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Exploring the Role of Educational Videos in Teacher Training: Usability, Satisfaction, and Pedagogical Intentions

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Abstract

The rapid evolution of technology in the digital age has led to its widespread adoption in daily life, which has significantly influenced many sectors, including education. A total of 145 students were enrolled in this study conducted in The Higher School of Pedagogical and Technological Education's (ASPETE) Educational Technology and Multimedia course. The course included both theoretical and practical components, with students creating and utilising digital videos. A structured questionnaire with multiple evaluative variables was used to collect data on students' experiences and perceptions regarding the creation and use of educational videos. The findings clearly demonstrate that future educators intend to incorporate educational videos into their teaching practices. This highlights the necessity for teacher training programs to incorporate digital literacy and multimedia tools into their curriculum. The analysis conducted using Jamovi 2.3.18 revealed a significant positive correlation between usability, satisfaction, and the intention to use videos. This study will highlight the satisfaction of the future educators who participated in this process concerning of educational videos in enhancing learning experiences and provide insight into their effectiveness in modern pedagogical practices. It will advocate their inclusion in teacher education programs.

Keywords: Educational Videos, Teacher Training, Digital Literacy, Multimodal Learning, Video-Based Learning (VBL)

1. Introduction

As a result of the influx of digital tools into education, since the COVID-19 pandemic, educators have been challenged to adopt innovative teaching methods to engage students. Among these methods, educational video has emerged as a powerful and creative tool capable of transforming the learning experience by making it more interactive, accessible and engaging.

Any educational content that is freely available for use by teachers and/or students free of charge is called an "open educational resource" (OER) (Kanwar et al., 2011; UNESCO, 2012). Their educational value has to do

with their use as an integral part of the curriculum - thus adopting resource-based learning. These resources, when in digital form, can be shared over the internet. The key difference between an AEP and any other educational resource is the license. Looking back in history, we can observe a transformation in the field of education due to the evolution of technology and distance learning. Until the end of the 20th century, digital content was not yet expanded nor open to users. The possibility that was later given to create a digital resource and to share and store it opened new horizons in education. In 2002, the term OER (open educational resources) was first used, which refers to educational, learning and research resources that are public and freely available or produced with the right of free use and reuse by all (UNESCO, 2002). Open educational resources also include videos.

Given the evolution of technology and the availability of digital resources, although video is not a new concept in education, its importance is growing. The combination of audiovisual stimuli, enhances comprehension (Mayer, 2003), while appealing to more learning styles. The video combines not only sound and image but also text. Its multimodal nature is consistent with the principles of multimodal learning. Studies highlight its importance since multimodality facilitates better understanding and engagement when information is presented in more formats (Guichon & Cohen, 2016; Kress & Van Leeuwen, 2001).

Studying the effectiveness of video learning which has been continuously researched in recent years, it appears that the use of video can significantly improve students' understanding and retention of complex science and technology concepts (Guo, Kim & Rubin, 2014; Zhang et al., 2006). In addition to multimodality, video has interactive elements, such as quizzes, interactive videos, and prompts for discussion, which further enhance learning by encouraging students' active participation and critical thinking (Yousef, Chatti & Schroeder, 2014).

This study examines the views and experiences of future educators who were asked to create instructional videos and assesses their potential and potential to transform teaching practices. In the course on new technologies in education offered by ASPETE in Thessaloniki, which aimed at the creation of videos, 145 students participated in both theoretical and practical parts. In the course, students were trained and educated on how to design and produce effective educational videos. In addition, as part of the course, they were taught the principles of digital literacy and the use of multimedia.

It is important to stress the fact that teacher training programs should include digital literacy and multimedia tools. These programs prepare teachers to meet the demands of the modern digital classroom and enhance teaching effectiveness and student engagement by preparing them to create their own and/or use ready-made educational videos in their lessons. New paragraph: Use this style when you need to begin a new paragraph.

