

## **AN OVERVIEW OF USING VIDEO IN EDUCATION**

**CIPRIAN IOAN CUCU** \*

**ABSTRACT:** *While video is a useful educational tool for some time, the COVID pandemic forced many institutions to suddenly switch to an online video-based ecosystem. This change brings important opportunities but poses serious challenges, if it is to be done right. The current article shows a systematic analysis of all the ways in which video may be used in education, highlighting benefits and limitations of various approaches and focusing on recommendations for learning institutions. As the pandemic will, eventually, come to an end, educational organizations should learn from non-formal initiatives (such as educational YouTube channels) and find ways to keep some of new tools and methods, to integrate them into their learning environment.*

**KEY WORDS:** *education, e-learning, online, video*

**JEL CLASSIFICATION:** *I21.*

### **1. INTRODUCTION**

Using video in education is by no means a new idea, going back even to WWII times, when filmstrips were used to train soldiers for specific combat situations. (Cruse, 2007). The digital (r)evolution is what has changed, the increase in availability of technologies such as computers and mobile devices, the ease of distribution over the Internet, the constant betterment of internet connections, that led to a real *anytime-anywhere* model of access to audio-video content.

For the scope of this article, we consider the term educational in a broad sense, to include all videos that may provide an audience with some new information on a specific topic, whether that information is related to philosophical or scientific concepts, to formal knowledge or skills (such as mathematics, economics etc), to specific practical abilities through tutorials, or to life skills (such as cooking, knitting etc).

Some categories are discussed and the impact of production on efficiency, and some limitations are presented as well.

---

\* Lecturer, Ph.D., "1 Decembrie 1918" University of Alba Iulia, Romania, [ccucu@uab.ro](mailto:ccucu@uab.ro)

## 2. LEARNING CONTEXT AND EDUCATIONAL VIDEOS

The first distinction that must be made regarding using video in education concerns the learning context: formal, non formal and informal educational contexts have an impact on decisions regarding the production and distribution of the videos.

As other researchers have stated, the distinction between formal, non formal and informal education is not always clear. “The boundaries between formal, non-formal and informal learning or education, or the relationships between them, can only be understood within particular contexts” (Colley, Hodkinson, Malcolm, 2002).

In the context of using video in education and for the scope of this paper, we consider *the intent* as being the deciding factor, more specifically if the video is produced considering the beliefs of the producers regarding learning intent (or lack of it) of the end users. There are three categories of videos:

**1) Traditional** - used mostly in formal, traditional education and produced for users that have a clear learning intent that is driven by external factors (professors, learning institutions that the user is enrolled in). Lecture recordings are an example, as are videos created especially for teaching specific skills or distributing specific knowledge (eg. teaching an algorithm, developing writing skills, teaching about human anatomy etc).

Emphasis is put more on the content of the video and less on production, since the educational process is monitored and directed.

**2) Standalone** - videos that would work on their own, with or without a human facilitator guiding the understanding around them. Such videos are produced for users that have a learning intent that is self driven, ie. persons who follow online courses (MOOCs) but are found in flipped classes as well.

Such videos are expected to contain more detailed explanations and video production favors “talking heads” and “free-hand sketching”, as shown for example by Guo et al. (2014).

Optimal video length is proposed to be under six minutes (Hazlett, 2013), though in practice they depend on the issues and can get up to 12 minutes long (UNSW Sydney - Learning to teach online).

Tutorials are a specific category; they usually consist in a screen recording accompanied by a voiceover and/or subtitles. They can be as short as one minute, or longer than 15 minutes, depending on the topic being presented.

**3) Edutainment** - videos created for informal contexts that mix education and entertainment. Target users don’t necessarily have a clear learning intent or clear learning objectives and learning is driven by a mixture of curiosity, self-image and entertainment. The videos in such cases will follow different production principles, usually focusing on making the video more entertaining. This is the case for science-popularization / philosophy channels on YouTube (eg. Veritasium, Kurzgesagt, School of Life and others).

