
	Proper use of technical terms	
	Referring to the other relevant educational resources	
	Matching the desired software version with the version taught in the video	

TABLE III

THE EXTRACTED CONSIDERATION UNDER RECORDING DOMAIN	
Sub-Domains	Items
Software and User Interface	Adjusting screen record frame
	Using default interface of operating system and software
	Hiding search history
	Proper performance of the software being taught
Working Space	Choosing appropriate screen recording software
	Avoiding opening unrelated windows to the subject of teaching
	Making recycle bin empty
	Deciding on showing or hiding the taskbar according to teaching subject
	Proper windows arrangement in recording frame
Hardware	Preventing unwanted system notifications
	Proper hardware function
	Adjusting hardware

TABLE IV

THE EXTRACTED CONSIDERATION UNDER VIDEO FILE DOMAIN	
Sub-Domains	Items
Audio Quality	Avoiding auditory Noise
	Audio and video synchronization
	Congruency of the sound volume in different parts of the film
Speech Quality	Pleasant tone and sound
	Accurate and authentic pronunciation of words, terms, and phrases
	Preventing speech noise
	Speech without vibration
	Speech without accent
	Prevent breathing noise in speech
Video Properties	Concordance of video file size and its duration
	Appropriate video dimensions
	Using current video file format

TABLE V

THE EXTRACTED CONSIDERATION UNDER EDITING DOMAIN	
Sub-Domains	Items
Inserted Objects	Proper quality of inserted graphic elements
	Proper quality of inserted audio elements
	Proper quality of inserted textual elements
	Proper formatting of inserted elements
	Having an introduction page
	Having a logo
Accessibilities	Having an intro
	Inserting subtitle
Sound & Video Edit	Clear and coherent speech
	Considering the principles of accessibility for people with special needs
	Lack of extra frames
Special effects	Lack of sound interruption
	Proper use of special effects and transitions
	Using appropriate mouse pointer effects

TABLE VI

THE EXTRACTED CONSIDERATION UNDER PUBLISHING DOMAIN	
Sub-Domains	Items
Publishing Environment	Publishing and distributing movies offline or online
	Appropriate user interface for publishing environment
	Possibility to download videos
Copyright	Copyright observation

#### IV. DISCUSSION AND CONCLUSION

The COVID-19 pandemic has changed education all over the world. Most teachers and educators used e-contents to train their students through distance learning. Therefore, e-content production became increasingly popular among teachers and educators. Among all types of e-content, video and specially screen-recorded videos have a special place in education. This type of content plays an important role as educational material in both e-learning and traditional courses. Many screen-recorded video producers produce their educational content based on their knowledge and experience, but since a coherent and comprehensive guideline to producing these e-contents was not available, some production may lack enough technical and educational quality. This article tried to outline technical and pedagogical considerations and thoughts to be considered in the production of these contents. The results of this study showed that in producing screen-recorded videos, many technical and pedagogical considerations should be noticed. These considerations were categorized into five domains: pedagogy, recording, video file, editing, and publishing. These domains were categorized and presented in the form of 15 sub-domains and 83 items. Among these domains, the pedagogy domain, with 41 titles, covers the most numbers of considerations. It is due to the nature of educational videos and the need to address the issue of education to increase the quality of these videos. Observing the considerations mentioned in this article will support producers to improve the quality of their e-content, both technically and pedagogically.

#### V. SUGGESTED RESEARCH

Due to the scope of the study, only the educational screen-recorded videos were examined. Therefore, researchers are suggested to conduct some studies in the following areas:

- Studying the factors affecting the production of educational content based on streaming and casting
- Investigating and comparing the role of technical and pedagogical consideration on learners' learning
- Investigating the role of these consideration on learners' interest

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