2. Theoretical Framework - Importance of Video in Education

2.1. Multimodal Learning and Cognitive Theory

Educational videos are an educational tool that enhances cognitive processing by utilising the principles of multimodal learning, where information is delivered through multiple sensory channels. People learn more effectively when they are provided with both visual and auditory information (Mayer, 2002). As mentioned, it reduces cognitive load, enhances retention and comprehension of complex concepts (Mayer, 2002).

Guo, Kim, and Rubin (2014) demonstrated that videos incorporating visual aids, animations, and demonstrations significantly enhance students' understanding. In addition, Zhang et al. (2006) demonstrated that interactive video-learning environments with videos lead to greater student satisfaction and better academic performance.

2.2. Video-Based Learning (VBL) and Cognitive Load Theory (CLT)

This is where Cognitive Load Theory (CLT) comes in, focusing on the amount of mental effort involved with processing information and what instructional design strategies can be used to more effectively manipulate

cognitive load so that learning takes place. CLT classifies cognitive load into the following three main types:

Intrinsic load: This is the complexity that exists within the content (Sweller, 2010).

Extraneous load: loads created by organisational failures in instructional materials (Chandler & Sweller, 1991).

Germane load: mental activity required to process, build and automate schemas (Sweller, 2010).

For instructional videos, in the realm of video-based learning, however, we can leverage them to decrease extraneous load and increase germane load by presenting technical concepts through visual and auditory information that speaks directly to how our brains process complex knowledge (Mayer, 2002). Animations, motion graphics and demonstrations deliver more abstract concepts in a simpler form that the brain will grasp faster than it would with an explanation of how everything works. Exemplar Videos: Well-organized videos that integrate interactive elements (e.g., quizzes, discussion prompts) can support active learning which enhances germane cognitive load even more (Yousef, Chatti & Schroeder, 2014).

Mayer's Cognitive Theory of Multimedia Learning (2002) suggests that by combining visual and auditory information, we leverage dual channel processing to enhance comprehension. Each of the things that you present in slides can be used to help them get information through their visual channel on demand, while still feeding info via your auditory channel as well. Particularly in video-based learning where the usage of multimodal inputs (i.e., Images, Sound and Text) can nucleate different areas of the brain resulting in increased deeper memory retention and overall better performance during assessments (Mayer, 2003).

2.3. Video-Based Learning Implications

Reducing Cognitive Overload: Educational videos aren't always designed well enough to avoid overwhelming the learner by piling on cognitive load. For example, limiting the text on screen and using good visuals alongside narration helps minimize extraneous cognitive load (Mayer, 2003).

Maximizing Germane Load: As video-based learning makes it possible to illustrate using real-world examples, animations or simulations that promote deeper understanding and schema-building. For example, the visualizations of science experiments or history re-enactments are facilitated by videos over text-based descriptions (Zhang et al., 2006).

Interactivity in VBL: Similar to the study aforesaid, interaction features in videos (e.g., interactive quizzes, branching scenarios) help significantly increase cognitive engagement. These tools help in keeping learners focused and moving towards the actively consuming information rather than passively sitting through lectures. It made learning livelier and more participatory (Yousef et al., 2014).

2.4. Interdisciplinary Applications of Video in Education

As part of creating an engaging, comprehensive learning experience transcending disciplinary boundaries, videos should incorporate elements from a wide range of subjects. Videos are an interdisciplinary material (Ito et al., 2013) because curricular mobility lessons can be crossed between different scenarios. Incorporating academic, social, and cultural learning into their teaching activities through video is what educators need. Video is an important tool while designing culturally responsive or socially engaging lessons.

2.5. Training of future educators

Future educators must create and utilise video content effectively to integrate video into education. Future educators must be trained to acquire technical skills, pedagogical knowledge, and knowledge of multimedia principles. TPACK (Technological Pedagogical Content Knowledge) is a model developed by Koehler and Mishra (2009) that makes it clear that teachers must possess a combination of technological, pedagogical, and content skills.