Such videos have been shown (Visbal & Crawford, 2017) to be short - similar to standalone videos - and entertaining, often presenting a well defined dramaturgic structure. They tend to have intros and outros that are meant to build the brand (and following) for the channel. They are also somewhat complex in terms of production and

---

montage and centered around building a personal connection between the producer/host and the user, through storytelling.

### **3. USE CASES - HOW VIDEO IS BEING USED FOR EDUCATION**

Depending on the educational context, but also on the specifics of course or instructor preference, there are several ways in which videos can be used in education, ranging from basic screening of video clips during traditional courses to using video editing as an educational strategy.

#### **3.1. Full online courses based on live video meetings**

The COVID-19 pandemic forced most countries to close down schools and universities and move learning to an online environment, where live video plays an essential role. The move has been swift and intense, turning online video-based learning into a “panacea” (Dhawan, 2020).

This push has some benefits but some limitations as well, depending on various factors such as instructors’ technological abilities or the adaptability of institutions and will be discussed further in section 4.

#### **3.2. Course integration of video resources**

Even in traditional classrooms (frontal, lecture-style instruction), video clips are used to highlight important points, to support the instructor’s arguments or to provide details about complex mechanisms or processes that would otherwise be difficult to show.

Different types of videos may be used, depending on the subject of the class: general clips about relevant events (eg. historical) or persons (eg. writers, philosophers), specialized clips showing the inner workings of a system (eg. the combustion engine, the circulatory system) and so on.

This use case is even more present in blended-learning approaches, with most Learning Management Systems (LMS) supporting video embedding from various sources in the lessons.

#### **3.3. Classroom recording**

Recording lectures and providing them to students through online platforms has been an important trend for the last ten years, especially in higher education, some studies even showing they “are becoming standard in the adult education arena” (Gosper, Malfroy, and McKenzie 2013).

This practice has been shown to have different results, depending on factors such as institutional culture (ie. how the practice fits in universities’ processes and how it is communicated), subject/discipline or even the technical solution for dissemination.

For example, Witthaus and Robinson (2015) have shown that usage of recorded lecture varies in studies from 20% of students to 100% of students. They also show that

most students use lecture recordings to supplement their in-class study and not to replace it, that usage of recordings increases if they are “enriched” with other content or activities and that they work better (ie. are more used but at the same time support live attendance) if the classroom is “flipped” - if students are asked to view recordings before coming to class.

Studies have also shown that “full recordings” are less useful, since students who use the recordings usually look for specific content, rather than watch full recordings. More dynamic / adaptive recordings, for example recording only important parts of a lecture, splitting lectures into smaller modules or joining smaller cuts into summaries, have been found to be used more and with more positive effects. However, there are technical barriers to getting such adaptive content. (Germany, 2014)

### **3.4. Self-regulated education**

The development of the Massive Open Online Course (MOOC) has been an answer to the question of how to allow scalability of online courses while maintaining a good learning experience. Experimenting with short-format videos, various exercises, interactive videos (ie. videos that presented quizzes) and web 2.0 products such as wikis, allowed MOOCs to grow in popularity. Today, well-known platforms such as Coursera, edX, Khan Academy, udemy and others reach millions of users. (Hollands & Tirthali, 2014)

MOOCs are used in two major ways - in a non-formal context, allowing large numbers of users to self-regulate their learning ie. follow courses without guidance and at their own pace, or in flipped classes (ie. formal education based on blended learning).

Since their early days, such platforms have become more institutionalized and started considering financial sustainability models. Only a small number of platforms (eg. Khan) have remained completely free, most platforms offering some free courses but have various paid courses or “tracks” or require payment for certification of some sort. This is mostly driven by the increasing costs related to developing and maintaining platforms, from technology related costs to human resources costs that are no longer limited to the instructors themselves but to support personnel as well.

Hollands & Tirthali proposed, in their 2014 report, that MOOCs have three main goals - to improve access to education, build brand awareness for developing institutions and increase learner results.