It is clear from numerous studies that teachers who receive training in video production and analysis are more confident and more effective in incorporating videos into their classrooms. Furthermore, Barton and Ryan (2014) demonstrated that pre-service teachers who participated in video-making workshops developed a deeper understanding of the subject matter and improved their teaching techniques.

Video in education allows students to learn more interdisciplinary, become more effective educators and gain better comprehension. As educational technologies continue to evolve, it is crucial that teachers receive comprehensive training so they can fully utilise video as a teaching tool. Video is an effective tool for engaging, interacting, and catering to the diverse needs of all students in a learning environment.

2.6. Purpose of the research and specific objectives

The purpose of this research was to diagnose the perception of future teachers towards a new educational practice introduced by the group of ASPETES' educators, which involved the creation of a virtual narrative, in the context of teaching educational technology courses. The research questions were related to the creation of an educational video and its use in pedagogical practice. More specifically, we sought answers to the questions related to video creation from script to creation. Moreover, this research is to investigate the attitudes of prospective teachers in relation to the importance of using video in the educational process. Sub-objectives are to investigate the teachers' predisposition regarding the creation of videos by themselves, as well as to investigate correlations between the factors involved in their use and creation. Finally, any significant statistical differences in the groups that make up the demographic characteristics in relation to the main factors are examined. Research questions to be researched:

What demographic characteristics (e.g. age, gender and teaching experience) moderate the effect of primary factors like utility, usability, private resources satisfaction intention to use in shaping the adoption of educational videos into pedagogical practices?

What are the attitudes of prospective teachers towards the use of video in the educational process?

What is the intention of the prospective teachers regarding the creation of videos by themselves?

How do the main factors of video creation and use correlate with each other?

Which factors have a statistically significant effect on the satisfaction factor in relation to video creation?

Which factors have a statistically significant effect on the factor 'intention' in relation to video creation?

3. Research design

This was an empirical study that explored the creation and use of instructional videos in pedagogical practices. It examined the perspectives and experiences of students attending the Annual Pedagogical Training Program (EPPAIK) of ASPETE in Thessaloniki, Greece. As a result of this study, insights were captured from the training of the trainees during an academic year at different stages.

4. Methodology

4.1. Data collection - Research instrument

For data collection, the participating students were asked to answer the questions of a structured questionnaire. Students were asked about their familiarity with making instructional videos, the techniques and tools they used, the challenges they faced, and the perceived benefits of using instructional videos.

4.2. Sample

The present empirical study has as subjects 145 students, who were attending the annual pedagogical training program of ASPETE in Thessaloniki.

4.3. Narrative techniques and content analysis

Within the research, narrative techniques were used to analyse a range of textual content, including still and moving images.

4.4. Collaborative video production

A video production was the culmination of the research. During the course, students created instructional videos based on the principles and techniques taught in the course theory. By putting theory into practice, they were able to gain a deeper understanding of the video-making process through this hands-on experience.

5. Results

The questionnaire includes as many identifying variables as possible to ensure liability and validity. The five-point Likert scale is used to minimize the effects of incorrect responses due to misunderstanding the content of a variable or selecting the wrong one. All procedures are followed to ensure the validity and reliability of the questionnaire. This includes indicators of internal consistency and relevance, as well as structural and consistency. The research instrument, and in particular the questionnaire, has been created based on the literature review and a focus group with experts in pedagogy, new technologies and video scripting.

The data from this pilot application were analysed using the statistical package Jamovi 2.3.18. Appropriate techniques are applied to ensure the validity and reliability of the research tool at the outset. Reliability of a measure Means the instrument is stable and consistent in measuring a concept, which contributes to its reliability. Specifically, we use Cronbach's alpha to calculate the reliability of the measures. This coefficient is a reliable indicator of the internal consistency of the variables that the research seeks to form a new extracted factor.