### **3.5. Social media and “smart fun”**

Videos that “hide” education in entertainment are very popular on YouTube channels, touching on a wide array of topics, from philosophy to science or engineering, but the openness of the platform and the loose connection to education principles makes them bring particular limitations (described in the next section).

This type of video is rarely connected to a set of learning objectives, either external (from an instructor) or internal (self defined), but rather education is a side-effect of users being either attracted to the format and presenter(s) or being curious about specific insights provided by the videos (Rosenthal, 2017).

### **3.6. Webinars and debates**

Structured debates, organized with a physical audience but also transmitted live on various platforms have been getting attention as well over the last ten years. The debate between Bill Nye and Ken Ham of 2014 has reached over eight million views on YouTube and the Munk debate between Christofer Hitchens and Tony Blair has had important press coverage, with excerpts being still uploaded to different YouTube channels.

Online-only conversations and webinars have also been garnering a lot of attention - especially in the context of the COVID-19 pandemic. Both formal and non-formal education providers have had to adapt to the current situation, with reports indicating more than 1.2 billion students being affected. (Li & Lalani, 2020). The switch from in person to online learning included video calls and several platforms have been used, such as Google Meet (former Hangouts), Microsoft Teams or Zoom. Most platforms have had important increases to their user base (Kastrenakes, 2020) and an important part of that has been for educational purposes.

## **4. ONLINE VIDEO-BASED COURSES DURING COVID**

The spread of Covid-19 forced most countries to shift towards online learning almost overnight. This push has provided some opportunities, such as reducing generic resistance to change and reluctance towards technology and online learning or forcing institutions to update some of their systems and processes (Dhawan, 2020). However, the sudden and forced move towards online, video-based courses has shown several important challenges, most important of which concerning availability of resources, technological competence, learning design, instructor presence and assessment issues. (Rapanta et al., 2020).

Many countries suffer from what we may call “a digital divide” - not all students, sometimes not even all the instructors have access to the necessary tools, not only laptops/computers and Internet connection, but also high-quality webcams, microphones and headphones. (Carey, 2020).

The technological divide is furthered by an ability divide: not all the students or instructor have embraced working with technology at the level needed to efficiently learn or teach a full online course.

As we now know, moving towards online, video-based courses is not efficient if the process is “mechanic” and just moves all interactions from the classroom to Zoom or Teams meetings. Online courses should have a customized design, that “shifts the focus onto students as responsible for their own learning” (Rapanta et al., 2020) while requiring instructors to focus on fostering communication in student groups and switching to a continuous assessment model based on personalized feed-back.

Working in such a way, with self-regulation being the key is also directly dependent on social and cultural patterns, work and general ethics. Students can falsley claim their devices are not working, can easily trick attendance requirements (by connecting to courses but doing other activities in parallel) and cheat much easier, for example by searching online or communicating with colleagues on various platforms.

Unfortunately, not many institutions have been able to address these issues both because of time and money constraints but also because “Students and teachers across various universities have never really practiced e-learning [and] most of them are complacent and are stuck with traditional modes of teaching” (Dhawan, 2020).

The question that remains is if institutions are able to learn from this effort and integrate some of the new technologies and processes into a new hybrid learning environment, or if they will revert to the more traditional and to some extent more comfortable model.

## 5. RESULTS AND LIMITATIONS

When looking at the impact of using lecture recordings we get very different results, that point back to the importance of educational context, organizational culture and even societal norms.

One study in the UK (Hall, 2015) concluded that students have a positive perception about lecture recording (more control, easy to recover missed content).

Danielson (2014) showed that it’s not only a perception, but that - at least in the case of specific disciplines - students were able to have important learning benefits from using lecture recordings.

It may be worth mentioning that, although some studies show a correlation between using lecture recordings and students’ performance, it is still unclear if there is a direct causality and to what extent. There are also studies that indicate a negative effect of lecture recordings in education, especially when they are used as a substitute for live classes (Williams, Birch & Hancock, 2012; Johnston, Massa & Burne, 2013).