In this study, a normal distribution test was conducted. It is possible for populations, regardless of whether they have identical locations (equal Means) or equal dispersions, to differ greatly in other characteristics. Consequently, hypothesis tests on location or variability parameters (mean, percentage points, dispersion) are unable to discern differences in other population characteristics. Consequently, in order to test hypotheses regarding the unknown probability distribution of a random variable on which observations (samples) have been made, it is necessary to propose an alternative hypothesis. This approach will be more comprehensive in that it will encompass all percentage points simultaneously, rather than focusing on a single median value. Furthermore, the hypothesis should encompass all probabilities simultaneously, rather than focusing on single or select probabilities. In essence, the normality of the quantitative variable is evaluated for each value of the qualitative variable (normal distribution). A goodness-of-fit test for the normal distribution that can be used in place of the Lilliefors test is the Shapiro-Wilk normality test. Empirical studies have demonstrated that this test has high power in many cases compared to other tests of the complex normality hypothesis, including the Lilliefors test and the χ^2 test.

The lack of normality that emerges after the Shapiro-Wilk test and data analysis Means that non-parametric tests such as the Mann-Whitney test must be used. These tests test the null hypothesis that two sample distributions, relating to a quantitative variable, come from the same population. Applying these non-parametric tests ensures the reliability of the results while addressing the problem of non-normality. To investigate differences between three or more sample groups in the population, the Kruskal-Wallis test was applied as the non-parametric criterion. The Spearman coefficient is used to test the degree of correlation between two variables. The correlation coefficient is a numerical indicator of the degree of correlation between two sets of observations, which can range from -1.00 to +1.00. A positive correlation is indicated by a + sign, while a negative correlation is indicated by a - sign. The + sign indicates that as one variable increases, the other also increases. Conversely, the - sign shows that as one variable increases, the other decreases.

We examine the correlations between the independent and dependent variables by applying linear regression. The dependent variable (Y) is defined as a variable whose values depend on the values of the independent variable (X). This Means that the relationship between them is stochastic or statistical, since each value of (X) may correspond to more than one value in (Y). In the case of multiple independent variables, multiple linear regression was used to examine their effect on a dependent variable.

The following table summarizes the values of the Crombach's alpha coefficient for the main variables. The Crombach's alpha for all variables is acceptable since they have a value greater than 0.70.

Table 1: Cronbach's a

<i>Variables</i>	
Utility	0.800
Usability	0.879
Satisfaction	0.902
Private Resources	0.852
Intention	0.828
Collaboration	0.894

The relationship between the six main ones is examined using a linear correlation coefficient.

Utility shows a statistically significant medium positive correlation with Usability ($r=0.427$, $N=145$, $p<0.001$), with Satisfaction ($r=0.480$, $N=145$, $p <0.001$), with Private Resources ($r=0.446$, $N=145$, $p<0.001$), with Intention ($r=0.397$, $N=145$, $p<0.001$) and with Collaboration ($r=0.346$, $N=145$, $p<0.001$).

In relation to Usability there is a statistically significant strong positive correlation with Satisfaction ($r=0.773$, $n=145$, $p <0.001$), Private Resources ($r=0.623$, $N=145$, $p <0.001$) and Intention ($r=0.597$, $N=145$, $p <0.001$). In contrast, Collaboration shows a statistically significant low positive correlation ($r=0.205$, $N=145$, $p <0.05$).

Satisfaction shows statistically significant strong positive correlation with Private Resources ($r=0.675$, $N=145$, $p<0.001$) and Intention ($r=0.572$, $N=145$, $p<0.001$). In contrast, it shows a statistically significant medium positive correlation with Collaboration ($r=0.292$, $N=145$, $p<0.001$).

Private Resources show a statistically significant strong positive correlation with Intention ($r=0.715$, $N=145$, $p<0.001$) and correspondingly statistically significant positive medium correlation with Collaboration ($r=0.327$, $N=145$, $p<0.001$).