Thus, best results in formal education are obtained when video is used in a complementary manner, either to allow students who miss classes to get back on track, either to help students with review of some concepts and work best when they are split into shorter clips, each focused on one topic.

Nonformal video-based online education provides a good method to improve access to education, reaching a large audience. Several studies, such as Colvin et al. (2014) or Hollands & Tirthali (2015) have shown that MOOCs help improve educational outcomes. Other studies, such as Lebedev & Sharma (2019) or Olasina (2017), have shown that YouTube educational channels support self-reflection and in some cases facilitate improved performance.

However, research also shows various limitations. For example, MOOCs have obtained best results when integrated in hybrid education contexts and they seem to be useful especially for highly motivated, already educated individuals. Costs of setting up platforms and developing better produces videos are also constantly increasing, so the efficiency in terms of cost/benefit of such methods depends on their possibilities to reach a large audience.

The design of good MOOCs has particularities, that raise the complexity of such implementations. For example, considering asynchronous communication in terms of scale, designing a course with 100,000 students brings important challenges to the interface, so that communication doesn’t become chaotic (Hollands & Tirthali, 2014).

Engagement with educational YouTube channels is found to be lower than expected, with only a minority of comments (2% - 18%) engaging in meaningful discussion on some of the most popular science channels (Visbal & Crawford, 2017).

Another limitation of non-formal video-based learning channels is the issue of content quality, in the sense of considering whether the information promoted in videos is consistent with current scientific consensus, follows a correct methodology for proposing new ideas/theories or at least offers compelling arguments.

In some cases, it is easy to distinguish - for example, we will not consider “quality content”, a video that proposes the “flat earth” theory, or various other conspiracy theories, though they do have a public and claim they are *educating* people.

In other cases, the distinction may be less clear; consider the “Prager U” Youtube channel, that belongs to an NGO called “Prager University”. Though not a learning institution in any sense, they claim to “educate, influence and change minds” and present several testimonials from users who support the idea of learning from the channel. (PragerU, 2020). Looking into PragerU shows a trend that could grow to become dangerous - the intentional conflation of education and ideological propaganda. Prager uses the word university without any academic backing, while attacking the role of academia - “educating people so they could resist the “institutional indoctrination” found in schools (from Pre-K to University campuses)” (Tripodi, 2017); their goal is, as shown in several articles (Kelley, 2018; Bowles, 2020, Tripodi, 2017), ideological i.e. teaching people what to think (as opposed to “how”) so as to satisfy the interests of the proponents (as opposed to building autonomous thinking).

## 6. TRENDS AND RECOMMENDATIONS

Beside the need for investment in production quality and the growing attention to showmanship, which have proven to raise following for YouTube channels but have also influenced MOOCs (Visbal & Crawford, 2017), there are a few other good practices and trends worth mentioning.

Guo, Kim & Rubin (2014) also found that student engagement with video content depends on the style of the video, with best results being observed in “Kahn-style” videos, i.e. recordings where explanations are accompanied by the instructor drawing by hand on a digital tablet, followed by “taking heads” videos, i.e. recordings where the presentations on the topic are added in post-production after the instructor has been recorded explaining.

Another recommendation, that has been found to foster learning is adding interactive elements either directly to recordings or in the delivery platform, connected to the recordings. This was found to contribute to increased satisfaction in users (Ferriday, 2015) or course attainment (Moes & Young, 2013), though it also increases the complexity of creating and distributing the content.

Interactive multimedia does not yet dominate video-based learning, not even in formal learning contexts. The ecosystem is still mostly based on linear videos such as (sliced) lecture recordings, probably due to the imperfections of interactive technologies that don’t seem to integrate seamlessly in the video learning experience.

In the case of stand-alone educational videos, there is little room to implement interactive elements (feedback, audience responses etc), since YouTube doesn't offer such capabilities (Guo, Kim, and Rubin 2014). However, creators have successfully used various techniques to cover this lack of interactivity, for example by using socratic dialogue (Muller et al. 2007), engaging in the comments section or even doing connected videos where the creator asks a question in one video and provides an answer in the second one.

## 7. CONCLUSIONS

Video offers a wide array of methods to help foster student engagement, self-regulation and self-reflection and overall can contribute to better learning outcomes and efficient scaling of well designed online or hybrid courses.

While linear video still dominates the space, interactivity has been found to be extremely useful, either directly implemented in the video or the distribution platform, or used indirectly by the platform administrators, eg. using forums, comments, linking the contents in several videos or challenging users to contribute with responses.

However, the growing competition has led to the need for better designed course structures and more investments in pre- and post-production, which may deter some institutions from pursuing developing video-based platforms or even support large-scale implementation of using video as an educational tool

The COVID-19 pandemic has pushed most educational organizations to move online and, in some ways, has helped with embracing both technology in a general sense as well as video-based education in particular. However, as seen in research, some of these moves have been too linear, using the same course design and only switching to online platforms as a meeting space between students and instructors, which does not provide a path to the best outcomes.

Further efforts should be made by learning institutions to better integrate online platforms and video-based instruction into their natural processes and use this experience to switch to a true and well-structured hybrid approach, where live interaction is still the center of education, but online tools such as short, interactive videos help engage students outside the classroom and provide access to an efficient and complete knowledge base.

## REFERENCES:

- [1]. **Bowles, N.** (2020) *Right-Wing Views for Generation Z, Five Minutes at a Time*, New York Times, [Online], Available at <https://www.nytimes.com/2020/01/04/us/politics/dennis-prager-university.html>. [Accessed August 2021]
- [2]. **Carey, K.** (2020) *Everybody Ready for the Big Migration to Online College? Actually, No*, [Online], <https://www.nytimes.com/2020/03/13/upshot/coronavirus-online-college-classes-unprepared.html> [Accessed September 2021]
- [3]. **Colley, H.; Hodkinson, P.; Malcolm, J.** (2002) *Non-formal learning: mapping the conceptual terrain*, A Consultation Report, Leeds: University of Leeds Lifelong Learning Institute, [Online], [http://www.infed.org/archives/e-texts/colley\\_informal\\_learning.htm](http://www.infed.org/archives/e-texts/colley_informal_learning.htm) [Accessed August 2021]