Finally, Intention shows a statistically significant medium positive correlation with Cooperation ($r=0.279$, $N=145$, $p<0.001$).

Table 2: Correlation table

	<i>Utility</i>	<i>Usability</i>	<i>Satisfaction</i>	<i>Private Resources</i>	<i>Intention</i>
Usability	0.427 ***	—			
Satisfaction	0.480 ***	0.773 ***	—		
Private Resources	0.446 ***	0.623 ***	0.675 ***	—	
Intention	0.397 ***	0.597 ***	0.572 ***	0.715 ***	—
Cooperation	0.346 ***	0.205 *	0.292 ***	0.327 ***	0.279 ***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The following linear regression table clearly shows that the coefficient of the variable Usability has the largest statistically significant effect on the variable Satisfaction. The coefficient of the variable Private Resources also shows a statistically significant positive effect on the variable Satisfaction.

Table 3: Linear Regression table for dependent variable Satisfaction

<i>Independent Variables</i>	<i>Standard Estimate</i>	<i>t</i>	<i>p</i>
Utility	0.1078	1.89	0.061
Usability	0.5507	8.69	< 0.001
Private Resources	0.2652	4.06	< 0.001
Cooperation	0.0551	1.05	0.298

$R^2 = 0.673$, the model R^2 is highly responsive to the dependent variable Satisfaction.

According to the linear regression table below, the coefficient of the Private Resources Usability variable shows the largest statistically significant effect on the Intention variable. Correspondingly follows the coefficient of the variable Usability shows statistically significant positive effect on the variable Intention.

Table 4: Linear Regression table for dependent variable Intention

<i>Independent Variables</i>	<i>Standard Estimate</i>	<i>t</i>	<i>p</i>
Usability	0.2445	2.650	0.009
Satisfaction	-0.0138	-0.140	0.889
Private Resources	0.5381	6.643	< 0.001
Cooperation	0.0414	0.666	0.506

$R^2 = 0.552$, the model R^2 is highly responsive to the dependent variable Intention.

In the table below it is observed that to $p < 0.05$ indicating that there is no normal distribution in the variables under test.

Table 5: Normal distribution test table for gender (Shapiro-Wilk)

	<i>W</i>	<i>p</i>
Utility	0.867	< 0.001
Usability	0.949	< 0.001
Satisfaction	0.905	< 0.001
Private Resources	0.953	< 0.001
Intention	0.907	< 0.001
Cooperation	0.833	< 0.001

According to the non-parametric Mann-Whitney U-test, the gender difference shows statistical significance only in terms of Intention.

Table 6: Mann-Whitney U test table with respect to gender

	<i>Statistic</i>	<i>p</i>
Utility	2147	0.839
Usability	2159	0.882
Satisfaction	2074	0.604

Private Resources	2005	0.411
Intention	1700	0.030
Cooperation	2030	0.471

According to the table below, men appear more willing (Mean=4.26 SD=0.556) than women (Mean=4.04 SD=0.710) to use video as a teaching tool.

Table 7: Table of gender groups' differentiation in relation to Intention

	<i>N</i>	<i>Mean</i>	<i>SD</i>
Male	43	4.26	0.556
Woman	102	4.04	0.710

In the table below it is observed that to $p < 0.05$ indicating that there is no normal distribution in the variables under test.

Table 8: Normal Distribution test table for Teaching Experience (Shapiro-Wilk)

	<i>W</i>	<i>p</i>
Utility	0.868	< 0.001
Usability	0.954	< 0.001
Satisfaction	0.916	< 0.001
Private Resources	0.961	< 0.001
Intention	0.921	< 0.001
Cooperation	0.852	< 0.001

According to the non-parametric Mann-Whitney U-test, the difference between having or not having teaching experience shows statistical significance in terms of Usability and Satisfaction.