- 
- [4]. **Cruse, E.** (2007) *Using Educational Video in the Classroom: Theory, Research and Practice Multimodal Learning Styles Dual-channel Learning Motivation and Affective Learning*, [Online], <https://www.safarimontage.com/pdfs/training/UsingEducationalVideoInTheClassroom.pdf> [Accessed September 2021]
- [5]. **Danielson, J., et al.** (2014) *Is the effectiveness of lecture capture related to teaching approach or content type?* *Computers and Education*, 72(2014), pp.121–131
- [6]. **Dhawan, S.** (2020) *Online Learning: A Panacea in the Time of COVID-19 Crisis*, *Journal of Educational Technology Systems*, 49(1), pp. 5–22, <https://doi.org/10.1177/0047239520934018>
- [7]. **Ferriday, R.** (2015) *Innovative Lecture Capture*, in *Proceedings of INTED2015 Conference 2nd-4th March 2015. Madrid*, pp. 0657–0661, Available at: <http://orca.cf.ac.uk/71716/>
- [8]. **Germany, L.** (2014) *Beyond lecture capture: What teaching staff want from web-based lecture technologies*, *Australasian Journal of Educational Technology*, 28(7), pp.1208–1220
- [9]. **Gosper, M.; Malfroy, J.; McKenzie, J.** (2013) *Students' experiences and expectations of technologies: An Australian study designed to inform planning and development decisions*, *Australasian Journal of Educational Technology*, 29(2)
- [10]. **Guo, P.J.; Kim, J.; Rubin, R.** (2014): *How video production affects student engagement: an empirical study of MOOC videos*, in *Proceedings of the first ACM conference on Learning @ scale conference (L@S '14)*, Association for Computing Machinery, New York, NY, USA, 41–50. DOI:<https://doi.org/10.1145/2556325.2566239>
- [11]. **Hazlett, C.** (2013) *Optimal Video Length for Student Engagement*, [Online], <https://blog.edx.org/optimal-video-length-student-engagement>, [Accessed September 2021]
- [12]. **Hollands F.M.; Tirthali D.** (2014) *MOOCs: Expectations and Reality. Center for Benefit-Cost Studies of Education*, Teachers College, Columbia University
- [13]. **Johnston, A.N.B.; Massa, H.; Burne, T.H.J.** (2013) *Digital lecture recording: A cautionary tale*, *Nurse Education in Practice*, 13, pp.40–47, [Online], <http://www.ncbi.nlm.nih.gov/pubmed/22889680>, [Accessed September 2021]
- [14]. **Kastrenakes, J.** (2020). *Zoom saw a huge increase in subscribers — and revenue — thanks to the pandemic*, [Online] <https://www.theverge.com/2020/6/2/21277006/zoom-q1-2021-earnings-coronavirus-pandemic-work-from-home> [Accessed September 2021]
- [15]. **Kelley, B.J.** (2018) *PragerU's Influence*, Southern Poverty Law Center: <https://www.splcenter.org/hatewatch/2018/06/07/prageru%E2%80%99s-influence>, [Accessed August 2021]
- [16]. **Li, C.; Lalani, F.** (2020) *The COVID-19 pandemic has changed education forever. This is how*, [Online] <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/> [Accessed September 2021]
- [17]. **Moes, S.; Young, C.** (2013) *Which types of lecture capture knowledge and instruction clips could improve the quality of learning outcomes?*, in *ICERI 2013*, Seville: International Conference of Education, Research and Innovation (ICERI)
- [18]. **PragerU** (2020) <https://www.prageru.com/about/> [Accessed September 2021]
- [19]. **Rapanta, C.; Botturi, L.; Goodyear, P.; Guàrdia, L.; Koole, M.** (2020) *Online University Teaching During and After the Covid-19 Crisis: Refocusing Teacher Presence and Learning Activity*. *Postdigit Sci Educ* 2, pp. 923–945, <https://doi.org/10.1007/s42438-020-00155-y>
- [20]. **Rosenthal, S.** (2017) *Motivations to seek science videos on YouTube: Free-choice learning in a connected society*, *International Journal of Science Education, Part B*, 8(1), pp. 22–39

- 
- [21]. **Tripodi F.** (2017) *Searching for Alternative Facts: Analyzing Scriptural Inference in Conservative News Practices*, Data & Society Research Institute, University of Virginia.
- [22]. **UNSW Sydney (The University of New South Wales)** *Learning to teach online*, Available on: <https://www.coursera.org/lecture/teach-online/what-are-different-approaches-to-using-videos-in-online-courses-and-which-are-aPqGk>
- [23]. **Visbal, J.L.; Crawford, L.** (2017) *Science Popularization Videos By Independent Youtube Creators And User's Appropriation Strategies: Qualitative Analysis Of User Comments*. Edulearn17 Conference, Barcelona, [Online] [https://www.researchgate.net/publication/318440264\\_Science\\_Popularization\\_Videos\\_by\\_Independent\\_YouTube\\_Creators\\_and\\_user's\\_Appropriation\\_Strategies\\_Qualitative\\_Analysis\\_of\\_user\\_comments](https://www.researchgate.net/publication/318440264_Science_Popularization_Videos_by_Independent_YouTube_Creators_and_user's_Appropriation_Strategies_Qualitative_Analysis_of_user_comments) [Accessed September 2021]
- [24]. **Williams, A.; Birch, E.; Hancock, P.** (2012) *The impact of online lecture recordings on student performance*. Australasian Journal of Educational Technology, 28(2), pp.199–213. Available at: <http://www.editlib.org/p/73264>
- [25]. **Witthaus, G.; Robinson, C.** (2015) *Lecture Capture Literature Review. A review of the literature from 2012 to 2015*, published by the Centre for Academic Practice, Loughborough University