Table 9: Mann-Whitney U test table in relation to Teaching Experience

		<i>Statistic</i>	<i>p</i>
Utility	Mann-Whitney U	2501	0.881
Usability	Mann-Whitney U	1905	0.011
Satisfaction	Mann-Whitney U	1711	< 0.001
Private Resources	Mann-Whitney U	2209	0.181
Intention	Mann-Whitney U	2419	0.630
Cooperation	Mann-Whitney U	2312	0.356

According to the table below, participants with no experience in education consider the video creation application more usable (Mean=3.85 SD=0.640) than their counterparts with experience (Mean=3.55 SD=0.646). Similarly again participants with no experience in education are more satisfied with the video creation application (Mean=3.81 SD=0.707) compared to their counterparts with experience (Mean=3.40 SD=0.771).

Table 10: Table of descriptive characteristics in relation to Previous Experience in education

	<i>Groups</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>
Usability	No Experience	86	3.85	0.640
	With Experience	59	3.55	0.646
Satisfaction	No Experience	86	3.81	0.707
	With Experience	59	3.40	0.771

The table below demonstrates that there are no statistically significant differences between the groups that make up the age variable since $p > 0.05$.

Table 11: Age group differentiation test table (Kruskal-Wallis)

	χ^2	<i>df</i>	<i>p</i>
Utility	2.518	3	0.472
Usability	2.239	3	0.524
Satisfaction	1.000	3	0.801
Private Resources	5.739	3	0.125
Intention	3.317	3	0.345
Cooperation	3.574	3	0.311

The table below demonstrates that there are no statistically significant differences between the participants' specialty groups since $p > 0.05$.

Table 12: Specialty differentiation test table (Kruskal-Wallis)

	χ^2	<i>df</i>	<i>p</i>
Utility	5.86	5	0.212
Usability	2.32	5	0.677
Satisfaction	4.91	5	0.296
Private Resources	4.90	5	0.297
Intention	2.90	5	0.575
Cooperation	1.12	5	0.891

According to the table below, most of the participants in the questionnaire were from the Sciences. This is followed by those from Health Sciences. There was parity in the number of the sample coming from Humanities and Social Sciences. Finally 10 of the participants were from other sciences.

Table 13: Frequencies of occurrence of specialities

<i>Specialty</i>	<i>N</i>	<i>Percentage %</i>
Humanities	20	13.8 %
Social Sciences	20	13.8 %
Sciences	48	33.1 %
Health Sciences	47	32.4 %
Other	10	6.9 %

In relation to the participants' familiarity with the video-making process prior to their participation in the ASPETE EPPAIK program, the Mean is low (Mean=2.29 SD=1.21). An even lower Mean is observed in the use of another creator's video creation as a teaching tool (Mean=1.68 SD=0.977). Similarly, the mean in the use of video creation of the teacher's own video (Mean=1.36 SD=0.663).

Table 14: Table of averages

	<i>Familiarity with video creation</i>	<i>Use of another creator's video</i>	<i>Use of video of the same</i>
Mean	2.29	1.68	1.36
SD	1.21	0.98	0.66

Most of the participants in the questionnaire (61.4%) state that they have watched another author's video with educational material related to their field of expertise.

Table 15: Frequency table Other Creator's Video Watching

<i>Watch another creator's video</i>	<i>Frequency</i>	<i>Percentage %</i>
No	56	38.6 %
Yes	89	61.4 %

Of those above who watched another creator's video, 57.9% indicate that they received help with their own efforts to create an educational video.

Table 16: Frequency table for accepting self-help video creation effort

<i>Accepting assistance with your own video Creation effort</i>	<i>Frequency</i>	<i>Percentage %</i>
No	61	42.1%
Yes	84	57,9%

In all cases of the main variables, the trend of the responses is clearly positive, with the majority of participants responding in a positive manner. This is evidenced by the mean's moving discretely above the Mean value 3 of the respective scale. However, it is crucial to record the participants' intention to use video when teaching their subject matter as a Means of activating their students. It is clear that collaboration is essential for the production of digital video files if a collective result is to be achieved.

6. Discussion

The present study conducted at the School of Pedagogical and Technological Education (ASPETE) provides valuable insights into the role of video training in teacher education. The study enrolled 145 students in the Educational Technology and Multimedia course, which included both theoretical and practical components. This comprehensive approach allowed students to engage deeply in the creation of educational videos from conceptualisation to scripting to production and evaluation. The study found that students intend to incorporate educational videos into their future teaching practices in large numbers. More broadly, this study will contribute to the ongoing story of digitization in education by providing preliminary evidence on how video-based learning (VBL) may influence teaching effectiveness and student engagement.

1. Theoretical Framework and Literature: This study is built on a solid theoretical foundation, drawing upon multimodal learning theory and cognitive models including Mayer Cognitive Theory of Multimedia Learning. They highlight that information must be delivered through different senses to reduce cognitive load and increase retention. It conforms to existing research, showing that students learn and are more engaged with

educational videos on difficult topics such as science and technology. It could go further into what this study contributes to our knowledge overall but also how it uses these theories within the teacher-training context.

2. The study results suggest that multimodal learning resources (e.g. videos) can have positive effects on student educational outcomes by addressing varying learning styles; The relation between interactivity features and cognitive load of video lectures highly depends on individual students, whereby some especially engaged with higher levels throughout the course might benefit from Continue Watching functions while others may not do so;} Possible question/the topic that could be discussed: How do the principles of cognitive load theory work in creating and employing educational videos. For example you could evaluate the ways in which different forms of video (e.g. motion graphics, demonstrations, interactive quizzes) add or remove cognitive load. Interestingly, videos have the potential to cross disciplinary boundaries and result in learning across different fields too which is in line with an all-round integrated education.

3. Teacher Training and TPACK Model: This has been taken as a vital part of the study with focus on teacher training for which Technological Pedagogical Content Knowledge (TPACK) model is brought into context. This finding reflects that, in order to integrate videos into their teaching activities effectively, future educators need a combination of appropriate tools and materials from video making skills as technical items, pedagogical understanding needed for educational processes or methods regarding how to teach using technologies. Once again, the conversation could delve into what it means to teach educators to be more well-rounded another domain. To what extent do our current teacher education programs prepare educators for this, and where are there gaps?

4. The methodology using a structured questionnaire and applying statistical analysis with Jamovi is strong meaning the reliability of student perceptions can be obtained. But the conversation would challenge how this view is more flawed than not. For example, what type of bias could self-reported data create? The fact that the data was not normally distributed and non-parametric tests were thus used in this study, casts uncertainty on how generalizable the results are. Investigating the long-term impact of VBL on teaching practices could be expanded in future works based upon alternative or complementary methodological lines (i.e. longitudinal research and/or qualitative inquiry), for example, to further explore more nuanced ways such processes unfold over time.

5. Gender and Experience-Based Differences: The study has interesting results in terms of gender and experience. More male participants and those without prior teaching experience were more interested in using videos as a tool for facilitating instruction. This would lead to the discussion on those implications at teacher education level. Why is there a difference in these numbers. Could it be attributed to things like previous familiarity with technology, or how confident people are? This perspective might allow for defining more inclusive training programs that are able both to improve and satisfy larger slices of the educators' population.

6. Educational Practice: The study suggests that future educators will likely use educational videos in their teaching practices, but this calls for teacher training programs to incorporate digital literacy and multimedia tools. This could be expanded in the further discussion to consider what this may imply for educational practices. How will VBL impact traditional teaching and classroom experiences, as well as learning outcomes? Furthermore, research on open educational resources (OER) to enhance equitable access to high-quality educational materials is warranted.

7. Conclusion

The findings of the study emphasized the necessity of providing comprehensive digital literacy and multimedia training in formal education and teacher training programs, with an emphasis on the creation of effective educational videos. The research also has lessons on one of the key features that defines how good an educational video is – and it shows, almost exactly to scale, the importance of collaboration in making educative videos more effective.

The paper concludes by recommending that teacher education programs incorporate video production and analysis into their training in order to prepare educators for the demands of contemporary digital classrooms. This addition of multimedia tools in teaching methodologies is believed to be crucial for keeping students engaged and meeting the variety fidelity needs within a contemporary digital-centric world.

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References

- Barton, G., & Ryan, M. (2014). Multimodal approaches to reflective teaching and assessment in higher education. *Higher Education Research & Development*, 33(3), 409-424.
- Chandler, P., & Sweller, J. (1991). Cognitive load theory and the format of instruction. *Cognition and instruction*, 8(4), 293-332.
- Guichon, N., & Cohen, C. (2016). Multimodality and CALL. In *The Routledge handbook of language learning and technology* (pp. 509-521). Routledge.
- Guo, P. J., Kim, J., & Rubin, R. (2014, March). How video production affects student engagement: An empirical study of MOOC videos. In *Proceedings of the first ACM conference on Learning@ scale conference* (pp. 41-50). <https://pubs.lib.umn.edu/index.php/mslt/article/download/758/763/1007>
- Ito, M., Gutiérrez, K., Livingstone, S., Penuel, B., Rhodes, J., Salen, K., ... & Watkins, S. C. (2013). *Connected learning: An agenda for research and design*. Digital Media and Learning Research Hub.
- Kanwar, Asha & Uvalić-Trumbić, Stamenka & Butcher, Neil. (2011). A Basic Guide to Open Educational Resources (OER).
- Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)?. *Contemporary issues in technology and teacher education*, 9(1), 60-70. https://www.learntechlib.org/p/29544/article_29544.pdf
- Kress, G. R., & Van Leeuwen, T. (2001). Multimodal discourse: The modes and media of contemporary communication. (*NoTitle*).
- Mayer, R. E. (2002). Multimedia learning. In *Psychology of learning and motivation* (Vol. 41, pp. 85-139). Academic Press.
- Mayer, R. E. (2003). The promise of multimedia learning: using the same instructional design methods across different media. *Learning and instruction*, 13(2), 125-139. [http://stc.huji.ac.il/thj/articles_tj/articles_english/Learning%20and%20Instruction%2013_2%20\(2003\)/The%20promise%20of%20multimedia%20learning%20using%20the%20same%20instructional%20design%20methods%20across.pdf](http://stc.huji.ac.il/thj/articles_tj/articles_english/Learning%20and%20Instruction%2013_2%20(2003)/The%20promise%20of%20multimedia%20learning%20using%20the%20same%20instructional%20design%20methods%20across.pdf)
- Sweller, J. (2010). Element interactivity and intrinsic, extraneous, and germane cognitive load. *Educational psychology review*, 22, 123-138.
- UNESCO. (2012). 2012 Paris OER Declaration. Statement made at the World Open Educational Resources (OER) Congress, UNESCO, Paris.
- UNESCO. (2002). *Forum on the impact of open courseware for higher education in developing countries: Final report*. Paris, France: UNESCO.
- United Nations Educational, Scientific, and Cultural Organization. (2002). Forum on the impact of open courseware for higher education in developing countries. *Final report*.
- Yousef, A. M. F., Chatti, M. A., & Schroeder, U. (2014). Video-based learning: A critical analysis of the research published in 2003-2013 and future visions. In *eLmL 2014, The Sixth International Conference on Mobile, Hybrid, and On-line Learning* (pp. 112-119). https://personales.upv.es/thinkmind/dl/conferences/elml/elml_2014/elml_2014_5_30_50050.pdf
- Zhang, D., Zhou, L., Briggs, R. O., & Nunamaker Jr, J. F. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. *Information & management*, 43(1), 15-27. <https://www.sciencedirect.com/science/article/abs/pii/S0378720605000170>